shall transmit all questions received from members of the Committee to the appropriate witness and include the transmittal letter and the responses from the witnesses in the hearing record. After consultation with the ranking minority member, the chairman is authorized to close the hearing record no earlier than 120 days from the date the questions were transmitted to the appropriate witness.

RULE 4. VICE CHAIRMEN; PRESIDING MEMBER

The chairman shall designate a member of the majority party to serve as vice chairman of the Committee, and shall designate a majority member of each subcommittee to serve as vice chairman of each subcommittee. The vice chairman of the Committee or subcommittee, as the case may be, shall preside at any meeting or hearing during the temporary absence of the chairman. If the chairman and vice chairman of the Committee or subcommittee are not present at any meeting or hearing, the ranking member of the majority party who is present shall preside at the meeting or hearing.

RULE 5. OPEN PROCEEDINGS

Except as provided by the Rules of the House, each meeting and hearing of the Committee for the transaction of business, including the markup of legislation, and each hearing, shall be open to the public, including to radio, television, and still photography coverage, consistent with the provisions of Rule XI of the Rules of the House.

RULE 6. QUORUM

Testimony may be taken and evidence received at any hearing at which there are present not fewer than two members of the Committee in question. A majority of the members of the Committee shall constitute a quorum for those actions for which the House Rules require a majority quorum. For the purposes of taking any other action, one-third of the members of the Committee shall constitute a quorum.

RULE 7. OFFICIAL COMMITTEE RECORDS

(a)(1) Journal. The proceedings of the Committee shall be recorded in a journal which shall, among other things, show those present at each meeting, and include a record of the vote on any question on which a record vote is demanded and a description of the amendment, motion, order, or other proposition voted. A copy of the journal shall be furnished to the ranking minority member.

VW FOIA, EPA 06/20/2017 2017-FFP_029393

(2) Record Votes. A record vote may be demanded by one-fifth of the members present or, in the apparent absence of a quorum, by any one member. No demand for a record vote shall be made or obtained except for the purpose of procuring a record vote or in the apparent absence of a quorum. The result of each record vote in any meeting of the Committee shall be made publicly available in electronic form on the Committee's website and in the Committee office for inspection by the public, as provided in Rule XI, clause 2(e) of the Rules of the House, within 24 hours. Such result shall include a description of the amendment, motion, order, or other proposition, the name of each member voting for and each member voting against such amendment, motion, order, or proposition, and the names of those members of the committee present but not voting. The chairman, with the concurrence of the ranking minority member, may from time to time postpone record votes ordered on amendments to be held at a time certain during the consideration of legislation.

(b) Archived Records. The records of the Committee at the National Archives and Records Administration shall be made available for public use in accordance with Rule VII of the Rules of the House. The chairman shall notify the ranking minority member of any decision, pursuant to clause 3 (b)(3) or clause 4 (b) of the Rule, to withhold a record otherwise available, and the matter shall be presented to the Committee for a determination on the written request of any member of the Committee. The chairman shall consult with the ranking minority member on any communication from the Archivist of the United States or the Clerk of the House concerning the disposition of noncurrent records pursuant to clause 3(b) of the Rule.

RULE 8. SUBCOMMITTEES

(a) Establishment. There shall be such standing subcommittees with such jurisdiction and size as determined by the majority party caucus of the Committee. The jurisdiction, number, and size of the subcommittees shall be determined by the majority party caucus prior to the start of the process for establishing subcommittee chairmanships and assignments.

(b) Powers and Duties. Each subcommittee is authorized to meet, hold hearings, receive testimony, mark up legislation, and report to the Committee on all matters referred to it. Subcommittee chairmen shall set hearing and meeting dates only with the approval of the chairman of the Committee with a view toward assuring the availability of meeting rooms and avoiding simultaneous scheduling of

VW FOIA, EPA 06/20/2017 2017-FFP_029394

Committee and subcommittee meetings or hearings whenever possible.

(c) Ratio of Subcommittees. The majority caucus of the Committee shall determine an appropriate ratio of majority to minority party members for each subcommittee and the chairman shall negotiate that ratio with the minority party, provided that the ratio of party members on each subcommittee shall be no less favorable to the majority than that of the full Committee, nor shall such ratio provide for a majority of less than two majority members.

(d) Selection of Subcommittee Members. Prior to any organizational meeting held by the Committee, the majority and minority caucuses shall select their respective members of the standing subcommittees.

(e) Ex Officio Members. The chairman and ranking minority member of the Committee shall be ex officio members with voting privileges of each subcommittee of which they are not assigned as members and may be counted for purposes of establishing a quorum in such subcommittees.

RULE 9. OPENING STATEMENTS

(a) Written Statements. All written opening statements at hearings and business meetings conducted by the committee shall be made part of the permanent record.

(b) Length. (1) At full committee hearings, the chairman and ranking minority member shall be limited to 5 minutes each for an opening statement, and may designate another member to give an opening statement of not more than 5 minutes. At subcommittee hearings, the subcommittee chairman and ranking minority member of the subcommittee shall be limited to 5 minutes each for an opening statement. In addition, the full committee chairman and ranking minority member shall each be allocated 5 minutes for an opening statement for themselves or their designees.

(2) At any business meeting of the Committee, statements shall be limited to 5 minutes each for the chairman and ranking minority member (or their respective designee) of the Committee or subcommittee, as applicable, and 3 minutes each for all other members. The chairman may further limit opening statements for Members (including, at the discretion of the Chairman, the chairman and ranking minority member) to one minute.

VW FOIA, EPA 06/20/2017 2017-FFP_029395

RULE 10. REFERENCE OF LEGISLATION AND OTHER MATTERS

All legislation and other matters referred to the Committee shall be referred to the subcommittee of appropriate jurisdiction within two weeks of the date of receipt by the Committee unless action is taken by the full Committee within those two weeks, or by majority vote of the members of the Committee, consideration is to be by the full Committee. In the case of legislation or other matter within the jurisdiction of more than one subcommittee, the chairman of the Committee may, in his discretion, refer the matter simultaneously to two or more subcommittees for concurrent consideration, or may designate a subcommittee of primary jurisdiction and also refer the matter to one or more additional subcommittees for consideration in sequence (subject to appropriate time limitations), either on its initial referral or after the matter has been reported by the subcommittee of primary jurisdiction. Such authority shall include the authority to refer such legislation or matter to an ad hoc subcommittee appointed by the chairman, with the approval of the Committee, from the members of the subcommittees having legislative or oversight jurisdiction.

RULE 11. MANAGING LEGISLATION ON THE HOUSE FLOOR

The chairman, in his discretion, shall designate which member shall manage legislation reported by the Committee to the House.

RULE 12. COMMITTEE PROFESSIONAL AND CLERICAL STAFF APPOINTMENTS

(a) Delegation of Staff. Whenever the chairman of the Committee determines that any professional staff member appointed pursuant to the provisions of clause 9 of Rule X of the House of Representatives, who is assigned to such chairman and not to the ranking minority member, by reason of such professional staff member's expertise or qualifications will be of assistance to one or more subcommittees in carrying out their assigned responsibilities, he may delegate such member to such subcommittees for such purpose. A delegation of a member of the professional staff pursuant to this subsection shall be made after consultation with subcommittee chairmen and with the approval of the subcommittee chairman or chairmen involved.

(b) Minority Professional Staff. Professional staff members appointed pursuant to clause 9 of Rule X of the House of Representatives, who are assigned to the ranking minority member of the Committee and not to the chairman of the

VW FOIA, EPA 06/20/2017 2017-FFP_029396

Committee, shall be assigned to such Committee business as the minority party members of the Committee consider advisable.

(c) Additional Staff Appointments. In addition to the professional staff appointed pursuant to clause 9 of Rule X of the House of Representatives, the chairman of the Committee shall be entitled to make such appointments to the professional and clerical staff of the Committee as may be provided within the budget approved for such purposes by the Committee. Such appointee shall be assigned to such business of the full Committee as the chairman of the Committee considers advisable.

(d) Sufficient Staff. The chairman shall ensure that sufficient staff is made available to each subcommittee to carry out its responsibilities under the rules of the Committee.

(e) Fair Treatment of Minority Members in Appointment of Committee Staff. The chairman shall ensure that the minority members of the Committee are treated fairly in appointment of Committee staff.

(f) Contracts for Temporary or Intermittent Services. Any contract for the temporary services or intermittent service of individual consultants or organizations to make studies or advise the Committee or its subcommittees with respect to any matter within their jurisdiction shall be deemed to have been approved by a majority of the members of the Committee if approved by the chairman and ranking minority member of the Committee. Such approval shall not be deemed to have been given if at least one-third of the members of the Committee request in writing that the Committee formally act on such a contract, if the request is made within 10 days after the latest date on which such chairman or chairmen, and such ranking minority member or members, approve such contract.

VW FOIA, EPA 06/20/2017 2017-FFP_029397

RULE 13. SUPERVISION, DUTIES OF STAFF

(a) Supervision of Majority Staff. The professional and clerical staff of the Committee not assigned to the minority shall be under the supervision and direction of the chairman who, in consultation with the chairmen of the subcommittees, shall establish and assign the duties and responsibilities of such staff members and delegate such authority as he determines appropriate.

(b) Supervision of Minority Staff. The professional and clerical staff assigned to the minority shall be under the supervision and direction of the minority members of the Committee, who may delegate such authority as they determine appropriate.

RULE 14. COMMITTEE BUDGET

(a) Administration of Committee Budget. The chairman of the Committee, in consultation with the ranking minority member, shall for the 114th Congress attempt to ensure that the Committee receives necessary amounts for professional and clerical staff, travel, investigations, equipment and miscellaneous expenses of the Committee and the subcommittees, which shall be adequate to fully discharge the Committee's responsibilities for legislation and oversight.

(b) Monthly Expenditures Report. Committee members shall be furnished a copy of each monthly report, prepared by the chairman for the Committee on House Administration, which shows expenditures made during the reporting period and cumulative for the year by the Committee and subcommittees, anticipated expenditures for the projected Committee program, and detailed information on travel.

RULE 15. BROADCASTING OF COMMITTEE HEARINGS

Any meeting or hearing that is open to the public may be covered in whole or in part by radio or television or still photography, subject to the requirements of clause 4 of Rule XI of the Rules of the House. The coverage of any hearing or other proceeding of the Committee or any subcommittee thereof by television, radio, or still photography shall be under the direct supervision of the chairman of the Committee, the subcommittee chairman, or other member of the Committee presiding at such hearing or other proceeding and may be terminated by such member in accordance with the Rules of the House.

VW FOIA, EPA 06/20/2017 2017-FFP_029398

RULE 16. SUBPOENA POWER

The power to authorize and issue subpoenas is delegated to the Chair of the full Committee, as provided for under clause 2(m)(3)(A)(i) of Rule XI of the Rules of the House of Representatives. The Chair shall notify the ranking minority member prior to issuing any subpoena under such authority. To the extent practicable, the Chair shall consult with the ranking minority member at least 72 hours in advance of a subpoena being issued under such authority. The chairman shall report to the members of the Committee on the issuance of a subpoena as soon as practicable but in no event later than one week after issuance of such subpoena.

RULE 17. TRAVEL OF MEMBERS AND STAFF

(a) Approval of Travel. Consistent with the primary expense resolution and such additional expense resolutions as may have been approved, travel to be reimbursed from funds set aside for the Committee for any member or any staff member shall be paid only upon the prior authorization of the chairman. Travel may be authorized by the chairman for any member and any staff member in connection with the attendance of hearings conducted by the Committee or any subcommittee thereof and meetings, conferences, and investigations which involve activities or subject matter under the general jurisdiction of the Committee. Before such authorization is given there shall be submitted to the chairman in writing the following: (1) the purpose of the travel; (2) the dates during which the travel is to be made and the date or dates of the event for which the travel is being made; (3) the location of the event for which the travel is to be made; and (4) the names of members and staff seeking authorization.

(b) Approval of Travel by Minority Members and Staff. In the case of travel by minority party members and minority party professional staff for the purpose set out in (a), the prior approval, not only of the chairman but also of the ranking minority member, shall be required. Such prior authorization shall be given by the chairman only upon the representation by the ranking minority member in writing setting forth those items enumerated in (1), (2), (3), and (4) of paragraph (a).

RULE 18. WEBSITE

The chairman shall maintain an official Committee website for the purposes of furthering the Committee's legislative and oversight responsibilities, including communicating information about the Committee's activities to Committee members and other members of the House. The ranking minority member may

VW FOIA, EPA 06/20/2017 2017-FFP_029399

maintain an official website for the purpose of carrying out official responsibilities, including communicating information about the activities of the minority members of the Committee to Committee members and other members of the House.

RULE 19. CONFERENCES

The chairman of the Committee is directed to offer a motion under clause 1 of Rule XXII of the Rules of the House whenever the chairman considers it appropriate.

VW FOIA, EPA 06/20/2017 2017-FFP_029400

Committee on Energy and Commerce
U.S. House of Representatives

Witness Disclosure Requirement - "Truth in Testimony"
Required by House Rule XI, Clause 2(g)(5)

1. Your Name:		
2. Your Title:		
3. The Entity(ies) You are Representing:		
4. Are you testifying on behalf of the Federal, or a State or local government entity?	**Yes**	**No**
5. Please list any Federal grants or contracts, or contracts or payments originating with a foreign government, that you or the entity(ies) you represent have received on or after January 1, 2013. Only grants, contracts, or payments related to the subject matter of the hearing must be listed.		
6. Please attach your curriculum vitae to your completed disclosure form.		

Signature:_____ **Date:**_____

INSTRUCTIONS FOR COMPLETING THE TRUTH-IN-TESTIMONY DISCLOSURE FORM

In General. The attached form is intended to assist witnesses appearing before the Committee on Energy and Commerce in complying with Rule XI, clause 2(g)(5) of the Rules of the House of Representatives, which provides:

> (B) In the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include a curriculum vitae and a disclosure of any Federal grants or contracts, or contracts or payments originating with a foreign government, received during the current calendar year or either of the two previous calendar years by the witness or by an entity represented by the witness and related to the subject matter of the hearing. (C) The disclosure referred to in subdivision (B) shall include (i) the amount and source of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) related to the subject matter of the hearing; and (ii) the amount and country of origin of any payment or contract related to the subject matter of the hearing originating with a foreign government. (D) Such statements, with appropriate redactions to protect the privacy or security of the witness, shall be made publicly available in electronic form not later than one day after the witness appears.

Please complete the form in accordance with these directions.

1. ***Name, Title, Entity(ies) (Items 1-3 on the form).*** Please provide the name and title of the witness and the entity(ies) on whose behalf the witness is testifying.

2. ***Governmental Entity (Item 4).*** Please check the box indicating whether or not the witness is testifying on behalf of a government entity, such as a Federal department or agency, or a State or local department, agency, or jurisdiction. Trade or professional associations of public officials are not considered to be governmental organizations.

Grants and Contracts (Item 5). Please list any Federal grants or contracts, or contracts or payments originating with a foreign government, that you or the entity(ies) you represent have received on or after January 1, 2013. For each Federal grant (or subgrant thereof) or contract (or subcontract thereof) related to the subject matter of the hearing, please include the amount and source of each. For each payment or contract originating with a foreign government related to the subject matter of the hearing, please include the amount and country of origin of each. Only grants, contracts, or payments related to the subject matter of the hearing must be listed.

3. ***Curriculum Vitae (Item 6).*** Please attach your CV to your completed disclosure form.

4. ***Submission.*** Please sign and date the form in the appropriate place. Please submit this form with your written testimony. Please note that under the Committee's rules, copies of a written statement of your proposed testimony must be submitted before the commencement of the hearing. To the greatest extent practicable, please also provide a

copy in electronic format according to the Electronic Format Guidelines that accompany these instructions.

To: Snyder, Jim[Snyder.Jim@epa.gov]
Cc: Rodgers, William (EEO)[William.Rodgers@vw.com]; Allen, Gregory (EEO)[Gregory.Allen@vw.com]
From: Giles, Michael (EEO)
Sent: Tue 10/6/2015 6:21:24 PM
Subject: VW Group - MY16 Audi A3 e-tron updated application

Hello Jim,

I have submitted a correction to the application for the MY 2016 Audi A3 e-tron: Test Group GVGAV01.4V3B. I corrected the DF for Cold CO as well as evap standards in section 17. The changes are highlighted in yellow.

We also re-processed the CSI through Verify for the same corrections.

A new cert request was submitted. Please let us know if you have any questions during your review.

Thanks,

Mike

Michael Giles

Certification Engineer

Engineering & Environmental Office (EEO)

Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4229

Fax: 248 754 4207

mailto: Michael.Giles@VW.com

To: Grundler, Christopher[grundler.christopher@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]; Haman, Patricia[Haman.Patricia@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Rackoff, Jonathan[Rackoff.Jonathan@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Emmerson, Caroline[Emmerson.Caroline@epa.gov]
From: Levine, Carolyn
Sent: Tue 10/6/2015 6:58:45 PM
Subject: Cleared EPA testimony- October 8 Oversight hearing on VW Emissions Cheating Allegations
EPA testimony- HEC Oversight hearing -VW.docx

Hi all,

Attached is EPA's cleared testimony.

FYI, the "official" statement that I am submitting for EPA's website and to the Committee is visually slightly different to comply with standard font/formatting and adding "the" before EPA-- no substantive edits. I am only attaching the oral statement that you all reviewed and concurred on earlier so as not to confuse (because Chris won't have time to speak all the "the EPA's" in his 5 minutes!)

Thanks and let me know any Qs.

Carolyn Levine

Office of Congressional and Intergovernmental Relations

U.S. EPA

(202) 564-1859

levine.carolyn@epa.gov

Statement of
Christopher Grundler, Director
Office of Transportation and Air Quality
Office of Air and Radiation
and
Phillip Brooks, Director
Office of Civil Enforcement—Air Enforcement Division,
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
U.S. House of Representatives

October 8, 2015

Chairman Murphy, Ranking Member DeGette and other members of the Subcommittee, we appreciate the opportunity to testify on the matter of the Environmental Protection Agency's Notice of Violation issued to Volkswagen.

I am Chris Grundler, and I direct EPA's Office of Transportation and Air Quality, which is responsible for EPA's air pollution compliance program for all mobile vehicles, engines and equipment, including cars and trucks. I am joined today by my colleague Phil Brooks, Director of the Office of Civil Enforcement's Air Enforcement Division. EPA's Civil Enforcement program develops and prosecutes civil administrative and judicial cases.

On September 18, 2015, EPA sent a Notice of Violation (NOV) of the Clean Air Act to Volkswagen (Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc.) alleging that four-cylinder Volkswagen and Audi diesel cars sold in the U.S. from model years 2009 to 2015 include software that

VW FOIA, EPA 06/20/2017 2017-FFP_029407

circumvents EPA emissions standards. Volkswagen manufactured and installed software in the electronic control module of these vehicles that sensed when the vehicle was being tested for compliance with EPA emission standards. Put simply, these cars contain software that turns off or significantly reduces the effectiveness of emissions controls when driving normally, and turns them on when the car is undergoing an emission test.

Known as a "defeat device," this design feature results in the cars emitting up to 40 times the emissions that are allowed to ensure public health is protected. These devices contain a "switch" that senses whether the vehicle is being tested or not based on various inputs, including the position of the steering wheel, vehicle speed, the duration of the engine's operation, and barometric pressure. The NOV that EPA issued covers roughly 482,000 diesel cars.

All new cars sold in the United States must have an EPA-issued "certificate of conformity" demonstrating that the car meets applicable federal emission standards to control air pollution. By making and selling vehicles with defeat devices that allowed for higher levels of air emissions than were certified to EPA, VW violated multiple important Clean Air Act provisions. These violations are very serious. Not only because the illegal defeat device results in excess emissions many times the allowable standard, but also because after the high emissions were discovered, VW concealed the facts from EPA, the State of California, and from consumers.

These vehicles are emitting more nitrogen oxides, or "NOx," than regulations allow. NOx pollution contributes to ground-level ozone and

VW FOIA, EPA 06/20/2017 2017-FFP_029408

particulate matter. Exposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

* * *

EPA is in the midst of the ongoing investigation into VW's actions. We will be working closely with the U.S. Department of Justice throughout this investigation, and determinations regarding potential penalties and other remedies will be assessed as part of the investigation. However, at this point we are unable to provide further details of the investigation because the release of such information could jeopardize this ongoing enforcement investigation.

EPA will continue to work closely with the California Air Resources Board during the investigation. CARB led and contributed much of the effort to get us to this point – our agencies work closely together on the implementation and oversight of the vehicle emissions programs.

As part of the investigation, we intend to assess the scope of VW's liability under the Clean Air Act, and whether there are additional vehicles with defeat devices. We intend to assess the economic benefit to VW of noncompliance and pursue appropriate penalties, as well as assess the excess pollution from VW's violations and appropriate ways to mitigate that harm.

While our enforcement authority concerns air pollution, we are acutely aware of the impact of these Clean Air Act violations on consumers, and we

VW FOIA, EPA 06/20/2017 2017-FFP_029409

have provided frequently asked questions for consumers on our website, such as whether the cars are safe to drive and whether EPA is officially recalling the vehicles at this point.

* * *

On September 25th, my office sent a letter to all auto manufacturers notifying them that we are stepping up our testing activities in response to VW's alleged violations. Over the 40-plus year history of our program, we have continuously updated and adapted our approaches to compliance oversight as technologies and situations changed. We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations. It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for.

Again, we thank you for the opportunity to appear as witnesses at this hearing for the Subcommittee, and we welcome your questions.

VW FOIA, EPA 06/20/2017 2017-FFP_029410

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Tue 10/6/2015 7:14:54 PM
Subject: P.M. NEWSCAST: UAW issues FCA strike notice; contract extension ends Wed. | VW warns of pain | Mazda3 stop-sale order | Forester updated | Too high for a Tesla?

October 6, 2015

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VW: Painful time ahead »
Mazda3 stop-sale order »

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To: Giles, Michael (EEO)[michael.giles@vw.com]
From: Snyder, Jim
Sent: Tue 10/6/2015 7:24:02 PM
Subject: FW: Retest of Audi Hybrid Vehicle

Mike, I'm not sure this is stating it accurately but is there any special instructions to forward to the lab to prevent this from occurring again this week?

Jim

From: Bochenek, David
Sent: Tuesday, October 06, 2015 3:20 PM
To: Snyder, Jim; Spieth, John; Peralta, Maria; Cieslak, Jeffrey; Haynes, Ben; McBryde, Dan
Subject: Retest of Audi Hybrid Vehicle

Jim,

Last week the Audi hybrid vehicle was voided apparently due to a verbal instruction from the manufacturer that may or may not have not been clear. As you know we are retesting the vehicle this Thursday (prep on Wed). Please confirm with the manufacture if there are any special instructions and make sure they are in writing to prevent any confusion.

Thanks

Dave Bochenek

To: Snyder, Jim[Snyder.Jim@epa.gov]
Cc: Horton, Garett (VWGoA Imp)[garett.horton@volkswagen.de]; Rodgers, William (EEO)[William.Rodgers@vw.com]; Allen, Gregory (EEO)[Gregory.Allen@vw.com]
From: Giles, Michael (EEO)
Sent: Tue 10/6/2015 7:38:34 PM
Subject: RE: Retest of Audi Hybrid Vehicle

Hi Jim,

I just talked with Garett about this topic. We believe that complete and accurate instructions are in the book. To avoid confusion, I suggested that VW should refrain from any verbal instructions unless specifically asked. This is not to be unhelpful, but rather to a repeat of the voided test. We ask that the drivers read the book and let us know if they have any questions, if so of course we will provide clarification.

I hope this resolves any issues moving forward.

Regards,

Mike

From: Snyder, Jim [mailto:Snyder.Jim@epa.gov]
Sent: Tuesday, October 06, 2015 3:24 PM
To: Giles, Michael (EEO) <michael.giles@vw.com>
Subject: FW: Retest of Audi Hybrid Vehicle

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Thanks

Dave Bochenek

To: Allen, Gregory (EEO)[Gregory.Allen@vw.com]; Mazaitis, Vincent[mazaitis.vincent@epa.gov]
From: Snyder, Jim
Sent: Tue 10/6/2015 7:59:18 PM
Subject: RE: Audi A3 eTron Prep Wednesday

I haven't heard when the Etron is running but it is scheduled to prep. Wednesday and run Thursday. Dan Mc Bryde will be here Wednesday.

Jim

From: Allen, Gregory (EEO) [mailto:Gregory.Allen@vw.com]
Sent: Tuesday, October 06, 2015 1:38 PM
To: Mazaitis, Vincent
Cc: Snyder, Jim
Subject: RE: Audi A3 eTron Prep Wednesday

Thanks for the help Vince.

Bill Rodgers will be there from EEO tomorrow for the testing.

Our resident form Germany (Garrett Horton) will be there for the eTron, so please let me know when a schedule is available so I can forward the information.

Thanks again!

Regards,

Greg Allen

VWGoA EEO

(248)754-4209

From: Mazaitis, Vincent [mailto:mazaitis.vincent@epa.gov]
Sent: Tuesday, October 06, 2015 1:32 PM
To: Allen, Gregory (EEO) <Gregory.Allen@vw.com>
Cc: Snyder, Jim <Snyder.Jim@epa.gov>
Subject: RE: Audi A3 eTron Prep Wednesday

Hello Greg,

The Passat is prepping today and testing tomorrow. It is scheduled for 7:00 a.m.

The schedule for the A3e-tron is still pending. Jim is working on it.

Thanks,

Vince Mazaitis

From: Allen, Gregory (EEO) [mailto:Gregory.Allen@vw.com]
Sent: Tuesday, October 06, 2015 10:44 AM
To: Mazaitis, Vincent
Subject: Audi A3 eTron Prep Wednesday

Hello Vince,

As you are probably aware – tomorrow is a busy day for VW at EPA (we have the Passat TDI running it's emissions tests, and also the prep run for the Audi A3 e-Tron).

Do we know when these tests will take place?

We are assuming for the TDI to be there at 7 a.m (unless we hear different), but our resident engineer for the A3 eTron was asking if we know what time the prep was going to run tomorrow. Any idea?

I know Arlene is gone, so I'm thinking we will just plan for 7 a.m in both cases.

Thanks Vince.

Regards,

Greg Allen

VWGoA EEO

(248)754-4209

To: Giles, Michael (EEO)[michael.giles@vw.com]
Cc: Rodgers, William (EEO)[William.Rodgers@vw.com]; Allen, Gregory (EEO)[Gregory.Allen@vw.com]
From: Snyder, Jim
Sent: Tue 10/6/2015 8:07:51 PM
Subject: RE: VW Group - MY16 Audi A3 e-tron updated application

I'll give it a quick look but 4 other cert requests came in this week before it. On another point, I've heard back from the lab about the CD data format. I think there is an output that we can get you when Dan gets back.

Also, I have Friday and Monday off (Columbus day).

-Jim

From: Giles, Michael (EEO) [mailto:michael.giles@vw.com]
Sent: Tuesday, October 06, 2015 2:21 PM
To: Snyder, Jim
Cc: Rodgers, William (EEO); Allen, Gregory (EEO)
Subject: VW Group - MY16 Audi A3 e-tron updated application

Hello Jim,

I have submitted a correction to the application for the MY 2016 Audi A3 e-tron: Test Group GVGAV01.4V3B. I corrected the DF for Cold CO as well as evap standards in section 17. The changes are highlighted in yellow.

We also re-processed the CSI through Verify for the same corrections.

A new cert request was submitted. Please let us know if you have any questions during your review.

Thanks,

Mike

Michael Giles

Certification Engineer

Engineering & Environmental Office (EEO)

Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4229

Fax: 248 754 4207

mailto: Michael.Giles@VW.com

To: Allen, Gregory (EEO)[Gregory.Allen@vw.com]
From: Snyder, Jim
Sent: Tue 10/6/2015 8:22:11 PM
Subject: RE: Audi A3 eTron Prep Wednesday

No I don't since Dan's not here today. I suspect it might be first thing though since I don't think anything else is scheduled in Cell 6 tomorrow.

From: Allen, Gregory (EEO) [mailto:Gregory.Allen@vw.com]
Sent: Tuesday, October 06, 2015 4:10 PM
To: Snyder, Jim; Mazaitis, Vincent
Subject: RE: Audi A3 eTron Prep Wednesday

Hello Jim,

Do you happen to know a time that the prep will start? Or should we just plan on 7 a.m.?

Regards,

Greg Allen

VWGoA EEO

(248)754-4209

From: Snyder, Jim [mailto:Snyder.Jim@epa.gov]
Sent: Tuesday, October 06, 2015 3:59 PM
To: Allen, Gregory (EEO) <Gregory.Allen@vw.com>; Mazaitis, Vincent <mazaitis.vincent@epa.gov>
Subject: RE: Audi A3 eTron Prep Wednesday

I haven't heard when the Etron is running but it is scheduled to prep. Wednesday and run

Thursday. Dan Mc Bryde will be here Wednesday.

Jim

From: Allen, Gregory (EEO) [mailto:Gregory.Allen@vw.com]
Sent: Tuesday, October 06, 2015 1:38 PM
To: Mazaitis, Vincent
Cc: Snyder, Jim
Subject: RE: Audi A3 eTron Prep Wednesday

Thanks for the help Vince.

Bill Rodgers will be there from EEO tomorrow for the testing.

Our resident form Germany (Garrett Horton) will be there for the eTron, so please let me know when a schedule is available so I can forward the information.

Thanks again!

Regards,

Greg Allen

VWGoA EEO

(248)754-4209

From: Mazaitis, Vincent [mailto:mazaitis.vincent@epa.gov]
Sent: Tuesday, October 06, 2015 1:32 PM
To: Allen, Gregory (EEO) <Gregory.Allen@vw.com>

Cc: Snyder, Jim <Snyder.Jim@epa.gov>
Subject: RE: Audi A3 eTron Prep Wednesday

Hello Greg,

The Passat is prepping today and testing tomorrow. It is scheduled for 7:00 a.m.

The schedule for the A3e-tron is still pending. Jim is working on it.

Thanks,

Vince Mazaitis

From: Allen, Gregory (EEO) [mailto:Gregory.Allen@vw.com]
Sent: Tuesday, October 06, 2015 10:44 AM
To: Mazaitis, Vincent
Subject: Audi A3 eTron Prep Wednesday

Hello Vince,

As you are probably aware – tomorrow is a busy day for VW at EPA (we have the Passat TDI running it's emissions tests, and also the prep run for the Audi A3 e-Tron).

Do we know when these tests will take place?

We are assuming for the TDI to be there at 7 a.m (unless we hear different), but our resident engineer for the A3 eTron was asking if we know what time the prep was going to run tomorrow. Any idea?

I know Arlene is gone, so I'm thinking we will just plan for 7 a.m in both cases.

Thanks Vince.

Regards,

Greg Allen

VWGoA EEO

(248)754-4209

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Tue 10/6/2015 8:31:54 PM
Subject: DAILY: Pressure grows on VW | UAW threatens strike at FCA | Toyota unveils new self-driving safety tech | BMW quits car-sharing program in S.F. | GM flexes engineering prowess | VW stops the music

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BMW car-sharing program quits San Francisco

By RICHARD TRUETT

DriveNow, the car-sharing program owned by BMW that allows drivers to rent electric cars by the minute, is pulling out of San Francisco, the only U.S. city in which it operates, the company said Monday.

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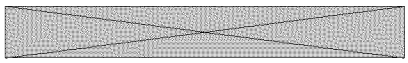

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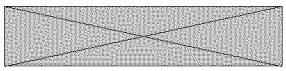

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Cc: Robert Ian[rian@sensorcommtech.com]
To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Kamil Agi
Sent: Tue 10/6/2015 8:32:02 PM
Subject: Smart NOx emissions monitoring - Volkswagen...

Director Grundler,
My name is Kamil Agi and I am the CEO of a company called SensorComm Technologies. I would like to draw you attention to a low-cost smart emissions monitoring system (IoT-based monitoring at the tailpipe of a vehicle) that we have developed. This is built on a NOx sensor technology that we have commercialized (based on Ohio State Univ and University of Florida technology) that is capable of measuring NOx at the sub-ppm level. With this type of monitoring capability installed, there wouldn't be a need for Volkswagen to game the system. Here is a link to our most recent news release.

http://www.sensorcommtech.com/iot-smart-emissions-monitoring-part-of-volkswagen-solution/

If you have any questions, please do not hesitate to contact me. Hope you find this information useful.

Good luck on Thursday...

With my best,

Kamil Agi
President-CEO
SensorComm Technologies, Inc.

****

Kamil Agi, Ph.D.
SensorComm Technologies, LLC
2350 Alamo Ave, Suite 301
Albuquerque, NM 87106
Phone (415) 857-0847
URL http://www.sensorcommtech.com
****

To: Wehrly, Linc[wehrly.linc@epa.gov]
From: Automotive News
Sent: Tue 10/6/2015 8:32:14 PM
Subject: DAILY: Pressure grows on VW | UAW threatens strike at FCA | Toyota unveils new self-driving safety tech | BMW quits car-sharing program in S.F. | GM flexes engineering prowess | VW stops the music

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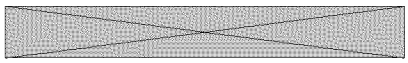

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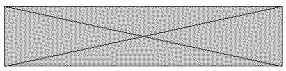

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To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: EnergyGuardian
Sent: Tue 10/6/2015 9:25:04 PM
Subject: Moniz, Murkowski pan efforts to treat oil reserve as 'cash machine'

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Energy and environment headlines for the afternoon of Tuesday, October 6, 2015

Moniz, Murkowski pan efforts to treat oil reserve as 'cash machine'

By Kevin Rogers

Senate Energy and Natural Resources Chairman Sen. Lisa Murkowski and Energy Secretary Ernest Moniz made common cause Tuesday in opposing congressional efforts to sell some of the Strategic Petroleum Reserve to raise cash, saying the SPR should be treated as "our nation's most central federal energy security asset" and not "a cash machine."

At a hearing on potential modernizations for the reserve, which holds 694 million barrels of

crude oil, Murkowski, R-Alaska, criticized both a Senate effort to sell off 101 million barrels of oil to fund new highway projects and a House bill to sell 68 million barrels to fund medical research.

Murkowski, who wants to expand the size of the reserve, said those bills would undermine a "strategic asset" to acquire short-term funding.

"We are looking at this as nothing more than a cash machine at a time when we're looking for more money," she said. "I think this is wrong. I think this is irresponsible. We don't know what may come next, but we know that if we drained it out and we don't have the flexibility to move when we need it, then there's going to be a lot of fingers pointing, saying 'where did it go?'"

"It's our nation's most central federal energy security asset, and it should be treated as such," Moniz told the hearing. "Some have concluded that selling large volumes of oil from the SPR for purposes not related to energy security will have no impacts on its energy security benefits, and I do not subscribe to those views."

Sen. John Hoeven, R-N.D., said the reserve would be less critical if crude exports were allowed, since exports would increase domestic production and supplies.

"Isn't it very important that we lift the oil export ban in order to reduce our dependence on the SPR?" he asked. "If we want our domestic industry to continue to expand and grow, we need to lift the ban on oil exports. With a more robust oil industry, we're less dependent on the SPR."

Moniz argued that even if lifting the ban did increase domestic production, the U.S. would remain subject to price spikes and supply interruptions.

"Even if we are producing a few hundred thousand barrels a day more, that in no way changes our linkage to the global oil price and our exposure to a price spike," he said. "That's really the modern issue in what SPR does for us."

Moniz said any decision on reducing the size of the reserve should wait until the Energy Department completes its congressionally-requested assessment of the proper size and function of the SPR. He said that review would be completed by May.

The Energy Department conducted a test sale of crude from the SPR last year, which identified deficiencies in both oil drawdown and distribution. Moniz said that the SPR will require up to $2 billion in total investment to modernize its infrastructure, noting the department would be able to better itemize those costs once its analysis is finished.

He also urged Congress to approve a $229.7 million budget request to pay for maintenance that has been put off for lack of funding. The House and Senate Energy appropriations bills allocate $88.8 million and $68.6 million, respectively.

"Unfortunately, the House and Senate appropriations bills' marks, if enacted, would not support that," he said. "Indeed, we might be going in the wrong direction in terms of increased deferred maintenance."

Murkowski said the investments Moniz proposed "merit careful consideration."

Sen. Elizabeth Warren, D-Mass., joined Murkoswki and Moniz in arguing against using the reserve to raise cash. She said the low price of crude oil, coupled with the current inefficiencies of the SPR, would make the proposed withdrawals a loss for taxpayers. She said that the government's bills should be financed through updates to the tax system instead.

"Mandating a massive, inefficient and inflexible selloff of the Strategic Petroleum Reserve years in advance is just one more bad idea for how to finance government," she said. "Oil prices are at strategic lows. This is a high-cost gimmick to let some people avoid facing the fact that loopholes for billionaires and giant corporations are leaving us with too little money to keep our highways in working order and to fund essential services like medical research."

Representatives for the House Energy and Commerce Committee, which advanced the medical research bill, didn't offer comment on remarks made at the hearing.

However, when it first proposed using SPR sales to fund medical research, the committee said the reserve is unwieldy, and "modestly reducing the volume of the SPR would create some breathing room for DOE to more efficiently and effectively manage the SPR without jeopardizing energy security."

A spokesperson for Senate Environment and Public Works Chairman Sen. James Inhofe, R-Okla., who led the Senate highway funding effort, did not offer news comment. Inhofe has said he believes the reserve is too large at present.

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Keystone XL developer seeks different approval for route

By Grant Schulte

LINCOLN, Neb. (AP) — The Canadian company that wants to build the Keystone XL pipeline is taking steps to circumvent one of the major roadblocks in Nebraska.

But in seeking approval Monday for the same contentious route through the state, TransCanada could create another round of lengthy delays in an already drawn-out process.

It also indicates a new push for the $8 billion Canada-to-Texas oil pipeline in a state where opponents have repeatedly thwarted efforts to build the project. President Barack Obama has indicated that he may reject a federal permit for the project, as he did in 2012 when he accused congressional Republicans of setting an arbitrary deadline.

Former Gov. Dave Heineman approved the Nebraska route in 2013 under a state law that allowed TransCanada to use eminent domain against holdout landowners, but opponents sued and the project has been mired in state courts ever since.

More

Disaster plan in case fire reaches nuke waste near St. Louis

By Jim Salter

ST. LOUIS (AP) — Beneath the surface of a St. Louis-area landfill lurk two things that should never meet: a slow-burning fire and a cache of Cold War-era nuclear waste, separated by no more than 1,200 feet.

Government officials have quietly adopted an emergency plan in case the smoldering embers ever reach the waste, a potentially "catastrophic event" that could send up a plume of radioactive smoke over a densely populated area near the city's main airport.

Although the fire at Bridgeton Landfill has been burning since at least 2010, the plan for a worst-case scenario was developed only a year ago and never publicized until this week, when St. Louis radio station KMOX first obtained a copy.

County Executive Steve Stenger cautioned that the plan "is not an indication of any imminent danger."

More

VW, with limited DC lobbying footprint, braces for Congress

By Ronnie Greene and Michael Biesecker

WASHINGTON (AP) — When Volkswagen's top American executive heads to Capitol Hill this week, he probably won't be able to count on longtime allies among the lawmakers investigating the company's emissions cheating scandal.

The world's No. 1 automaker has a modest political footprint in Washington, and that will put Volkswagen Group of America President and CEO Michael Horn at a disadvantage Thursday when he appears before the House Subcommittee on Oversight and Investigations. It will be Horn's first time testifying before Congress.

The panel's chairman, Rep. Tim Murphy, R-Pa., said lawmakers will investigate Volkswagen's admission that it installed "defeat-devices" in some diesel vehicles that emitted far more exhaust pollution than was legal. "The American people want to know why these devices were in place, how the decision was made to install them and how they went undetected for so long," Murphy said in a statement. "We will get them those answers."

Campaign finance records show only a few thousand dollars in federal campaign donations by Volkswagen's top executives during the most recent election cycle — a figure dwarfed by the political giving of its top global competitors.

More

EIA forecast calls for lower heating bills this winter

By David Sharp

PORTLAND, Maine (AP) — Some U.S. households can expect to save hundreds of dollars this winter with a drop in heating bills, thanks to a combination of lower energy prices and warmer weather across most of the country, the U.S. Energy Department predicted Tuesday.

The department's annual outlook calls for lower heating bills, with the biggest savings for those who use propane or oil to heat their homes. The government predicts a 25 percent drop for homes using heating oil and an 18 percent drop for homes using propane, compared to last winter.

The outlook is based on a National Oceanic and Atmospheric Administration forecast that calls for warmer weather across all regions except the West, which is expected to be slightly cooler.

People using natural gas and electricity for heat also can expect to see a savings this winter. Heating bills for homes using electricity should drop about 3 percent and natural gas about 10 percent, the Energy Department said.

More

Freeport-McMoRan considers exiting oil and gas business

By The Associated Press

NEW YORK (AP) — Freeport-McMoRan said Tuesday that it is considering spinning off its oil and gas business and other strategic alternative to focus on its copper mining business.

The Phoenix company produces oil and natural gas around the country. Energy companies have been hurt by falling oil prices and weaker demand. Many have cut spending as a result. Earlier this year, Freeport-McMoRan slashed its quarterly dividend 84 percent because of falling oil prices. And in August, Freeport-McMoRan announced a cost-cutting plan due to falling copper prices and soft economic conditions. That same month, activist investor Carl Icahn disclosed that he bought an 8.5 percent stake in the company and planned to discuss possible cuts in the company's operations.

Besides a spinoff, Freeport-McMoRan said it is also considering joint venture arrangements or cutting spending in the oil and gas business.

The company also shook up its board of directors, cutting its size to nine members from 16.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

North Dakota taxable sales drop 16 percent in second quarter

By Blake Nicholson

BISMARCK, N.D. (AP) — North Dakota's taxable sales and purchases dropped more than 16 percent during April, May and June compared to the same quarter a year ago because of a decline in activity in the western oil patch.

It is only the second such quarterly decline since 2009, but officials say they're not surprised nor too concerned given the tremendous growth in taxable sales and purchases the state has experienced in recent years.

"Hopefully this is just a short-term situation," said Mike Rud, president of the North Dakota Retail Association. "We weren't going to keep running at levels we were running at anyway."

The state recorded $5.9 billion in taxable sales and purchases during the second quarter, compared to about $7 billion in the second quarter of 2014, state Tax Commissioner Ryan

Rauschenberger said Tuesday. Six of the 15 major industry sectors had gains, but the mining and oil extraction sector was down more than 31.4 percent.

More

US trade deficit widens to $48.3 billion in August

By Martin Crutsinger

WASHINGTON (AP) — The U.S. trade deficit jumped sharply in August as exports fell to the lowest level in nearly three years while imports increased, led by a surge in shipments of cellphones from China.

The deficit increased 15.6 percent to $48.3 billion, the biggest deficit since March, the Commerce Department reported Tuesday. Exports of goods and services dropped 2 percent to $185.1 billion, the lowest level since October 2012. Imports rose 1.2 percent to $233.4 billion.

The drop in exports reflected lower sales of manufactured goods such as computers, industrial machinery and autos. Shipments of U.S. energy products also fell 9.3 percent to $8.1 billion, reflecting the slump in oil prices.

Exports have been hurt this year by the rising value of the dollar, which makes U.S. goods less competitive on overseas markets, and weaker economic growth in China and other major export markets. Economists say they expect these trends will combine to push the deficit higher and make trade a drag on overall growth this year.

More

Korean energy economist to head UN climate science panel

By Seth Borenstein

WASHINGTON (AP) — A South Korean professor of climate change economics will lead the Nobel Prize-winning group of climate scientists that keeps track of global warming.

The United Nations-affiliated Intergovernmental Panel on Climate Change announced Tuesday it had elected Hoesung Lee, one of its vice chairmen, to its top post.

Lee is president of the government affiliated Korea Energy Economics Institute and past dean of the College of Environment at Keimyung University.

Each country is allowed one vote for climate panel leader. Lee pledged to work more closely

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with business and industry and pay special attention to job creation, health, poverty reduction and technology development.

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S.C. assessing damage after historic floods

By The Associated Press

COLUMBIA, S.C. (AP) — South Carolina Gov. Nikki Haley says she doesn't have a dollar amount yet for the damage done by the historic rains and flooding in the state.

Haley said Tuesday that officials are still assessing the damage and trying to get roads and bridges repaired. "We're not going to stop until we need everything we need to get back up and running and fixed again," she added.

Haley warned that there could still be some evacuations along some coastal areas of the state over the next 48 hours. The governor also said more than 800 people were staying in shelters as of midday Tuesday.

Authorities, meanwhile, have released the name of a 15th person killed in flooding in South Carolina, bringing the death toll to 17 in two states.

More

Nigeria Senate names 20 nominees for president's new Cabinet

By Michelle Faul

LAGOS, Nigeria (AP) — Nigeria's Senate announced 20 nominees for the Cabinet of President Muhammadu Buhari on Tuesday, representing all regions of this West African nation but only three women in a team expected to fight endemic corruption.

Buhari has said he will hold the most powerful portfolio of petroleum in Africa's biggest oil producer.

Among the candidates is the recently appointed head of the Nigerian National Petroleum Corp., Harvard-educated Ibe Kachikwu. Kachikwu has 30 years' experience in Nigeria's private oil sector and is touted to be minister of state running the petroleum ministry with Buhari's oversight.

One of Buhari's first acts was to fire the top echelon of the state oil industry, from which $20 billion allegedly has been looted.

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Correction to AP story about marine sanctuaries

VALPARAISO, Chile (AP) — In a story published Oct. 5 by EnergyGuardian about the United States and Chile setting up new marine sanctuaries, The Associated Press incorrectly quoted Secretary of State John Kerry as saying, "There is literally too much money chasing too much fish." What Kerry said was, "There is literally too much money chasing too few fish."

A corrected version of the story appears here

Correction to AP story about ship ballast and invasive species

TRAVERSE CITY, Mich. (AP) — In a story published on EnergyGuardian the morning of Tuesday, Oct. 6 about a federal appeals court ordering the government to rewrite regulations on ballast water discharges from ships, The Associated Press erroneously reported the name of an environmental group that challenged the rules. It is the Natural Resources Defense Council, not the National Resources Defense Council.

A corrected version of the story appears here.

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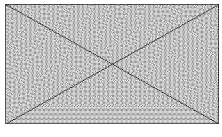


Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

Click here to read the brief

Pebble Mine foes got special treatment from EPA: Report

A report commissioned by the Pebble Partnership—conducted fully independently, according to its author, former Defense Secretary William Cohen—says the Environmental Protection Agency did not use the "fairest and most appropriate process" when it ruled against the proposed mining project in Alaska, The Hill reports.

More

Shrinking production will restore oil prices, says OPEC chief

OPEC's Secretary-General told a London conference Tuesday that investments in oil projects will fall by $130 billion this year, which will mean less production in the future and a return to higher crude prices within two years, The Wall Street Journal reports.

More

Oil rockets on OPEC predictions, Brent busts $50

A projection from OPEC's Secretary General of substantial spending cuts by oil producers around the world sent prices soaring Tuesday. West Texas Intermediate crude for November delivery jumped $2.27, or 4.9 percent, to $48.53 a barrel on the Nymex, while in London, Brent zoomed $2.67, or 5.4 percent, higher to $51.92, Marketwatch reports.

More

Hedges shrinking for North American oil drillers: IHS

IHS Energy says companies drilling for oil in North America will have much less protection against lower prices in the future: their moves to hedge production in 2016 cover only 11 percent of their production, FuelFix reports.

More

Republican Moeller to leave FERC in October

Republican Federal Energy Regulatory Commission member Philip Moeller said Tuesday he will leave his post at the end of the month after serving two terms, The Hill reports.

More

Laureate notes links between his Nobel work and fusion

Arthur McDonald, who, alongside Takaaki Kajita, won the Nobel prize for physics Tuesday for his work with neutrinos, says the processes his team observed on the Sun "are very similar to the processes people are investigating on Earth to develop nuclear fusion reactors," The Financial Times reports.

More

15 percent of workforce to go at SunEdison

Spending cuts at SunEdison will see 15 percent of the company's employees go, amounting to around 1,000 jobs, The Wall Street Journal reports.

More

ValueAct has designs on Baker Hughes

ValueAct Capital Management—an activist investor known for aggressively pushing management to boost shareholder value—said in a regulatory filing that it intends to bring a number of issues up with the management and board of oil field services company Baker Hughes, FuelFix reports.

More

New NV plant would cost customers money: Study

A study by two economists for the Nevada Policy Research Institute found that NV Energy's proposed new natural gas-fired plant would cost customers money and be a drag on the state's economy, the Las Vegas Review-Journal reports.

More

Brown researchers testing new hydropower device

The prototype Water Wing—a generating device with paddles that's being tested by Brown University researchers in moving water—has the potential to produce a kilowatt of energy, NPR reports.

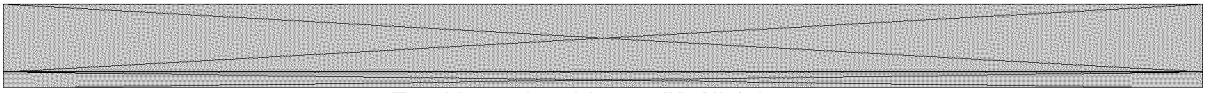
More

Upcoming Events

- Oct. 6, Washington: The Senate Energy and Natural Resources Committee to hold a hearing on updates to the Strategic Petroleum Reserve and other energy security issues. Energy Secretary Ernest Moniz to testify. 10:30 am , 366 Dirksen.
- Oct. 6, Washington: Energy Information Administration Deputy Administrator Howard Gruenspecht to unveil and discuss the agency's Winter Fuels Outlook at an event hosted by the National Association of State Energy Officials. 9:15 am , National Press Club.
- Oct. 6, Arlington, Va.: Energy Secretary Ernest Moniz to give the keynote speech at the Minorities in Energy Initiative forum. 9:00 am , 2121 Crystal City Dr., Arlington VA, 22202.
- Oct. 6, Washington: The North American Gas Forum wraps up with Rep. Ted Poe, R-Texas, Rep. Bill Johnson, R-Ohio, Sen. Heidi Heitkamp, D-N.D., and Commissioner Tony Clark of the Federal Energy Regulatory Commission among the scheduled speakers. 8:00 am , Park Hyatt Washington, 1201 24th Street NW.
- Oct. 7, Washington: The House Natural Resources Committee to hold a markup on eight bills. 4:00 pm , 1324 Longworth.
- Oct. 7, Washington: The House Rules Committee to hold a meeting to set protocol a bill from Rep. Joe Barton, R-Texas, to lift the ban on crude oil exports. 3:00 pm , H-313.
- Oct. 7, Washington: The House Energy and Commerce Subcommittee on Energy and Power to hold a hearing on the Environmental Protection Agency's Clean Power Plan. Acting Assistant Administrator Janet McCabe, of the Office of Air and Radiation, to

testify. 10:00 am , 2123 Rayburn.

- Oct. 7, Washington: The House Science, Space and Technology subcommittees on Environment and Oversight to hold a hearing on the Environmental Protection Agency's newly final ozone standard. 10:00 am , 2318 Rayburn.
- Oct. 7, Washington: The Senate Environment and Public Works Committee to hold an oversight hearing for the Nuclear Regulatory Commission. NRC Chairman Stephen Burns and commissioners Kristine Svinicki, William Ostendorff and Jeffrey Baran to testify. 9:30 am , Dirksen 406.



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EPA comm	VERIFY cc	Model Yr (Mfr Name	Division (t	Carline	Verify Mfr	Index (Mo	Eng Displ	# Cyl
		2016 Volkswage	Audi	A3	VGA	36	1.8	4
		2016 Volkswage	Audi	A3 Cabriol	VGA	37	1.8	4
		2016 Volkswage	Audi	A3 Cabriol	VGA	39	2.0	4
		2016 Volkswage	Audi	A3 quattro	VGA	38	2.0	4
		2016 Volkswage	Audi	A4	VGA	51	2.0	4
		2016 Volkswage	Audi	A4 quattro	VGA	33	2.0	4
		2016 Volkswage	Audi	A4 quattro	VGA	49	2.0	4
		2016 Volkswage	Audi	A5 Cabriol	VGA	35	2.0	4
		2016 Volkswage	Audi	A5 quattro	VGA	34	2.0	4
		2016 Volkswage	Audi	A5 quattro	VGA	50	2.0	4
		2016 Volkswage	Audi	A6	VGA	16	2.0	4
		2016 Volkswage	Audi	A6 quattro	VGA	15	2.0	4
		2016 Volkswage	Audi	A6 quattro	VGA	2	3.0	6
Diesel;		2016 Volkswage	Audi	A6 quattro	VGA	3	3.0	6
		2016 Volkswage	Audi	A7 quattro	VGA	1	3.0	6
Diesel;		2016 Volkswage	Audi	A7 quattro	VGA	4	3.0	6
Diesel;		2016 Volkswage	Audi	A8L	VGA	26	3.0	6
		2016 Volkswage	Audi	A8L	VGA	25	3.0	6
		2016 Volkswage	Audi	A8L	VGA	9	4.0	8
		2016 Volkswage	Audi	A8L	VGA	66	6.3	12
		2016 Volkswage	Audi	allroad qu	VGA	32	2.0	4
		2016 Volkswage	Audi	Q3	VGA	53	2.0	4
		2016 Volkswage	Audi	Q3 quattro	VGA	54	2.0	4
		2016 Volkswage	Audi	Q5	VGA	31	2.0	4
Diesel;		2016 Volkswage	Audi	Q5	VGA	27	3.0	6
		2016 Volkswage	Audi	Q5	VGA	47	3.0	6
Hybrid;		2016 Volkswage	Audi	Q5 Hybrid	VGA	62	2.0	4
		2016 Volkswage	Audi	RS7	VGA	12	4.0	8
		2016 Volkswage	Audi	S3	VGA	55	2.0	4
		2016 Volkswage	Audi	S4	VGA	42	3.0	6
		2016 Volkswage	Audi	S4	VGA	45	3.0	6
		2016 Volkswage	Audi	S5	VGA	43	3.0	6
		2016 Volkswage	Audi	S5	VGA	46	3.0	6
		2016 Volkswage	Audi	S5 Cabriole	VGA	44	3.0	6
		2016 Volkswage	Audi	S6	VGA	14	4.0	8
		2016 Volkswage	Audi	S7	VGA	13	4.0	8
Relabeled. Please include in 2016		2016 Volkswage	Audi	S8	VGA	11	4.0	8
		2016 Volkswage	Audi	SQ5	VGA	48	3.0	6
		2016 Volkswage	Audi	TT Coupe c	VGA	60	2.0	4
		2016 Volkswage	Audi	TT Roadste	VGA	61	2.0	4
		2016 Volkswage	Audi	TTS Coupe	VGA	52	2.0	4
		2016 Volkswage	Bentley	Continenta	VGA	6	4.0	8
		2016 Volkswage	Bentley	Continenta	VGA	28	6.0	12
		2016 Volkswage	Bentley	Continenta	VGA	7	4.0	8

	2016	Volkswage	Bentley	Continenta	VGA	30	6.0	12
	2016	Volkswage	Bentley	Flying Spur	VGA	8	4.0	8
	2016	Volkswage	Bentley	Flying Spur	VGA	29	6.0	12
	2016	Volkswage	Bentley	Mulsanne	VGA	5	6.8	8
	2016	Volkswage	Lamborghi	Aventador	VGA	17	6.5	12
	2016	Volkswage	Lamborghi	Aventador	VGA	18	6.5	12
	2016	Volkswage	Lamborghi	Huracan	VGA	87	5.2	10
Suppressed by EPA from FE2016	2016	Volkswage	Lamborghi	Huracan Sp	VGA	88	5.2	10
	2016	Volkswage	Volkswage	Beetle	VGA	71	1.8	4
	2016	Volkswage	Volkswage	Beetle	VGA	74	1.8	4
	2016	Volkswage	Volkswage	Beetle	VGA	82	2.0	4
	2016	Volkswage	Volkswage	Beetle	VGA	79	2.0	4
	2016	Volkswage	Volkswage	Beetle Con	VGA	72	1.8	4
	2016	Volkswage	Volkswage	Beetle Con	VGA	77	2.0	4
	2016	Volkswage	Volkswage	Beetle Con	VGA	80	2.0	4
	2016	Volkswage	Volkswage	CC	VGA	63	2.0	4
	2016	Volkswage	Volkswage	CC	VGA	64	2.0	4
	2016	Volkswage	Volkswage	CC 4Motio	VGA	68	3.6	6
	2016	Volkswage	Volkswage	Eos	VGA	65	2.0	4
	2016	Volkswage	Volkswage	Golf	VGA	58	1.8	4
	2016	Volkswage	Volkswage	Golf	VGA	59	1.8	4
Relabeled. Please include in 2016	2016	Volkswage	Volkswage	Golf R	VGA	22	2.0	4
	2016	Volkswage	Volkswage	Golf R	VGA	23	2.0	4
	2016	Volkswage	Volkswage	Golf Sport\	VGA	56	1.8	4
	2016	Volkswage	Volkswage	Golf Sport\	VGA	57	1.8	4
	2016	Volkswage	Volkswage	GTI	VGA	40	2.0	4
	2016	Volkswage	Volkswage	GTI	VGA	41	2.0	4
	2016	Volkswage	Volkswage	Jetta	VGA	85	1.4	4
	2016	Volkswage	Volkswage	Jetta	VGA	100	1.4	4
	2016	Volkswage	Volkswage	Jetta	VGA	70	1.8	4
	2016	Volkswage	Volkswage	Jetta	VGA	73	1.8	4
	2016	Volkswage	Volkswage	Jetta	VGA	76	2.0	4
	2016	Volkswage	Volkswage	Jetta	VGA	78	2.0	4
Hybrid;	2016	Volkswage	Volkswage	Jetta Hybri	VGA	83	1.4	4
	2016	Volkswage	Volkswage	Passat	VGA	81	1.8	4
	2016	Volkswage	Volkswage	Passat	VGA	67	3.6	6
	2016	Volkswage	Volkswage	Tiguan	VGA	21	2.0	4
	2016	Volkswage	Volkswage	Tiguan 4M	VGA	20	2.0	4
Diesel;	2016	Volkswage	Volkswage	Touareg	VGA	19	3.0	6
	2016	Volkswage	Volkswage	Touareg	VGA	69	3.6	6

Transmiss	City FE (G	Hwy FE (C	Comb FE	Low'd City	Low'd HW	Low'd Cor	City Unad	Hwy Unad	Comb Una
Auto(AM-S	23	33	27				28.9	46.6	34.858
Auto(AM-S	24	35	28				30.5	47	36.2224
Auto(AM-S	23	32	26				29	44.2	34.3094
Auto(AM-S	24	33	27				30	44.6	35.1828
Auto(AV-S	24	31	27				30.3	44.6	35.4089
Auto(S8)	21	30	25				27.1	42.2	32.3011
Manual(M	22	32	26				27.6526	43.9914	33.2017
Auto(S8)	21	29	24				26.4	41	31.4377
Auto(S8)	21	30	25				27.1	42.2	32.3011
Manual(M	22	32	26				27.6526	43.9914	33.2017
Auto(AM-S	24	35	28				31.2269	48.8	37.2657
Auto(S8)	22	32	26				27.8348	45.5	33.7274
Auto(S8)	20	30	24				25.6	41.9	31.0325
Auto(S8)	25	38	30				31.1687	52.7	38.1901
Auto(S8)	20	30	24				25.6	41.9	31.0325
Auto(S8)	25	38	30				31.1687	52.7	38.1901
Auto(S8)	24	36	28				29.9399	51.4	36.8664
Auto(S8)	19	29	22				23.5657	39.6	28.8162
Auto(S8)	18	29	22				22.278	39.1	27.6266
Auto(S8)	14	22	17				17.2	28.6	20.9595
Auto(S8)	21	28	24				26.7	39.2	31.1732
Auto(S6)	20	29	23				24.8499	40	29.9555
Auto(S6)	20	28	23				24.8	38.5	29.5284
Auto(S8)	20	28	23				24.8	38.6	29.5548
Auto(S8)	24	31	27				29.1832	44.1	34.4228
Auto(S8)	18	26	21				22.8446	35.5	27.2096
Auto(S8)	24	30	26				30.4	39.9	34.048
Auto(S8)	15	25	18				17.8763	33.1799	22.5584
Auto(AM-S	23	31	26				28.5	41.5	33.1767
Auto(AM-S	18	28	21				22.4	35.8	26.9372
Manual(M	17	26	20				20	33.4	24.4063
Auto(AM-S	18	28	21				22.4	35.8	26.9372
Manual(M	17	26	20				20	33.4	24.4063
Auto(AM-S	18	26	21				22.1	34.7	26.4165
Auto(AM-S	18	27	21				21.9777	36.8	26.843
Auto(AM-S	17	27	21				21.7499	37.3	26.7724
Auto(S8)	16	26	20				19.8464	35.1318	24.6781
Auto(S8)	17	24	19				20.8	32.9	24.9252
Auto(AM-S	23	30	26				28.8051	41.9128	33.5228
Auto(AM-S	23	30	26				28.8051	41.9128	33.5228
Auto(AM-S	23	27	25				28.2	38	31.9024
Auto(S8)	15	25	19				19.1	33.5	23.6806
Auto(S8)	12	21	15				15.4	28.3	19.3741
Auto(S8)	14	24	17				17.3	31.8	21.7662

vided) [600.314-08 states label values must not change for entire model year, except for 600.507(a) and 600.314-0

Auto(S8)	12	20	15	14.4	26.7	18.1658
Auto(S8)	14	24	17	17.3	31.8	21.7662
Auto(S8)	12	20	15	14.4	26.7	18.1658
Auto(S8)	11	18	13	13.6993	24.8	17.1546
Auto(AM-S	11	18	13	12.6	25.2	16.2581
Auto(AM-S	10	17	12	11.7313	21.9881	14.8481
Auto(AM-S	14	21	17	17.3	27	20.6362
Auto(AM-S	14	20	16	17	26.4	20.2436
Auto(S6)	25	34	28	31.4714	47.6267	37.1407
Manual(M	25	34	28	31.76	47.8	37.4089
Auto(AM-S	24	31	27	30.4602	44.2	35.4141
Manual(M	23	31	26	28.5453	43.3257	33.7222
Auto(S6)	25	34	28	31.4714	47.6267	37.1407
Auto(AM-S	23	31	26	29.1428	43.2697	34.1618
Manual(M	23	31	26	28.5453	43.3257	33.7222
Auto(AM-S	22	31	25	26.9721	42.4615	32.2692
Manual(M	21	32	25	25.7082	43.8369	31.5863
Auto(S6)	17	25	20	20.5	33.5	24.8373
Auto(AM-S	22	30	25	27.5	41.5	32.4219
Auto(S6)	25	36	29	32.5	51.1	38.8661
Manual(M	25	37	30	32.6	52.5	39.3042
Auto(AM-S	23	30	25	28.1	40.6	32.6193
Manual(M	22	31	25	26.5	39.7	31.1626
Auto(S6)	25	35	29	32.7	49.4	38.567
Manual(M	25	36	29	31.7	50.5	38.0792
Auto(AM-S	25	33	28	30.7	45.3	35.9078
Manual(M	25	34	28	30	46.4	35.674
Auto(S6)	28	39	32	36.4	58.1	43.7538
Manual(M	28	40	33	37.3	59.4	44.8007
Auto(S6)	25	36	29	32.6424	51.503	39.083
Manual(M	25	37	29	32.2552	52.1	38.9275
Auto(AM-S	24	33	27	30.639	47.1	36.3569
Manual(M	23	33	27	28.8819	46.678	34.8632
Auto(AM-S	42	48	44	57.5	65.3	60.7663
Auto(S6)	25	38	29	32.1277	53.336	39.1294
Auto(AM-S	20	28	23	23.9	37.3	28.5088
Auto(S6)	21	26	23	25.9873	36.0386	29.7169
Auto(S6)	20	26	23	25.7782	36.0407	29.5668
Auto(S8)	21	29	24	25.3	41	30.5673
Auto(S8)	17	23	19	21.3	31.6	24.9612

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City Unrd	Hwy Unrd	Comb Unr	Guzzler?	Air Aspir I	Air Aspira	Trans	Trans Des	Trans, Otl	# Gears
23.4556	33.3421	27.0673		TC	Turbochar	AMS	Automated Manual-	Selectable	6
24.3444	34.5845	28.0867		TC	Turbochar	AMS	Automated Manual-	Selectable	6
23.312	31.5429	26.4136		TC	Turbochar	AMS	Automated Manual-	Selectable	6
24.0818	32.6198	27.297		TC	Turbochar	AMS	Automated Manual-	Selectable	6
23.7847	30.8933	26.532		TC	Turbochar	SCV	Selectable Continuously Variable		8
21.3584	30.0427	24.5522		TC	Turbochar	SA	Semi-Automatic		8
22.2613	32.093	25.8209		TC	Turbochar	M	Manual		6
20.8442	29.2228	23.9319		TC	Turbochar	SA	Semi-Automatic		8
21.3584	30.0427	24.5522		TC	Turbochar	SA	Semi-Automatic		8
22.2613	32.093	25.8209		TC	Turbochar	M	Manual		6
24.3335	34.5182	28.059		TC	Turbochar	AMS	Automated Manual-	Selectable	7
21.8708	32.2876	25.5853		TC	Turbochar	SA	Semi-Automatic		8
20.2543	29.8379	23.6763		SC	Supercha	SA	Semi-Automatic		8
25.2158	37.5811	29.5982		TC	Turbochar	SA	Semi-Automatic		8
20.2543	29.8379	23.6763		SC	Supercha	SA	Semi-Automatic		8
25.2158	37.5811	29.5982		TC	Turbochar	SA	Semi-Automatic		8
23.8727	36.3252	28.2271		TC	Turbochar	SA	Semi-Automatic		8
18.6853	29.3211	22.3303		SC	Supercha	SA	Semi-Automatic		8
17.9485	28.5015	21.5369		TC	Turbochar	SA	Semi-Automatic		8
13.8358	21.9706	16.602	G	NA	Naturally A	SA	Semi-Automatic		8
21.0646	27.9892	23.7037		TC	Turbochar	SA	Semi-Automatic		8
19.6619	28.538	22.8617		TC	Turbochar	SA	Semi-Automatic		6
19.7028	28.0105	22.7375		TC	Turbochar	SA	Semi-Automatic		6
19.6619	27.5771	22.5781		TC	Turbochar	SA	Semi-Automatic		8
23.6286	31.3636	26.5783		TC	Turbochar	SA	Semi-Automatic		8
17.8443	25.5746	20.6536		SC	Supercha	SA	Semi-Automatic		8
24.0075	29.7936	26.3065		TC	Turbochar	SA	Semi-Automatic		8
14.521	25.1577	17.9329		TC	Turbochar	SA	Semi-Automatic		8
23.1833	30.7065	26.056		TC	Turbochar	AMS	Automated Manual-	Selectable	6
18.117	27.558	21.419		SC	Supercha	AMS	Automated Manual-	Selectable	7
17.0438	26.023	20.1767		SC	Supercha	M	Manual		6
18.117	27.558	21.419		SC	Supercha	AMS	Automated Manual-	Selectable	7
17.0438	26.023	20.1767		SC	Supercha	M	Manual		6
17.6699	25.953	20.6333		SC	Supercha	AMS	Automated Manual-	Selectable	7
17.7328	26.6352	20.8721		TC	Turbochar	AMS	Automated Manual-	Selectable	7
17.4937	26.7312	20.715		TC	Turbochar	AMS	Automated Manual-	Selectable	7
16.1833	26.2858	19.5672		TC	Turbochar	SA	Semi-Automatic		8
16.7285	23.6581	19.2682		SC	Supercha	SA	Semi-Automatic		8
23.3039	30.3915	26.0363		TC	Turbochar	AMS	Automated Manual-	Selectable	6
23.3039	30.3915	26.0363		TC	Turbochar	AMS	Automated Manual-	Selectable	6
22.8034	27.3644	24.6524		TC	Turbochar	AMS	Automated Manual-	Selectable	6
15.2087	25.3816	18.5553		TC	Turbochar	SA	Semi-Automatic		8
12.4737	21.0866	15.2827	G	TC	Turbochar	SA	Semi-Automatic		8
13.819	23.8488	17.0447	G	TC	Turbochar	SA	Semi-Automatic		8

8(e)(4) reasons] Please revise release date to the effective date when vehicles were relabeled;

12.0228	20.0478	14.6643	G	TC	Turbochar¡SA	Semi-Automatic 8
13.819	23.8488	17.0447	G	TC	Turbochar¡SA	Semi-Automatic 8
12.0228	20.0478	14.6643	G	TC	Turbochar¡SA	Semi-Automatic 8
11.1823	17.9616	13.4701	G	TC	Turbochar¡SA	Semi-Automatic 8
10.6055	18.4729	13.1199	G	NA	Naturally ASAMS	Automated Manual- Selectable 7
9.9676	16.7	12.1766	G	NA	Naturally ASAMS	Automated Manual- Selectable 7
14.318	20.6311	16.6044	G	NA	Naturally ASAMS	Automated Manual- Selectable 7
13.9274	19.9987	16.1311	G	NA	Naturally ASAMS	Automated Manual- Selectable 7
24.5488	33.7087	27.9689		TC	Turbochar¡SA	Semi-Automatic 6
24.7637	33.8438	28.164		TC	Turbochar¡M	Manual 5
23.83	31.405	26.7315		TC	Turbochar¡AMS	Automated Manual- Selectable 6
23.0368	30.5347	25.8985		TC	Turbochar¡M	Manual 6
24.5488	33.7087	27.9689		TC	Turbochar¡SA	Semi-Automatic 6
22.8175	30.7926	25.8277		TC	Turbochar¡AMS	Automated Manual- Selectable 6
23.0368	30.5347	25.8985		TC	Turbochar¡M	Manual 6
21.8736	31.0153	25.2185		TC	Turbochar¡AMS	Automated Manual- Selectable 6
20.7831	31.7504	24.6082		TC	Turbochar¡M	Manual 6
16.9415	25.219	19.8774		NA	Naturally ASA	Semi-Automatic 6
21.7634	30.1121	24.8658		TC	Turbochar¡AMS	Automated Manual- Selectable 6
25.264	36.0643	29.1989		TC	Turbochar¡SA	Semi-Automatic 6
25.3353	37.0021	29.5244		TC	Turbochar¡M	Manual 5
22.6857	29.0622	25.5705		TC	Turbochar¡AMS	Automated Manual- Selectable 6
21.6528	30.5249	24.911		TC	Turbochar¡M	Manual 6
25.4066	34.9222	28.9572		TC	Turbochar¡SA	Semi-Automatic 6
24.6921	35.6616	28.6591		TC	Turbochar¡M	Manual 5
24.6434	32.6158	27.6891		TC	Turbochar¡AMS	Automated Manual- Selectable 6
24.9095	34.2917	28.407		TC	Turbochar¡M	Manual 6
27.8072	39.2595	32.009		TC	Turbochar¡SA	Semi-Automatic 6
28.4148	40.0257	32.681		TC	Turbochar¡M	Manual 5
25.3353	36.3325	29.3303		TC	Turbochar¡SA	Semi-Automatic 6
25.1212	36.7344	29.2878		TC	Turbochar¡M	Manual 5
23.902	33.3709	27.4007		TC	Turbochar¡AMS	Automated Manual- Selectable 6
23.1336	32.7327	26.6506		TC	Turbochar¡M	Manual 6
41.5773	48.2766	44.3466		TC	Turbochar¡AMS	Automated Manual- Selectable 7
24.9783	37.5368	29.4054		TC	Turbochar¡SA	Semi-Automatic 6
19.7174	27.8048	22.6868		NA	Naturally ASAMS	Automated Manual- Selectable 6
20.5496	25.7855	22.6161		TC	Turbochar¡SA	Semi-Automatic 6
20.3859	25.8136	22.5164		TC	Turbochar¡SA	Semi-Automatic 6
20.799	28.6879	23.7363		TC	Turbochar¡SA	Semi-Automatic 8
17.0411	22.7325	19.2048		NA	Naturally ASA	Semi-Automatic 8

8(e)(4) reasons] Please revise release date to the effective date when vehicles were relabeled.

Lockup Tc	Trans Cre	Drive Sys	Drive Des	Primary B	Max Ethar	Max Biodi	Range1 - I	Fuel Usag	Fuel Usag
tomated Ma	nual with	paddles)	2-Wheel D	GVGAV02.	15			G	Gasoline (F
tomated Ma	nual with	paddles)	2-Wheel D	GVGAV02.	15			G	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			G	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			G	Gasoline (F
MT with pad	dles)	F	2-Wheel D	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ02.(	85		422	GP	Gasoline (F
N	N	A	All Wheel	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ02.(	85		406	GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ02.(	85		422	GP	Gasoline (F
N	N	A	All Wheel	GVGAV02.	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	2-Wheel D	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV03.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ03.0	NU4		5	DU	Diesel, ultr
Y	N	A	All Wheel	GVGAV03.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ03.0	NU4		5	DU	Diesel, ultr
Y	N	A	All Wheel	GVGAJ03.0	NU4		5	DU	Diesel, ultr
Y	N	A	All Wheel	GVGAV03.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV04.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV06.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ02.(	85		406	GP	Gasoline (F
Y	N	F	2-Wheel D	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ02.(	85		455	GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ03.0	NU4		5	DU	Diesel, ultr
Y	N	A	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAT02.(	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV04.	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
N	N	A	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
N	N	A	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV04.	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV04.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV04.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAJ03.(	15			GP	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			G	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			G	Gasoline (F
tomated Ma	nual with	paddles)	All Wheel	GVGAV02.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV04.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV06.	15			GP	Gasoline (F
Y	N	A	All Wheel	GVGAV04.	15			GP	Gasoline (F

Y	N	A	All Wheel IGVGAV06.	15		GP	Gasoline (F
Y	N	A	All Wheel IGVGAV04.	15		GP	Gasoline (F
Y	N	A	All Wheel IGVGAV06.	15		GP	Gasoline (F
Y	N	R	2-Wheel DGVGAV06.	15		GP	Gasoline (F
tomated Ma	nual with	A	paddles) All Wheel IGVGAV06.	15		GPR	Gasoline (F
tomated Ma	nual with	A	paddles) All Wheel IGVGAV06.	15		GPR	Gasoline (F
tomated Ma	nual with	A	paddles) All Wheel IGVGAV05.	15		GP	Gasoline (F
tomated Ma	nual with	A	paddles) All Wheel IGVGAV05.	15		GP	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAJ02.(	15		GP	Gasoline (F
N	N	F	2-Wheel DGVGAJ02.(	15		GP	Gasoline (F
Y	N	A	All Wheel IGVGAV03.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV02.	15		GP	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	A	paddles) All Wheel IGVGAV02.	15		GP	Gasoline (F
N	N	A	All Wheel IGVGAV02.	15		GP	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
Y	N	F	2-Wheel DGVGAV01.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV01.	15		G	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV02.	15		G	Gasoline (F
N	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV01.	15		GP	Gasoline (F
Y	N	F	2-Wheel DGVGAV02.	15		G	Gasoline (F
tomated Ma	nual with	P	paddles) 2-Wheel DGVGAV03.	15		G	Gasoline (F
Y	N	F	2-Wheel DGVGAJ02.(	15		GP	Gasoline (F
Y	N	A	All Wheel IGVGAJ02.(	15		GP	Gasoline (F
Y	N	A	All Wheel IGVGAT03.0NU2		5	DU	Diesel, ultr
Y	N	A	All Wheel IGVGAT03.(	15		G	Gasoline (F

Fuel Unit	Fuel Unit	Evaluation Fuel	Gas Guzz	Gas Guzz	2Dr Pass	2Dr Lugg	4Dr Pass	4Dr Lugg	Htchbk Pa	Htchbk Lu
MPG	miles per ga	Unleaded Recommended)		Not exempt			86	12		
MPG	miles per ga	Unleaded Recommended)		Not exempt	79	10				
MPG	miles per ga	Unleaded Recommended)		Not exempt	79	10				
MPG	miles per ga	Unleaded Recommended)		Not exempt			86	10		
MPG	miles per ga	Unleaded Recommended)		Not exempt			91	12		
MPG	miles per ga	Unleaded Recommended)		Not exempt			91	12		
MPG	miles per ga	Unleaded Recommended)		Not exempt			91	12		
MPG	miles per ga	Unleaded Recommended)		Not exempt	81	10				
MPG	miles per ga	Unleaded Recommended)		Not exempt	84	12				
MPG	miles per ga	Unleaded Recommended)		Not exempt	84	12				
MPG	miles per ga	Unleaded Recommended)		Not exempt			98	16		
MPG	miles per ga	Unleaded Recommended)		Not exempt			98	16		
MPG	miles per ga	Unleaded Recommended)		Not exempt			98	16		
MPG	miles per ga	ulfur (15 ppm maximum)		Not exempt			98	16		
MPG	miles per ga	Unleaded Recommended)		Not exempt					94	25
MPG	miles per ga	ulfur (15 ppm maximum)		Not exempt					94	25
MPG	miles per ga	ulfur (15 ppm maximum)		Not exempt			107	15		
MPG	miles per ga	Unleaded Recommended)		Not exempt			107	15		
MPG	miles per ga	Unleaded Recommended)		Not exempt			107	15		
MPG	miles per ga	Unleaded Recommended)		Not exempt			107	15		
MPG	miles per ga	Unleaded Recommended)		Not exempt			90	28		
MPG	miles per ga	Unleaded Recommended)		Not exempt					84	17
MPG	miles per ga	Unleaded Recommended)		Not exempt					84	17
MPG	miles per ga	Unleaded Recommended)		Truck						
MPG	miles per ga	ulfur (15 ppm maximum)		Truck						
MPG	miles per ga	Unleaded Recommended)		Truck						
MPG	miles per ga	Unleaded Recommended)		Truck						
MPG	miles per ga	Unleaded Recommended)		Not exempt					94	25
MPG	miles per ga	Unleaded Recommended)		Not exempt			86	10		
MPG	miles per ga	Unleaded Recommended)		Not exempt			90	13		
MPG	miles per ga	Unleaded Recommended)		Not exempt			90	13		
MPG	miles per ga	Unleaded Recommended)		Not exempt	84	13				
MPG	miles per ga	Unleaded Recommended)		Not exempt	84	13				
MPG	miles per ga	Unleaded Recommended)		Not exempt	81	10				
MPG	miles per ga	Unleaded Recommended)		Not exempt			98	16		
MPG	miles per ga	Unleaded Recommended)		Not exempt					94	25
MPG	miles per ga	Unleaded Recommended)		Not exempt			100	15		
MPG	miles per ga	Unleaded Recommended)		Truck						
MPG	miles per ga	Unleaded Recommended)		Not exempt	74	13				
MPG	miles per ga	Unleaded Recommended)		Not exempt						
MPG	miles per ga	Unleaded Recommended)		Not exempt	74	13				
MPG	miles per ga	Unleaded Recommended)		Not exempt	89	11				
MPG	miles per ga	Unleaded Recommended)		Not exempt	89	11				
MPG	miles per ga	Unleaded Recommended)		Not exempt	86	7				

Unleaded Recommended)							
MPG	miles per gN	Not exempt	86	7			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	102	13			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	102	13			
Unleaded Recommended)							
MPG	miles per gN	Not exempt			101	11	
Unleaded Required)							
MPG	miles per gN	Not exempt					
Unleaded Required)							
MPG	miles per gN	Not exempt					
Unleaded Recommended)							
MPG	miles per gN	Not exempt					
Unleaded Recommended)							
MPG	miles per gN	Not exempt					
Unleaded Recommended)							
MPG	miles per gN	Not exempt				85	15
Unleaded Recommended)							
MPG	miles per gN	Not exempt				85	15
Unleaded Recommended)							
MPG	miles per gN	Not exempt				85	15
Unleaded Recommended)							
MPG	miles per gN	Not exempt				85	15
Unleaded Recommended)							
MPG	miles per gN	Not exempt	81	7			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	81	7			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	81	7			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	94	13			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	94	13			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	94	13			
Unleaded Recommended)							
MPG	miles per gN	Not exempt	77	11			
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	30	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	30	
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt				93	16
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			94	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			102	16	
Unleaded Recommended)							
MPG	miles per gN	Not exempt			102	16	
Unleaded Recommended)							
MPG	miles per gN	Truck					
Unleaded Recommended)							
MPG	miles per gN	Truck					
ulfur (15 ppm maximum)							
MPG	miles per gN	Truck					
Unleaded Recommended)							
MPG	miles per gN	Truck					

Annual Fu	EPA Calcu	Comment	City2 FE (H	Hwy2 Fue	Comb2 Fu	Low'd City	Low'd Hw	Low'd Cor	City2 Una
1650	1650	fuel costs corrected							
1600	1600	fuel costs corrected							
1750	1750	fuel cost corrections							
1650	1650	fuel cost corrections							
1850	1850								
2000	2000		15	22	18				19.5
1900	1900								
2050	2050		15	21	17				19
2000	2000		15	22	18				19.5
1900	1900								
1750	1750								
1900	1900	CO2 unrounded and rounded values corrected, typo. further CO2 corrections							
2050	2050								
1700	1700	release date change,added configuration after EPA confirmatory testing, corrected unadj unr							
2050	2050								
1700	1700	added configuration after EPA confirmatory testing to base level, corrected unadj unrnd com							
1800	1800								
2250	2250								
2250	2250	engine code correction, data sub used							
2900	2900								
2050	2050		15	21	17				19.2
2150	2150								
2150	2150								
2150	2150		14	19	16				17.4
1850	1850	corrected fuel economy rating							
2350	2350								
1900	1900								
2750	2750	50/50 weighting of best and worse (D&S) testing							
1900	1900								
2350	2350								
2500	2500								
2350	2350								
2500	2500								
2350	2350								
2350	2350	corrected typo adj unrounded city CO2 value.							
2350	2350								
2500	2500	voluntary relabeled with addition of 605 HP engine and configuration for the S8 Plus model (S							
2600	2600								
1750	1750	fuel costs correction							
1750	1750	fuel cost correction							
2000	2000								
2600	2600	engine configuration changed to 520 HP = #6, release date changed							
3300	3300	changed to a gasoline fueled label from flex fueled concept. 15% ethanol max							
2900	2900								

3300	3300	this is corrected to drop flex fueled concept for 2016; 15% ethanol max
2900	2900	
3300	3300	this is corrected to drop flex fueled concept for 2016, 15% ethanol max
3800	3800	Vehicle model equipped with cylinder deactivation with a switch. Active and inactive tests av
3800	3800	
4100	4100	corrected ETW with RLHP for SV
2900	2900	release date change
3100	3100	release date change
1600	1600	
1600	1600	5 YR FUEL SAVINGS CORRECTED
1650	1650	release date changed to 8/28, corrected typo rounded CO2 value, corrected unrounded CO2 c
1750	1750	
1600	1600	
1750	1750	release date changed
1750	1750	
2000	2000	
2000	2000	
2250	2250	recommended fuel correction
2000	2000	
1550	1550	fuel costs corrected
1500	1500	
2000	2000	new ETW for automatic
2000	2000	
1550	1550	
1550	1550	
1600	1600	fuel cost correction, 5 year cost correction, add equivalent engine codes data substitution use
1600	1600	fuel cost correction, add equivalent engine codes, data substitution used
1400	1400	
1350	1350	
1550	1550	gal/100 miles corrected
1550	1550	
1650	1650	combined typo unadjusted MPG value corrected, adjusted unrounded CO2 value corrected
1650	1650	adjusted unrounded CO2 values corrected
1100	1100	
1550	1550	release date change to Sept 21st
1950	1950	recommended fuel change correction, release date now Sept 21st
2150	2150	
2150	2150	
2100	2100	
2350	2350	

Hwy2 Unit	Comb2	CO2	Hwy2	Unrd Hwy2 Unrd	Comb2	Unrd Range2 -	Fuel2 Usa	Fuel2 Usa	Fuel2 Unit	Fuel2 Unit
30.8	23.356	15.3563	21.9111	17.7451	304	E	Ethanol (E8	MPG	miles per g	
30	22.7545	15.0024	21.384	17.3296	287	E	Ethanol (E8	MPG	miles per g	
30.8	23.356	15.3563	21.9111	17.7451	304	E	Ethanol (E8	MPG	miles per g	

nd combined CO2 value

bined CO2

28.8	22.5882	15.1507	20.5603	17.1855	287	E	Ethanol (E8	MPG	miles per g	
27.1	20.7407	13.7947	19.3602	15.8444	317	E	Ethanol (E8	MPG	miles per g	

OP wk45) no new carline.

eraged together at 50/50. Data substitution for engine code with lesser HP.

[redacted]

ity value

d

Alternative Fuel									
Fuel2 AltmCity	CO2 I	Hwy CO2	Comb CO	Fuel2 EPA	Descripto	Intake Val	Exhaust V	Carline Cl	Carline Cl
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	4	Compact C
2150	400	281	347	2150	SIDI; FFV;	2	2	4	Compact C
					SIDI;	2	2	4	Compact C
2300	410	288	355	2300	SIDI; FFV;	2	2	3	Subcompa
2150	400	281	347	2150	SIDI; FFV;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	5	Midsize Ca
					SIDI;	2	2	5	Midsize Ca
					SIDI;	2	2	5	Midsize Ca
						2	2	5	Midsize Ca
					SIDI;	2	2	5	Midsize Ca
						2	2	5	Midsize Ca
						2	2	6	Large Cars
					SIDI;	2	2	6	Large Cars
					SIDI;	2	2	6	Large Cars
					SIDI;	2	2	6	Large Cars
2300	406	300	358	2300	SIDI; FFV;	2	2	7	Small Stati
					SIDI;	2	2	4	Compact C
					SIDI;	2	2	4	Compact C
2450	450	320	392	2450	SIDI; FFV;	2	2	31	Small SUV 4WD
						2	2	31	Small SUV 4WD
					SIDI;	2	2	31	Small SUV 4WD
					SIDI;	2	2	31	Small SUV 4WD
					SIDI;	2	2	5	Midsize Ca
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	4	Compact C
					SIDI;	2	2	4	Compact C
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	5	Midsize Ca
					SIDI;	2	2	5	Midsize Ca
					SIDI; Unde	2	2	5	Midsize Ca
					SIDI;	2	2	31	Small SUV 4WD
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	1	Two Seate
					SIDI;	2	2	3	Subcompa
					SIDI;	2	2	4	Compact C
						2	2	4	Compact C
					SIDI;	2	2	3	Subcompa

	2	2	3	Subcompa
SIDI;	2	2	5	Midsize Ca
	2	2	5	Midsize Ca
	1	1	5	Midsize Ca
	2	2	1	Two Seate
	2	2	1	Two Seate
SIDI & PFI;	2	2	1	Two Seate
SIDI & PFI;	2	2	1	Two Seate
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	3	Subcompa
SIDI;	2	2	3	Subcompa
SIDI;	2	2	3	Subcompa
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	3	Subcompa
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI; Unde	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	7	Small Stati
SIDI;	2	2	7	Small Stati
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	4	Compact C
SIDI;	2	2	5	Midsize Ca
SIDI;	2	2	5	Midsize Ca
SIDI;	2	2	30	Small SUV 2WD
SIDI;	2	2	31	Small SUV 4WD
	2	2	33	Standard SUV 4W
SIDI;	2	2	33	Standard SUV 4W

MC	Car/Truck	Calc Appr	Sales	Release D	EPA FE Label Dataset ID	Unique La	Label Rec	Relabel	Relabel D
	car	Vehicle Specific 5-cycle	6/22/2015	18159	[redacted]	N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18160		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18162		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18161		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18128		N	N		
	car	Derived 5-cycle label	6/22/2015	18103		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18121		N	N		
	car	Derived 5-cycle label	6/22/2015	18105		N	N		
	car	Derived 5-cycle label	6/22/2015	18104		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18122		N	N		
	car	Vehicle Specific 5-cycle	3/23/2015	17682		N	N		
	car	Derived 5-cycle label	3/23/2015	17714		N	N		
	car	Derived 5-cycle label	1/8/2015	17475		N	N		
	car	Vehicle Specific 5-cycle	3/30/2015	17658		N	N		
	car	Derived 5-cycle label	1/8/2015	17474		N	N		
	car	Vehicle Specific 5-cycle	3/30/2015	17659		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18062		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18055		N	N		
	car	Vehicle Specific 5-cycle	1/8/2015	17744		N	N		
	car	Vehicle Specific 5-cycle	7/13/2015	18361		N	N		
ons	car	Derived 5-cycle label	6/22/2015	18102		N	N		
	car	Derived 5-cycle label	6/22/2015	18130		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18131		N	N		
		Derived 5-cycle label	6/22/2015	18101		N	N		
		Vehicle Specific 5-cycle	6/22/2015	18088		N	N		
		Vehicle Specific 5-cycle	6/22/2015	18118		N	N		
		Vehicle Specific 5-cycle	6/22/2015	18216		N	N		
	car	Vehicle Specific 5-cycle	1/8/2015	17565		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18132		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18113		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18116		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18114		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18117		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18115		N	N		
	car	Vehicle Specific 5-cycle	3/23/2015	17715		N	N		
	car	Vehicle Specific 5-cycle	3/23/2015	17657		N	N		
el	economy label values on Previous Values were XX MPG city, XX MPG highway, and XX MPG combined;								
		Vehicle Specific 5-cycle	6/22/2015	18120		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18213		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18212		N	N		
	car	Vehicle Specific 5-cycle	6/22/2015	18129		N	N		
	car	Vehicle Specific 5-cycle	5/25/2015	17559		N	N		
	car	Vehicle Specific 5-cycle	7/20/2015	18239		N	N		
	car	Vehicle Specific 5-cycle	5/25/2015	17560		N	N		

car	Vehicle Specific 5-cycle label	7/20/2015	18241		N	N	
car	Vehicle Specific 5-cycle label	5/25/2015	17561		N	N	
car	Vehicle Specific 5-cycle label	6/15/2015	18240		N	N	
car	Derived 5-cycle label	1/14/2015	17486		N	N	
car	Vehicle Specific 5-cycle label	5/1/2015	17766		N	N	
car	Vehicle Specific 5-cycle label	5/1/2015	17787		N	N	
car	Vehicle Specific 5-cycle label	9/14/2015	18710		N	N	
car	Vehicle Specific 5-cycle label	3/14/2016	18711		N	N	
car	Derived 5-cycle label	7/20/2015	18391		N	N	
car	Derived 5-cycle label	7/20/2015	18461		N	N	
car	Derived 5-cycle label	9/2/2015	18981		N	N	
car	Vehicle Specific 5-cycle label	7/20/2015	18398		N	N	
car	Derived 5-cycle label	7/20/2015	18392		N	N	
car	Vehicle Specific 5-cycle label	7/27/2015	18576		N	N	
car	Vehicle Specific 5-cycle label	7/20/2015	18399		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18217		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18218		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18370		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18307		N	N	
car	Derived 5-cycle label	7/13/2015	18183		N	N	
car	Derived 5-cycle label	7/13/2015	18185		N	N	
el economy label values on Previous values were XX MPG city, XX MPG highway, and XX MPG combined;							
car	Vehicle Specific 5-cycle label	6/22/2015	18134		N	N	
car	Derived 5-cycle label	7/13/2015	18176		N	N	
car	Derived 5-cycle label	7/13/2015	18179		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18365		N	N	
car	Vehicle Specific 5-cycle label	7/13/2015	18366		N	N	
car	Derived 5-cycle label	8/17/2015	18665		N	N	
car	Derived 5-cycle label	10/26/2015	18905		N	N	
car	Derived 5-cycle label	7/20/2015	18462		N	N	
car	Derived 5-cycle label	7/30/2015	18714		N	N	
car	Derived 5-cycle label	7/20/2015	18570		N	N	
car	Vehicle Specific 5-cycle label	7/20/2015	18464		N	N	
car	Vehicle Specific 5-cycle label	8/17/2015	18676		N	N	
car	Derived 5-cycle label	9/21/2015	19016		N	N	
car	Vehicle Specific 5-cycle label	9/21/2015	19015		N	N	
	Derived 5-cycle label	7/13/2015	18215		N	N	
	Derived 5-cycle label	7/13/2015	18214		N	N	
D	Vehicle Specific 5-cycle label	7/13/2015	17922		N	N	
D	Derived 5-cycle label	7/27/2015	18591		N	N	

Suppress	Police/Em	Comment	Cyl Deact	Cyl Deact	Var Valve	Var Valve	Var Valve	Var Valve	Energy St
N	N	1.8L Engin	N		Y	CONTINUC	N		
N	N	1.8L Engin	N		Y	CONTINUC	N		
N	N	2.0L Engin	N		Y	CONTINUC	Y	Audi Valve System	
N	N	2.0L Engin	N		Y	CONTINUC	Y	Audi Valve System	
N	N	N			Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM FO	
N	N	N			Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM FO	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM FO	
N	N	N			Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	Electro/Hy	Y	Audi Valve System	
N	N	Engine Coc	N		Y	Electro/Hy	Y	Audi Valve System	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	N			N		N		
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	N			N		N		
N	N	N			N		N		
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
N	N	Engine Coc	Y	12 to 6 cyli	Y	Intake and	N		
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM FO	
N	N	Engine Coc	N		Y	CONTINUC	N		
N	N	Engine Coc	N		Y	CONTINUC	N		
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM FO	
N	N	N			N		N		
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVBattery(s)	
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
N	N	Engine Coc	N		Y	CONTINUC	Y	Audi Valve System - Exhaust	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
ne decreased	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
N	N	Engine Coc	N		Y	CONTINUC	Y	AUDI VALVE LIFT SYSTEM	
N	N	2.0L Engin	N		Y	CONTINUC	Y	Audi Valve System	
N	N	2.0L Engin	N		Y	CONTINUC	Y	Audi Valve System	
N	N	Engine Coc	N		Y	CONTINUC	N		
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	
N	N	Engine Coc	N		Y	INLET AND	N		
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig	

N	N	Engine Coc	N	Y	INLET AND	N	
N	N	Engine Coc	Y	Deactivatic	Y	Continuou	Y	Multi-lobe Int/Exh cam desig
N	N	Engine Coc	N	Y	INLET AND	N	
N	N	Engine cod	Y	Cylinder d	Y	Variation c	N	
N	N	Engine Coc	Y	ELECTRON	Y	HYDRAULI	N	
N	N	Engine Coc	Y	ELECTRON	Y	HYDRAULI	N	
N	N	ENGINE CC	Y	Soft COD. !	Y	INLET AND	Y	Fixed 1: One Setting of Valve
Y	N	ENGINE CC	Y	Soft COD. !	Y	INLET AND	Y	Fixed 1: One Setting of Valve
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	N		Y	position of	N	
N	N	N		Y	position of	N	
N	N	N		Y	position of	N	
N	N	N		Y	CONTINUC	N	
N	N	1.8L Engin	N	Y	CONTINUC	N	
N	N	1.8L Engin	N	Y	CONTINUC	N	
N	N	Engine Coc	N	Y	CONTINUC	Y	Audi Valve System - Exhaust
N	N	Engine Coc	N	Y	CONTINUC	Y	Audi Valve System - Exhaust
N	N	1.8L Engin	N	Y	CONTINUC	N	
N	N	1.8L Engin	N	Y	CONTINUC	N	
N	N	2.0L Engin	N	Y	CONTINUC	Y	Audi Valve System
N	N	2.0L Engin	N	Y	CONTINUC	Y	Audi Valve System
N	N	Engine Coc	N	Y	MECHANIC	N	
N	N	Engine Coc	N	Y	MECHANIC	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	N		Y	MECANICA	N	Battery(s)
N	N	Engine Coc	N	Y	MECANICA	N	
N	N	Engine cod	N	Y	Electronic	N	
N	N	N		Y	position of	N	
N	N	N		Y	position of	N	
N	N	Engine Coc	N	N		N	
N	N	N		Y	INTAKE / E	N	

ne decreased

evice Desc	# Batteries	Battery Ty	Battery Ty	Total Volt	Batt Ener	Batt Spec	Batt Char	Comment	# Capacit
Energy St									
R / EXHAUST									
R / EXHAUST									
R / EXHAUST									
R / EXHAUST									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
tolled and hydraulically adjusted.									
R / EXHAUST									
R / EXHAUST									
	1	Lithium Ion		266	5	37	On-Board		
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
valves only									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									
ECHANICAL-HYDRAULIC									
alves to a valve lift of 1 mm (all valves adjusted), the fuel injection and ignition are deactivated and the exhaust valves are opened.									

ECHANICAL-HYDRAULIC

alves to vary valve lift or timing (all valves designed to be fully closed during the exhaust stroke).

ECHANICAL-HYDRAULIC

aust valves on a single camshaft. No change in valve overlaps.

ONTINUOUSLY VVT

ONTINUOUSLY VVT

ECHANICAL-HYDRAULIC

ECHANICAL-HYDRAULIC

AMS

AMS

AMS

AMS

AMS

AMS

AMS

controlled and hydraulically adjusted

controlled and hydraulically adjusted

controlled and hydraulically adjusted

valves only

valves only

AND OUTLET CAMS

AND OUTLET CAMS

AMS

AMS

AMS

AMS

ND OUTLET CAMS 1 Lithium Ion 220 1100 27 On-Board

AMS

controlled and hydraulically adjusted

controlled and hydraulically adjusted

LICALLY AND CONTROLLED ELECTRONICALLY

Regen Bra	Regen Bra	Regen Bra	Driver Cnt	Fuel Cell I	Usable H2	Fuel Cell (	HEV-EV C	# Drive M	Motor Ger

est above 3rd gear or higher, ECT greater than 40C, engine speed 930 to 3500 RPM, vehicle speed greater than 25 km

[redacted]

Electrical RBRAKE PECFront WheY 1Other

Motor Ger	Rated Mot	Fuel Mete	Fuel Mete	Fuel Mete	Fuel Mete	Fuel Cell V	Off Board	Camless V	Oil Viscosi
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				CRDI	Common Rail Direct Diesel Injection			N	5W30 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				CRDI	Common Rail Direct Diesel Injection			N	5W30 VW
				CRDI	Common Rail Direct Diesel Injection			N	5W30 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignit	N		N	5W40
				GDI	Spark Ignit	N		N	5W40
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				CRDI	Common Rail Direct Diesel Injection			N	5W30 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
		40		GDI	Spark Ignit	N	N	N	5W40 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
				GDI	Spark Ignit	N		N	5W40
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignition Direct Injection			N	5W40 VW
				GDI	Spark Ignit	N		N	5W40
h				GDI	Spark Ignition Direct Injection			N	5W30 VW
				MFI	Multipoint	N		N	5W30 VW
h				GDI	Spark Ignition Direct Injection			N	5W30 VW

		MFI	Multipoint	N	N	5W30 VW
h		GDI	Spark Ignition Direct Injection		N	5W30 VW
		MFI	Multipoint	N	N	5W30 VW
		MFI	Multipoint/sequential fuel injection		N	0W40 / VW
		MFI	Multipoint/sequential fuel injection		N	5W30 VW
		MFI	Multipoint/sequential fuel injection		N	5W30 VW
		GDPI	Spark Ignition direct & ported injection		N	5W30 VW
		GDPI	Spark Ignition direct & ported injection		N	5W30 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W-40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 / VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignit	N	N	5W40
		GDI	Spark Ignit	N	N	5W40
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
3 PHASE PI	15	GDI	Spark Ignit	N	N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW
		CRDI	Common Rail Direct Diesel Injection		N	5W30 VW
		GDI	Spark Ignition Direct Injection		N	5W40 VW

Stop/Start	Stop/Start	Trans in FE	Trans as I	Model Typ	Charge De	Charge De	Charge Su	Charge Su	EPA Calcul
N	No	Auto(AM-S	Auto(AM-S6)						
N	No	Auto(AM-S	Auto(AM-S6)						
N	No	Auto(AM-S	Auto(AM-S6)						
N	No	Auto(AM-S	Auto(AM-S6)						
N	No	Auto(AV-S	Auto(AV-S8)						
N	No	Auto(S8)	Auto(S8)						
N	No	Manual(M	Manual(M6)						
N	No	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
N	No	Manual(M	Manual(M6)						
Y	Yes	Auto(AM-S	Auto(AM-S7)						
N	No	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
Y50700	Yes	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
N	No	Auto(S6)	Auto(S6)						
N	No	Auto(S6)	Auto(S6)						
N	No	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
Y	Yes	Auto(S8)	Auto(S8)						
N50700	No	Auto(S8)	Auto(S8)						
N	No	Auto(AM-S	Auto(AM-S6)						
N	No	Auto(AM-S	Auto(AM-S7)						
N	No	Manual(M	Manual(M6)						
N	No	Auto(AM-S	Auto(AM-S7)						
N	No	Manual(M	Manual(M6)						
N	No	Auto(AM-S	Auto(AM-S7)						
N50700	No	Auto(AM-S	Auto(AM-S7)						
N50700	No	Auto(AM-S	Auto(AM-S7)						
N50700	No	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
N	No	Auto(AM-S	Auto(AM-S	TT Coupe quattro					
N	No	Auto(AM-S	Auto(AM-S	TT Coupe quattro					
N	No	Auto(AM-S	Auto(AM-S6)						
N50700	No	Auto(S8)	Auto(S8)						
N	No	Auto(S8)	Auto(S8)						
N50700	No	Auto(S8)	Auto(S8)						

N	No	Auto(S8)	Auto(S8)	
N	No	Auto(S8)	Auto(S8)	
N	No	Auto(S8)	Auto(S8)	
N	No	Auto(S8)	Auto(S8)	
Y	Yes	Auto(AM-S	Auto(AM-S7)	
Y	Yes	Auto(AM-S	Auto(AM-S7)	
N	No	Auto(AM-S	Auto(AM-S7)	
N	No	Auto(AM-S	Auto(AM-S7)	
N	No	Auto(S6)	Auto(S6)	
N	No	Manual(M	Manual(M5)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
N	No	Auto(S6)	Auto(S6)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
N	No	Auto(S6)	Auto(S6)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Auto(S6)	Auto(S6)	
N	No	Manual(M	Manual(M5)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
N	No	Auto(S6)	Auto(S6)	
N	No	Manual(M	Manual(M5)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
N	No	Auto(S6)	Auto(S6)	
N	No	Manual(M	Manual(M5)	
N	No	Auto(S6)	Auto(S6)	
N	No	Manual(M	Manual(M5)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Manual(M	Manual(M6)	
Y	Yes	Auto(AM-S	Auto(AM-S7)	
N	No	Auto(S6)	Auto(S6)	
N	No	Auto(AM-S	Auto(AM-S6)	
N	No	Auto(S6)	Auto(S6)	Tiguan front
N	No	Auto(S6)	Auto(S6)	
N	No	Auto(S8)	Auto(S8)	
N	No	Auto(S8)	Auto(S8)	

[redacted]	EPA Calculated Gas GE	[redacted]	[redacted] (GHG Ratin	#1 Smog R	#1 Mfr Sm	#1 EPA Sm	SmartWay
34.9	[redacted]	6	6	GVGAV02.	9		
36.2	[redacted]	7	7	GVGAV02.	9		
34.3	[redacted]	6	6	GVGAV02.	9		
35.2	[redacted]	6	6	GVGAV02.	9		
35.4	[redacted]	6	6	GVGAV02.	5		
32.3	[redacted]	6	6	GVGAJ02.(	5		
33.1	[redacted]	6	6	GVGAV02.	5		
31.4	[redacted]	5	5	GVGAJ02.(	5		
32.3	[redacted]	6	6	GVGAJ02.(	5		
33.1	[redacted]	6	6	GVGAV02.	5		
37.3	[redacted]	7	7	GVGAV02.	6		
33.7	[redacted]	6	6	GVGAV02.	6		
31	[redacted]	5	5	GVGAV03.	5		
38.2	[redacted]	7	6	GVGAJ03.(	5		
31	[redacted]	5	5	GVGAV03.	5		
38.2	[redacted]	7	6	GVGAJ03.(	5		
36.9	[redacted]	7	6	GVGAJ03.(	5		
28.8	[redacted]	5	5	GVGAV03.	5		
27.6	[redacted]	5	5	GVGAV04.	5		
21.1	[redacted]	3	3	GVGAV06.	5		
31.2	[redacted]	5	5	GVGAJ02.(	5		
30	[redacted]	5	5	GVGAV02.	5		
29.5	[redacted]	5	5	GVGAV02.	5		
29.6	[redacted]	5	5	GVGAJ02.(	5		
34.3	[redacted]	6	5	GVGAJ03.(	5		
27.2	[redacted]	5	5	GVGAJ03.(	5		
34	[redacted]	6	6	GVGAT02.(	5		
22.6	[redacted]	4	4	GVGAV04.	5		
33.2	[redacted]	6	6	GVGAV02.	5		
26.9	[redacted]	5	5	GVGAJ03.(	5		
23.5	[redacted]	4	4	GVGAJ03.(	5		
26.9	[redacted]	5	5	GVGAJ03.(	5		
23.5	[redacted]	4	4	GVGAJ03.(	5		
26.4	[redacted]	5	5	GVGAJ03.(	5		
26.8	[redacted]	5	5	GVGAV04.	5		
26.8	[redacted]	5	5	GVGAV04.	5		
24.7	[redacted]	4	4	GVGAV04.	5		
24.9	[redacted]	4	4	GVGAJ03.(	5		
33.5	[redacted]	6	6	GVGAV02.	9		
33.5	[redacted]	6	6	GVGAV02.	9		
31.9	[redacted]	6	6	GVGAV02.	5		
23.7	[redacted]	4	4	GVGAV04.	5		
19.5	[redacted]	2	2	GVGAV06.	5		
21.9	[redacted]	3	3	GVGAV04.	5		

18.3	[redacted]	2	2 GVGAV06.	5
21.9		3	3 GVGAV04.	5
18.3		2	2 GVGAV06.	5
17.3		1	1 GVGAV06.	5
16.4		1	1 GVGAV06.	5
15		1	1 GVGAV06.	5
20.8		3	3 GVGAV05.	5
20.4		3	3 GVGAV05.	5
37.1		7	7 GVGAV02.	7
37.4		7	7 GVGAV02.	7
35.4		6	6 GVGAV02.	7
33.7		6	6 GVGAV02.	7
37.1		7	7 GVGAV02.	7
34.2		6	6 GVGAV02.	7
33.7		6	6 GVGAV02.	7
32.2		6	6 GVGAV02.	7
31.6		6	6 GVGAV02.	7
24.8		4	4 GVGAV03.	5
32.4		6	6 GVGAV02.	5
38.9		7	7 GVGAV02.	9
39.3		7	7 GVGAV02.	9
32.6		6	6 GVGAV02.	5
31.2		6	6 GVGAV02.	5
38.6		7	7 GVGAV02.	9
38.1		7	7 GVGAV02.	9
35.9		7	7 GVGAV02.	9
35.8		7	7 GVGAV02.	9
43.8		8	8 GVGAV01.	5
44.8		8	8 GVGAV01.	5
39.4		7	7 GVGAV02.	7
38.9		7	7 GVGAV02.	7
36.4		6	6 GVGAV02.	7
34.9		6	6 GVGAV02.	7
60.8		9	9 GVGAV01.	7
39.1		7	7 GVGAV02.	7
28.5		5	5 GVGAV03.	5
29.7		5	5 GVGAJ02.(	5
29.6		5	5 GVGAJ02.(	5
30.6		5	4 GVGAT03.(	5
25		4	4 GVGAT03.(	5

#3 Smog R #3 Mfr Sm #3 EPA Sm SmartWay #4 Smog R #4 Mfr Sm

GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAJ02.C	5
GVGAJ02.C	5

GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5
GVGAV02.I	5

[illegible]	$ You Save	$ You Spend	City CO2	Hwy CO2	Comb CO2	CO2- Volu	CO2- Volu	CO2-Vol In
		750	379	267	328			
		1000	362	256	314			
		250	379	280	334			
		750	366	271	323			
		250	371	303	341			
		1000	415	295	361			
		500	397	276	343			
		1250	424	303	370			
		1000	415	295	361			
		500	397	276	343			
		250	357	252	310			
		500	398	269	340			
		1250	436	296	373			
		500	403	270	343			
		1250	436	296	373			
		500	403	270	343			
		0	426	280	360			
		2250	473	303	397			
		2250	492	310	410			
		5500	640	403	534			
		1250	420	317	373			
		1750	451	313	389			
		1750	446	316	387			
		1750	452	322	393			
		250	430	328	385			
		2750	496	347	429			
		500	369	298	337			
		4750	614	355	497			
		500	381	289	340			
		2750	488	321	413			
		3500	519	341	439			
		2750	488	321	413			
		3500	519	341	439			
		2750	500	341	428			
		2750	497	332	423			
		2750	505	331	427			
		3500	546	336	452			
		4000	528	373	458			
		250	373	290	336			
		250	373	290	336			
		1000	386	323	358			
		4000	580	347	475			
		7500	710	421	580			
		5500	638	370	517			

	7500	736	443	604
	5500	638	370	517
	7500	736	443	604
	10000	791	491	656
	10000	836	481	676
	11500	887	532	727
	5500	617	429	532
	6500	634	442	547
1000		360	263	316
1000		358	261	314
750		374	282	333
250		385	292	343
1000		360	263	316
250		383	288	340
250		385	292	343
	1000	403	283	349
	1000	426	279	360
	2250	523	351	446
	1000	405	292	354
1250		352	247	305
1500		350	240	300
	1000	388	298	347
	1000	406	289	354
1250		348	253	305
1250		358	248	309
1000		358	271	319
1000		355	258	311
2000		321	228	279
2250		311	221	271
1250		350	245	302
1250		353	241	303
750		370	265	323
750		383	273	333
3500		212	184	200
1250		355	236	302
	750	449	319	390
	1750	431	344	392
	1750	435	344	394
	1500	502	356	437
	2750	520	391	462

[illegible]	[illegible]	[illegible]	[illegible]	240V Char	120V Char	PHEV Tota
309	191	255.9	378.7	267.1	328.5
289	188	243.6	362.1	255.5	314.1
305	200	257.8	378.6	280.1	334.3
294	198	250.8	366	271	323.2
292	199	250.2	371.2	303.3	340.6
327	210	274.4	415	295	361
320.1	202	267	396.8	276.4	342.5
335	216	281.4	424.4	303.1	369.8
327	210	274.4	415	295	361
320.1	202	267	396.8	276.4	342.5
278.5	178	233.3	357.1	251.9	309.8
312.5	191	257.8	397.9	269.4	340.1
345	211	284.7	436.2	296.4	373.3
326.3	193.3	266.4	402.7	270.5	343.2
345	211	284.7	436.2	296.4	373.3
326.3	193.3	266.4	402.7	270.5	343.2
339	198	275.6	425.6	280.1	360.1
376.5	225	308.3	473.4	302.9	396.7
396	226	319.5	492.3	309.7	410.1
515	310	422.8	640.3	403.3	533.6
331	226	283.8	419.7	316.6	373.3
357.5	223	297	451	312.5	388.7
357	230	299.9	445.6	315.7	387.1
358	230	300.4	451.6	321.9	393.2
348	231	295.4	430.5	328.5	384.6
390	251	327.4	496	347	429
380	223	309.4	369	298	337
499.5	269.5	396	613.8	354.8	497.3
311	214	267.4	381.4	289.2	339.9
396	248	329.4	488	321	412.8
443	266	363.4	519	341	438.9
396	248	329.4	488	321	412.8
443	266	363.4	519	341	438.9
401	256	335.8	500	341	428.4
403.5	241	330.4	496.9	331.8	422.6
407.5	238	331.2	505.4	331.1	427
446.1	251.6	358.6	546	336.3	451.6
427	269	355.9	528	372.7	458.1
307.9	216.6	266.8	373.4	289.6	335.6
307.9	216.6	266.8	373.4	289.6	335.6
314	233	277.6	385.7	323.4	357.7
462	263	372.4	580	347	475.2
576	314	458.1	709.5	420.8	579.6
511	278	406.2	638.3	369.6	517.4

617	333	489.2	736.3	442.9	604.3
511	278	406.2	638.3	369.6	517.4
617	333	489.2	736.3	442.9	604.3
645.5	355.5	515	791	490.9	656
705	353	546.6	836	481	676.2
756.1	403.3	597.3	887.1	532.1	727.4
512	328	429.2	616.6	428.8	532.1
521	336	437.8	633.8	441.8	547.4
280.8	185.9	238.1	360.4	262.6	316.4
278.4	185	236.4	357.6	261.3	314.3
292.5	200	250.9	374.2	281.5	332.5
309.3	204.2	262	384.6	292.2	343
280.8	185.9	238.1	360.4	262.6	316.4
299.7	204.7	257	382.8	287.9	340
309.3	204.2	262	384.6	292.2	343
327.3	207.8	273.5	402.7	282.8	348.8
346.5	203.1	282	426	279.1	359.9
434	265	358	523	351	445.6
321	213	272.4	404.7	291.7	353.9
274	174	229	352.4	246.5	304.7
272	169	225.6	350.1	239.8	300.5
315	218	271.4	388	297.7	347.4
334	223	284	406.3	289.2	353.6
270	179	229	347.7	253.3	305.2
279	175	232.2	358.3	247.9	308.6
288	195	246.2	358	270.7	318.7
294	191	247.7	354.6	257.9	311.1
245	154	204.1	320.6	227.7	278.8
237	149	197.4	311.3	221.2	270.8
271.8	172.5	227.1	349.8	244.5	302.4
274.4	170	227.4	352.9	241.2	302.6
288.6	188	243.3	369.7	265.4	322.8
305.8	189.6	253.5	382.9	272.9	333.4
155	136	146.4	212.1	184.3	199.6
276.4	166.4	226.9	355.3	236.3	301.8
372	238	311.7	449	319	390.5
340.8	246.4	298.3	431.3	344	392
343.8	246.3	299.9	434.9	343.9	393.9
401	248	332.2	502.3	356.5	436.7
416	281	355.2	520.1	390.6	461.8

[illegible]	[illegible]	[illegible]	Comb Vol Higher	Final Label	EPA_FUEL	EPA_GHG	EPA_AMT
	N		3.7	3.7			
	N		3.6	3.6			
	N		3.8	3.8			
	N		3.7	3.7			
	N		3.7	3.7			
	N		4	4			
	N		3.8	3.8			
	N		4.2	4.2			
	N		4	4			
	N		3.8	3.8			
	Y		3.6	3.6			
	Y		3.8	3.8			
	N		4.2	4.2			
	N		3.3	3.3			
	N		4.2	4.2			
	N		3.3	3.3			
	N		3.6	3.6			
	N		4.5	4.5			
	N		4.5	4.5			
	N		5.9	5.9			
	N		4.2	4.2			
	N		4.3	4.3			
	N		4.3	4.3			
	N		4.3	4.3			
	N		3.7	3.7			
	N		4.8	4.8			
	N		3.8	3.8			
	N		5.6	5.6			
	N		3.8	3.8			
	N		4.8	4.8			
	N		5	5			
	N		4.8	4.8			
	N		5	5			
	N		4.8	4.8			
	N		4.8	4.8			
	N		4.8	4.8			
	N		5	5			
	N		5.3	5.3			
	N		3.8	3.8			
	N		3.8	3.8			
	N		4	4			
	N		5.3	5.3			
	N		6.7	6.7			
	N		5.9	5.9			

N	6.7	6.7
N	5.9	5.9
N	6.7	6.7
N	7.7	7.7
N	7.7	7.7
N	8.3	8.3
N	5.9	5.9
N	6.2	6.2
N	3.6	3.6
N	3.6	3.6
N	3.7	3.7
N	3.8	3.8
N	3.6	3.6
N	3.8	3.8
N	3.8	3.8
N	4	4
N	4	4
N	5	5
N	4	4
N	3.4	3.4
N	3.3	3.3
N	4	4
N	4	4
N	3.4	3.4
N	3.4	3.4
N	3.6	3.6
N	3.6	3.6
Y	3.1	3.1
Y	3	3
N	3.4	3.4
N	3.4	3.4
N	3.7	3.7
N	3.7	3.7
N	2.3	2.3
N	3.4	3.4
N	4.3	4.3
N	4.3	4.3
N	4.3	4.3
N	4.2	4.2
N	5.3	5.3

EPA_UNR	EPA_UNR	EPA_UNR	EPA_ADJ_	EPA_PHEV	Label Subr	GHG 1-10	rating on Ethanol (EPA Deter
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richarc	6	
					Mr Richard E Thomas Jr		
					Mr Richarc	6	
					Mr Richarc	6	
					Mr Richard E Thomas Jr		
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					Mr Richard E Thomas Jr		
					Mr Richarc	6	
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richarc	5	
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
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					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr		
					Mr Richard E Thomas Jr

Mr Richard E Thomas Jr
Mr Richard E Thomas Jr
Mr Richard E Thomas Jr

mined)

From: MSN.com - Hotmail, Outlook, Skype, Bing, Latest News, Photos & Videos
Sent: Tue 10/6/2015 10:37:33 PM
Subject: VW CEO says recall to start in January, be completed end-2016
MAIL_CONVERSATION_TOPIC: VW CEO says recall to start in January, be completed end-2016
Created: Fri 3/18/2016 6:18:04 PM

Volkswagen Chief Executive Matthias Mueller said in an interview with a German newspaper that the company would launch a recall for cars affected by its diesel emissions rigging in January and complete the fix by the end of next year.

View article...

To: Grundler, Christopher[grundler.christopher@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: McCabe, Janet
Sent: Tue 10/6/2015 11:44:47 PM
Subject: Fwd: VW Group of America

FYI

Sent from my iPhone

Begin forwarded message:

From: "Rupp, Mark" <Rupp.Mark@epa.gov>
Date: October 6, 2015 at 7:06:58 PM EDT
To: "McCabe, Janet" <McCabe.Janet@epa.gov>, "Giles-AA, Cynthia" <Giles-AA.Cynthia@epa.gov>
Subject: VW Group of America

We received a nice letter in the mail today from the President/CEO offering "a personal and profound apology" and with a commitment "at every level of [the] company to do what must be done to begin to regain [our] trust."

To: Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Tue 10/6/2015 11:47:28 PM
Subject: VW under pressure for answers as emissions scandal deadlines loom

Ex. 5
http://www.autonews.com/article/20151006/OEM02/151009888?template=mobile&X-IgnoreUserAgent=1

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

To: Bunker, Byron[bunker.byron@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 12:23:36 AM
Subject: Mueller says recall to begin Jan 2016/complete by end of 2016

foxbusiness.com

Download the Twitter app

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

To: Bunker, Byron[bunker.byron@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 12:35:29 AM
Subject: Fwd: VW Group of America

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

Begin forwarded message:

From: "McCabe, Janet" <McCabe.Janet@epa.gov>
Date: October 6, 2015 at 7:44:47 PM EDT
To: "Grundler, Christopher" <grundler.christopher@epa.gov>, "Bunker, Byron" <bunker.byron@epa.gov>, "Hengst, Benjamin" <Hengst.Benjamin@epa.gov>
Subject: Fwd: VW Group of America

FYI

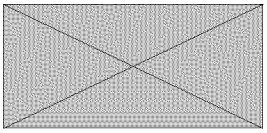
Sent from my iPhone

Begin forwarded message:

From: "Rupp, Mark" <Rupp.Mark@epa.gov>
Date: October 6, 2015 at 7:06:58 PM EDT
To: "McCabe, Janet" <McCabe.Janet@epa.gov>, "Giles-AA, Cynthia" <Giles-AA.Cynthia@epa.gov>
Subject: VW Group of America

We received a nice letter in the mail today from the President/CEO offering "a personal and profound apology" and with a commitment "at every level of [the] company to do what must be done to begin to regain [our] trust."

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Environmental Law360
Sent: Wed 10/7/2015 7:31:31 AM
Subject: EPA Rejects New TSCA Controls For Mercury, CO2



ENVIRONMENTAL

Wednesday, October 7, 2015

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In 1995, only 11 years into her career, Norton Rose Fulbright’s Gerry Lowry received

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perhaps the highest vote of confidence any trial lawyer can get: a letter from a judge sent to her firm's head of litigation praising her trial work.

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At companies with $1 billion or less in revenues, general counsel pull in $311,750 a year, while other in-house lawyers make about $197,000, according to a new in-house compensation report that breaks down pay by company revenues, industry, practice area and legal experience.

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Any law firm or client would want its attorneys to make the best use of their time, but some time-wasting habits remain entrenched in the industry, leading to unnecessary billable hours that can make lawyers or firms less attractive. Here, Law360 looks at five common ways attorneys waste time — and what to do about them.

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Royal Dutch Shell PLC

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Federal Emerge Manage Agency

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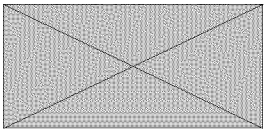

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Tim Crane
Sent: Wed 10/7/2015 8:10:35 AM
Subject: Volkswagen Briefing - Wednesday, 7th October 2015

Hi Christopher

Ahead of testifying to congress tomorrow I thought you may like to receive a super earlier round up of global news on the VW saga.

Today's is below – let me know if both you and your colleagues would like to receive the summary free of any charge for a few days.

Best regards

Tim

Tim Crane | Early Morning Media Ltd | 27 High Street, Ewell, Epsom KT17 1SD | Tel: **0207 186 1060**| Registered in England No: 06719248. www.earlymorningmedia.co.uk

EARLY MORNING MEDIA

Volkswagen Briefing

Produced by Early Morning Media

A round-up of the key press news and comment relating to Volkswagen

Wednesday, 7th October 2015

MANAGEMENT

Mueller: Changes will not be painless

VW is facing changes that “will not be painless” in the wake of its emissions scandal, the car manufacturer’s new chief executive, Matthias Mueller, has said. All investments that were not deemed absolutely necessary would be abandoned or delayed, he said. Technical solutions were within view and the firm would do everything it could to keep jobs secure, he added. Mr Mueller told employees at VW's Wolfsburg home plant in Germany: “I will be very open: this will not be painless.” Future investment in plant, technology and vehicles would be put “under scrutiny”. “We will do everything to ensure that Volkswagen will stand for good and secure jobs in the future,” he added.

ITV News *Deutsche Welle* *Financial Times* *City AM* *The Daily Telegraph, Business, Page: 5* *Daily Mail, Page: 63* *The Guardian, Page: 21*

VW expects “painful” cutbacks

Volkswagen CEO Matthias Müller has announced plans to launch an urgent review into all investments in new vehicles, plants and technology, insisting that any planned changes that are not urgently needed will be "scrapped or delayed". He also admitted that the €6.5bn that the group has set aside to deal with the scandal would not be enough. Speaking to staff at the VW HQ Wolfsburg, he indicated that job losses could also take place.

The Times

Recalls will start in January

VW expects to start a recall of cars affected by its emissions scandal in January, the company’s new chief executive, Matthias Mueller, has said. All affected cars will be fixed by the end of 2020, he told Frankfurter Allgemeine Zeitung. Only a few employees have been involved in the scandal, he added in the interview.

BBC News

REGULATORY

VW chief to face Congress

Michael Horn, president and CEO of Volkswagen Group of America, is set to face Congress this week when he testifies in front of a House committee about the company's emissions cheating scandal. He is scheduled to testify in front of the House Energy and Commerce Committee on Thursday morning. The committee is examining the use of so-called "defeat devices" that allowed Volkswagen's "clean diesel" vehicles to cheat emissions testing. Christopher Grundler, director of the Environmental Protection Agency's Office of Transportation and Air Quality, and Phillip Brooks, director of the EPA's Air Enforcement Division, also are scheduled to testify.

Washington Examiner *Reuters*

Car makers deny cheating emissions tests

A number of major car manufacturers have denied cheating emissions tests in a survey conducted by Which?. All 19 respondents, including Nissan, Hyundai and Jaguar Land Rover, said they had not manipulated data. Which? said it was important for the Government to immediately publish a timetable for a genuinely independent investigation into the emission scandal, and ensure any consumers found to be affected could gain easy access to redress.

The Herald, Page: 1 *Yorkshire Post, Page: 2*

LEGAL

Second group of VW owners to sue

Another group of Volkswagen vehicle owners in South Korea has sued the German

carmaker for deceiving them about manipulated emission tests following the first case which was filed last week. They sought 30 million won (£16,958) each in damages in case the contracts are not cancelled. Nearly 500 people have sent documents to proceed with a legal action against the carmaker since the first lawsuit was filed.

Independent I, Page: 39

OPINION

SMMT chief: Industry needs to regain trust

Mike Hawes, chief executive of the Society of Motor Manufacturers and Traders has warned that the sector faces a fight to regain customer trust after the Volkswagen emissions scandal, and that it was on the car makers to regain that trust. Mr Hawes said he would not rule out the possibility that the scandal would affect car sales in the UK. However, latest figures showed that dealerships recorded their highest ever registrations in September, with sales of VW brand cars in Britain up by almost 4%.

Financial Times

SALES

Diesel sales fall in UK

The number of British motorists choosing diesel-powered cars has dropped to its lowest level in more than two years in the wake of Volkswagen scandal. New car registrations data from the Society of Motor Manufacturers and Traders (SMMT) for September show that diesel's market share was 45.9%, a drop of 3 percentage points on the previous month and 2 percentage points on the same point a year ago. Registrations of petrol-powered vehicles rose 2.7 percentage points on August's level to 51.4% of the market, while sales of alternatively fuelled vehicles (AFVs) edged up to 2.6% from 2.4% the previous month.

The Daily Telegraph *The Guardian, Page: 21* *Daily Mirror, Page: 44* *The Independent, Page: 49*

Scottish VW sales accelerate

Sales of Volkswagen Group cars increased in Scotland last month despite the brand being engulfed by a diesel emissions cheating scandal. In September, 3,959 new Volkswagen cars were registered to drivers in Scotland compared to 3,768 in September 2014 - an increase in sales of 5%.

The Herald *The Scotsman, Page: 30*

OTHER

Fleets to review VW models

Eight out of 10 fleet operators expect implications for the UK fleet market, following revelations that Volkswagen cheated in official nitrogen oxide (NOx) emissions tests in the US. Sewells Research & Insight questioned more than 460 fleet operators in the wake of the scandal and more than half (54%) said they are less likely to trust claims made by manufacturers in future. Of those with Volkswagen Group models on fleet, half (49%) say they are potentially looking to review the company's position on their choice list.

Fleet News

Drivers encouraged to use VW website

ITV News has learned that VW is testing a new system to alert drivers whether they are affected by the emissions scandal. Volkswagen and Audi sites are already being tested on the quiet. Skoda and SEAT will be established soon. Drivers can check if they are going to be impacted by the biggest crisis in the car maker's long history.

ITV News

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Registered Address; 27 High Street, Ewell, Epsom KT17 1SD

Phone: 0207 186 1060

To: Good, David[good.david@epa.gov]
From: Thomas, Richard (EEO)
Sent: Wed 10/7/2015 10:06:59 AM
Subject: RE: 2016 FE Guide - dataset attached as of 6AM 10/6/2015

Thank you Dave.

I sent another email on Friday, Sept 25th with a sample, Series PHEV Audi A3 e-tron Ultra fuel economy (Monroney), label for your review. Did you have time to look it over? Confirmatory CD highway testing continues at EPA his week.

Richard

From: Good, David [mailto:good.david@epa.gov]
Sent: Tuesday, October 06, 2015 6:19 PM
To: Thomas, Richard (EEO)
Subject: 2016 FE Guide - dataset attached as of 6AM 10/6/2015

Richard,

Here's the 2016 VW data in Verify as of 6AM this morning---except I didn't include the eGolf. The macro didn't find any errors.

Dave

From: Thomas, Richard (EEO) [mailto:Richard.Thomas@vw.com]
Sent: Tuesday, October 06, 2015 11:52 AM
To: Good, David
Subject: RE: Relabel Index #022

Thanks Dave.

From: Good, David [mailto:good.david@epa.gov]
Sent: Tuesday, October 06, 2015 11:51 AM
To: Thomas, Richard (EEO)
Subject: RE: Relabel Index #022

Richard,

I'll run our query in an hour or so.

Dave

From: Thomas, Richard (EEO) [mailto:Richard.Thomas@vw.com]
Sent: Tuesday, October 06, 2015 6:02 AM
To: Good, David
Subject: Relabel Index #022
Importance: High

Hi Dave;

Last Friday I relabeled the automatic Golf R as we discussed last week. I would like to make sure that all is in order with the label before I forward to the our group that print Monroney labels. Could you do an audit of the 2016 fuel economy labels and send to me please?

If you have any questions, please feel free to contact me.

Best regards,

Richard

Richard E. Thomas

Senior Emission Certification Specialist

Engineering & Environmental Office (EEO)

Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4213

Fax: 248 754 4207

mailto:

Richard.Tho

To: Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Harrison, Melissa[Harrison.Melissa@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]
From: Purchia, Liz
Sent: Wed 10/7/2015 10:56:31 AM
Subject: Fwd: VW CEO says recall to start in January, be completed end-2016 | Reuters

http://mobile.reuters.com/article/idUSKCN0S02XH20151007

To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Harrison, Melissa[Harrison.Melissa@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]
From: Purchia, Liz
Sent: Wed 10/7/2015 11:01:48 AM
Subject: Re: VW CEO says recall to start in January, be completed end-2016 | Reuters

Ex. 5

Liz Purchia
U.S. EPA
202-564-6691
202-841-2230

On Oct 7, 2015, at 7:01 AM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:

Ex. 5

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 6:56 AM, Purchia, Liz <Purchia.Liz@epa.gov> wrote:

http://mobile.reuters.com/article/idUSKCN0S02XH20151007

To: Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 11:02:08 AM
Subject: Fwd: VW CEO says recall to start in January, be completed end-2016 | Reuters

Sent this last night. Pls find out if this is for US vehicles

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

Begin forwarded message:

From: "Purchia, Liz" <Purchia.Liz@epa.gov>
Date: October 7, 2015 at 6:56:31 AM EDT
To: "Grundler, Christopher" <grundler.christopher@epa.gov>, "Hengst, Benjamin" <Hengst.Benjamin@epa.gov>, "Birgfeld, Erin" <Birgfeld.Erin@epa.gov>, "Allen, Laura" <Allen.Laura@epa.gov>, "Harrison, Melissa" <Harrison.Melissa@epa.gov>, "Conger, Nick" <Conger.Nick@epa.gov>
Subject: Fwd: VW CEO says recall to start in January, be completed end-2016 | Reuters

http://mobile.reuters.com/article/idUSKCN0S02XH20151007

To: Purchia, Liz[Purchia.Liz@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Harrison, Melissa[Harrison.Melissa@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 11:08:55 AM
Subject: Re: VW CEO says recall to start in January, be completed end-2016 | Reuters

The vehicles outside the US are easier to fix because they were built for less demanding standards and test cycles

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 7:01 AM, Purchia, Liz <Purchia.Liz@epa.gov> wrote:

> Thanks. Seems to be getting a lot of coverage this am. Just heard it on morning edition.
>
> Liz Purchia
> U.S. EPA
> 202-564-6691
> 202-841-2230
>
> On Oct 7, 2015, at 7:01 AM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:
>
> Caution: we are not sure if this applies to US vehicles. We are finding out
>
> Christopher Grundler, Director
> Office of Transportation and Air Quality
> U.S. EPA
> 202-564-1682 (DC)
> 734-214-4207 (Ann Arbor)
>
> On Oct 7, 2015, at 6:56 AM, Purchia, Liz <Purchia.Liz@epa.gov> wrote:
>
> http://mobile.reuters.com/article/idUSKCN0S02XH20151007

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: EnergyGuardian
Sent: Wed 10/7/2015 11:13:44 AM
Subject: Cruz spars with Sierra Club over impact of EPA rules on minorities

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Energy and environment headlines for the morning of Wednesday, October 7, 2015

Cruz spars with Sierra Club over impact of EPA rules on minorities

By Kevin Rogers

New federal regulations to rein in power plant carbon emissions and reduce ozone will have a deleterious effect on minorities, GOP presidential candidate Sen. Ted Cruz and Black Chamber of Commerce President Harry Alford charged Tuesday.

The comments drew a sharp rebuke from Sierra Club President Aaron Mair, who said the rules would only serve to protect vulnerable communities and improve public health.

Cruz, a Texas Republican, used a hearing of the Senate Judiciary Subcommittee on Oversight, Agency Action, Federal Rights and Federal Courts, which he chairs, to paint the Environmental Protection Agency as a rogue agency steering the country toward a bleak economic future laden with minority job losses and higher electricity prices.

He touted a report from the Black Chamber, presented at the hearing by Alford, that projected that EPA's Clean Power Plan to cut carbon emission would result in the loss of 7 million jobs among black Americans and 12 million jobs among Hispanic Americans by 2035.

The regulations, finalized in August, would aim to cut power plant carbon pollution by 32 percent by 2030, compared with 2005 levels.

"Those are staggering numbers, and those are numbers in the minority community, who only want to have a fair chance to achieve the American dream," Cruz said. "How should a politician justify his or her support for rules costing them their livelihood?"

Alford also decried the agency's newly final ground-level ozone regulation, which set a new standard of 70 parts per billion, down from the previous 75 ppb standard. He said it would fall hardest on urban areas, which often have more traffic and manufacturing to generate ozone-forming pollutants.

"Under a 70 ppb ozone standard, more urban areas will be in non-attainment, which means further penalties for places that already face slower than average economic growth," he said. "This new ozone standard also could raise energy costs, and families on fixed incomes have little room to absorb them."

Mair said the group's Clean Power Plan report was "bogus" and said Alford's group bought into "smoke and mirrors" from the fossil fuel industry. He argued that the rules would offer minority communities a respite from pollution and related health impacts.

"Environmental injustices are taking black lives. The overwhelming evidence shows that low-income areas and communities of color do not receive equal protection from environmental harm, despite suffering the greatest exposure to toxic pollutants," he said. "Lacking political power, these communities are frequently chosen as sites for polluting facilities who feel compelled to accept them as a source for jobs, despite the hazards they pose."

Subcommittee Ranking Member Sen. Chris Coons, D-Del., also raised concerns with the Black Chamber of Commerce study, noting it clashed with other analyses from the Union of Concerned Scientists and the National Association for the Advancement of Colored People.

"I think this is a subject of active dispute," he said.

Cruz and Mair sparred over the economic implications of the plan, with Cruz contending that Mair was painting too rosy a picture of the Obama administration's environmental policies.

"We've had six and a half years of this administration putting oppressive environmental regulations in place and you said 'well, this new wave of regulation it's not going to impact any jobs, it not's going to impact electric bills,'" he said. "I'm willing to bet that six and a half years ago you made the same predictions that the onerous regulations being put in place then weren't going to cost any jobs, weren't going to raise electric bills."

But Muir argued that the rules hadn't had a chance to be implemented yet. He argued that the new pollution regulations would spur new development in the renewable energy industry, providing new job opportunities in sectors he said have been stifled by oil and coal companies.

He pointed to the EPA's assessment that the Clean Power Plan could create 360,000 jobs by 2020.

"When we talk about existing status quo, right now doing nothing is costing jobs. Doing nothing is poisoning our economy. Doing nothing is taking human health," he said. "When we talk about the Clean Power Plan and new policies that are moving forward, shifting to this new clean, green economy will actually create jobs, not reduce them."

Quick Links

Senate panel probing VW's use of tax credits

VW CEO: Recall of cars hit by scandal to begin in January

California governor to sign aggressive climate change bill

Study: No fracking bonanza for California's Monterey Shale

Mine panel overrules judge's tossing of violation notice

US experts warn plutonium stocks could soar in East Asia

Gasholder, piece of industrial past, faces uncertain future in N.H.

Power sector coal consumption declining in 2015: EIA

Endangered species fight changing direction

Wolf offers lesser gas extraction tax to help break Pa. impasse

Oil rises on tighter U.S. supply numbers

Deaths report, stats can offer lessons to oil and gas industry

Glencore wants Paris conference to recognize coal

Denton to go 70 percent renewable by 2019: Mayor

Exterran returns to plans for spinoff, renaming

SunEdison's Latin deal falls by the wayside

Watchdog unhappy with latest appointment to Michigan PUC

Upcoming Events

Senate panel probing VW's use of tax credits

By Matthew Daly

WASHINGTON (AP) — The Senate Finance Committee opened a probe Tuesday into Volkswagen's use of a federal tax credit intended for fuel-efficient cars as the company's emissions-rigging scandal widened.

Sens. Orrin Hatch, R-Utah, and Ron Wyden, D-Ore. said in a letter to Volkswagen that more than $50 million in tax subsidies may have gone to VW owners under false pretenses. Hatch chairs the Finance panel and Wyden is its senior Democrat.

Volkswagen's use of "defeat devices" in diesel passenger cars raises the question of whether the automaker "made false representations to the U.S. government" in certifying that the VW Jetta and other models met emissions standards needed to claim the $1,300-per-veheicle tax credit, the senators said. The Associated Press obtained a copy of the letter, which was sent to VW late Tuesday.

The vehicles in which Volkswagen installed the defeat devices "included those that the company certified as qualifying for the advanced lean-burn technology motor vehicle credit," Hatch and Wyden said.

More

VW CEO: Recall of cars hit by scandal to begin in January

By The Associated Press

BERLIN (AP) — Volkswagen plans to launch in January a recall of vehicles with software at the center of the emissions-rigging scandal and aims to fix them all by the end of next year, the company's new chief executive says.

Volkswagen has said up to 11 million vehicles worldwide across several of its brands contain the diesel engine with the software used to cheat on U.S. emissions tests. CEO Matthias Mueller told the daily Frankfurter Allgemeine Zeitung: "It will hopefully be fewer, but in any case still far too many."

Asked when the recall will begin, Mueller said in an interview published Wednesday that "care goes before speed."

"If everything goes as planned, we can start the recall in January," he said. "All the cars should be in order by the end of 2016."

More

California governor to sign aggressive climate change bill

By Michael R. Blood and Judy Lin

LOS ANGELES (AP) — California is doubling down in its fight against global warming.

Gov. Jerry Brown is expected on Wednesday to sign an ambitious climate change measure to increase California's renewable electricity use to 50 percent and double energy efficiency in existing buildings by 2030.

"We have the technological means and now we have the legal mandate to reduce carbon pollution," Brown said in a statement after the Legislature approved the bill, SB350, last month.

The governor began the year with a proposal for the state to set the most aggressive greenhouse-gas emissions benchmark in North America. He discussed global warming concerns with the pope at the Vatican in July and met with other leaders around the world on the issue.

More

Study: No fracking bonanza for California's Monterey Shale

By Ellen Knickmeyer

SAN FRANCISCO (AP) — A U.S. Geological Survey report out Tuesday downgrades the fracking potential of California's vast Monterey Shale oil deposits.

The study is the latest to lower a 2011 federal energy estimate that billed the Monterey Shale as a game-changer for U.S. oil, with what was then estimated at 13.7 billion barrels of recoverable oil overall.

Instead, the U.S. Geological Survey's new study said, the most oil-rich portion of the giant shale formation holds just 21 million barrels of oil that can be recovered by intensive methods, such as hydraulic fracturing, better-known as fracking.

The modest assessment has the potential to influence energy policy in California, where Gov. Jerry Brown has resisted calls from environmentalists to ban fracking.

More

Mine panel overrules judge's tossing of violation notice

By The Associated Press

CHARLESTON, W.Va. (AP) — An administrative law judge has been ordered to revisit a finding that a Patriot Coal subsidiary displayed a "pattern of violations."

The Mine Safety and Health Administration on Tuesday announced the ruling by the Federal Mine Safety and Health Review Commission.

The judge had invalidated the administration's enforcement action involving Brody Mining of Wharton and determined U.S. Labor Secretary Thomas Perez failed to define what a pattern of violations entailed.

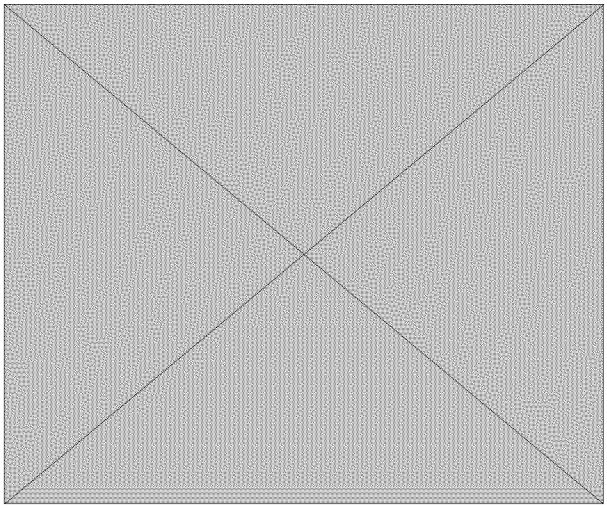
The commission ruled Perez's definition was adequate and returned the case to the judge for further proceedings.

More

A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org



US experts warn plutonium stocks could soar in East Asia

By Matthew Pennington and Mari Yamaguchi

WASHINGTON (AP) — Experts warn that Northeast Asia could see a dangerous growth in stocks of weapons-usable plutonium — and U.S. lawmakers say Obama administration policies could be making matters worse.

Japan plans to open as early as next spring a plant that could reprocess enough spent reactor fuel to make as many as 1,000 nuclear bombs a year. The plutonium that is produced is supposed to be for generating electricity, but Japan already has tons on hand and no use for it, with its reactors at a virtual halt following the 2011 Fukushima Dai-ichi disaster. Local politicians are aggressively backing the plant, eager for investment in a remote northern region.

Meanwhile, the U.S. is renewing civil nuclear agreements with China and South Korea on less restrictive terms.

For the first time, China has prior consent to extract plutonium from the spent fuel generated in U.S.-designed reactors. The plutonium could potentially be used for nuclear weapons, though the agreement bars the use of American technology for military purposes. South Korea could also get permission to reprocess within six years.

More

Gasholder, piece of industrial past, faces uncertain future in N.H.

By Rik Stevens

CONCORD, N.H. (AP) — A round, red-brick relic of this country's industrial transformation sits shakily at the southern entrance to New Hampshire's capital city, the cupola atop its conical, tree-damaged roof slumping northward.

Built in 1888, the Concord gasholder building is believed to be the last of its clan in the United States with its interior works intact, a monument to a turning point in how people lived and worked: By forcing coal gas through pipes to homes and businesses, the gas works meant people were no longer captive to candles or oil lamps. Businesses could run three shifts; people could read, gather or walk the streets more safely deep into the night with a steady source of illumination.

After the roof was damaged during a storm in 2013, the building was temporarily repaired and now historians and preservation experts worry that without permanent repairs — and soon — the building is doomed to the rubble pile.

"This was a technical revolution," said Jim Garvin, the retired state architectural historian. "This is a unique survivor in the United States."

More

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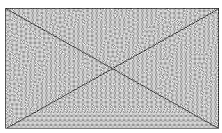

Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

Click here to read the brief

Power sector coal consumption declining in 2015: EIA

The latest Short-Term Energy Outlook from the Energy Information Administration predicts the U.S. power sector will use an estimated 781.4 million short tons of coal this year, a drop of 8.2 percent from 2014, Platts reports.

More

Endangered species fight changing direction

A number of environmental and conservation groups are coming around to support Obama administration moves to support endangered species without listing them, The New York Times reports.

More

Wolf offers lesser gas extraction tax to help break Pa. impasse

In a compromise offer to Pennsylvania lawmakers to try to break the impasse over the state budget, Gov. Tom Wolf is proposing to make cuts in several of his tax proposals, including the one for a gas extraction tax, The Associated Press reports.

More

Oil rises on tighter U.S. supply numbers

American Petroleum Institute data showing a decrease in crude and distillate stocks on Wednesday helped oil prices build on big gains a day earlier. Light U.S. crude rose $1.07 to $49.60 a barrel in electronic trading on the Nymex early Wednesday, while in London Brent gained 90 cents to $52.82, Reuters reports.

More

Deaths report, stats can offer lessons to oil and gas industry

A National Institute for Occupational Safety and Health epidemiologist says detailed federal data on the deaths of workers in the oil and gas industry can point to trends and offer lessons for improved safety going forward, the Pittsburgh Post-Gazette reports.

More

Glencore wants Paris conference to recognize coal

The upcoming global climate change conference in Paris should recognize that coal continues to be an important energy source, a top official with mining giant Glencore was set to tell a conference in Australia Wednesday, Reuters reports.

More

Denton to go 70 percent renewable by 2019: Mayor

The latest energy plan for Denton, Texas accelerates the timeline for the city to generate 70 percent of its energy from renewable sources, from 2030 to 2019, The Texas Tribune reports.

More

Exterran returns to plans for spinoff, renaming

Exterran Holdings says it intends by year's end to reorganize into two entities: the natural gas compression firm Archrock Inc. and gas transportation partnership Archrock Partners LP, FuelFix reports.

More

SunEdison's Latin deal falls by the wayside

Strapped renewable firm SunEdison Inc. hasn't been able to make a $400 million cash payment that was needed to complete its purchase of Latin American Power, people familiar with the matter told The Wall Street Journal.

More

Watchdog unhappy with latest appointment to Michigan PUC

Fox2Detroit probes the appointment of former Consumers Energy official Norm Saari to a post on the Michigan Public Service Commission, which watchdog Progress Michigan describes as tapping "a fox to guard a henhouse."

More

Upcoming Events

- Oct. 7, Washington: The House Natural Resources Committee to hold a markup on eight bills. 4:00 pm , 1324 Longworth.
- Oct. 7, Washington: The House Armed Services Subcommittee on Strategic Forces to hold a hearing on plutonium disposition and the MOX Project in South Carolina. National Nuclear Safety Agency Administrator Frank Klotz, Energy Department Senior Advisor John MacWilliams and Oak Ridge National Laboratory Thom Mason to testify. 3:30 pm , 2118 Rayburn.
- Oct. 7, Washington: The House Rules Committee to hold a meeting to set protocol a bill from Rep. Joe Barton, R-Texas, to lift the ban on crude oil exports. 3:00 pm , H-313.
- Oct. 7, Washington: The House Energy and Commerce Subcommittee on Energy and Power to hold a hearing on the Environmental Protection Agency's Clean Power Plan. Acting Assistant Administrator Janet McCabe, of the Office of Air and Radiation, to testify. 10:00 am , 2123 Rayburn.
- Oct. 7, Washington: The House Science, Space and Technology subcommittees on Environment and Oversight to hold a hearing on the Environmental Protection Agency's newly final ozone standard. 10:00 am , 2318 Rayburn.
- Oct. 7, Washington: The Senate Environment and Public Works Committee to hold an oversight hearing for the Nuclear Regulatory Commission. NRC Chairman Stephen Burns and commissioners Kristine Svinicki, William Ostendorff and Jeffrey Baran to testify. 9:30 am , Dirksen 406.

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: E&E Publishing
Sent: Wed 10/7/2015 11:34:26 AM
Subject: October 7 -- E&E Daily is ready

Read today's E&E Daily on the web

AN E&E PUBLISHING SERVICE

E&E DAILY — Wed., October 7, 2015

READ FULL EDITION

1.FEDERAL AGENCIES:

One of EPA's toughest critics is running for speaker

Jason Chaffetz vows that he wouldn't let his daughters work at U.S. EPA. That's not what an agency wants to hear from a lawmaker who could become speaker of the House. But since taking the reins of the Oversight and Government Reform Committee earlier this year, the Utah Republican has become one of EPA's fiercest critics.

TOP STORIES

2.TRADE:
Landmark Trans-Pacific deal to get 'intense scrutiny' on Hill

3.OIL:
Key Democrat to vote against House crude export bill

4.AIR POLLUTION:
Foes of new ozone limit push legislation to halt it

ON THE HILL

5.APPROPRIATIONS:
Spending talks off to a slow start

IN THE HOUSE

6.CLEAN POWER PLAN:
McCabe girds to defend rule today in House hearing

7.URANIUM:
NRC questioned legality of EPA pollution plan -- documents

8.FISHERIES:
Bill would bar NOAA from charging fishermen for monitors

ON THE HOUSE FLOOR

9.FISHERIES:
House OKs bill handing crab fishery management to 3 states

ON THE SENATE FLOOR

10.NOAA:
Senate passes bill to update tsunami warning program

IN THE SENATE

11.AIR POLLUTION:
Senate panel probes whether VW abused tax break program

12.REGULATIONS:
Cruz, Sierra Club chief get hot over climate change at hearing

13.EPA:
Sen. Cotton offers bill to drop agency liability shield

POLITICS

14.CAMPAIGN 2015:
Clashes over clean coal, Sierra Club arise in Ky. debate

E&ETV'S ONPOINT

15.EMISSIONS:
World Coal Association's Sporton discusses global disconnect on industry's future

UPCOMING HEARINGS AND MARKUPS

16.CALENDAR:

Activity for October 5 - October 11, 2015

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Subject: Grundler, Christopher Calendar
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CHRISTOPHER GRUNDLER

WEDNESDAY, OCTOBER 7, 2015

CALENDAR

DC OFFICE

10:00 AM – 11:00 AMPrep Session #2 for VW HEC Hearing

Location: RM. 6520 DC/RM. C-174 DOD AA

Non-Responsive

Gwen Stewart

Office of Transportation and Air Quality

202 564-1682 – Telephone

202 564-1686 – Fax Number

Stewart.gwen@epa.gov

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NEWS UPDATE October 7, 2015

IEA releases mid-term forecast for biofuels, renewable energy

By Katie Fletcher, Biomass Magazine • • Posted October 7, 2015

The International Energy Agency recently released its annual Medium-Term Renewable Energy Market Report at a Group of 20 leaders' meeting in Turkey. The report forecasts global market trends and developments for renewable energy and biofuels to 2020. The MTRMR 2015 indicates that renewable energy will represent the largest single source of electricity growth over the next five years, driven by falling costs and aggressive expansion in emerging economies. Although the report points to the promise renewables hold for affordably mitigating climate change and enhancing energy security, the report warns governments to reduce policy uncertainties that are slowing greater deployment. [read more …]

Moniz stands his ground against crude exports

Geof Koss, E&E reporter • • Posted October 7, 2015

Congressional support for repealing the ban on crude oil exports may be growing, but Energy Secretary Ernest Moniz remains a skeptic. In an appearance before the Senate Energy and Natural Resources Committee today, Moniz was pressed by Sen. John Barrasso (R-Wyo.) on why the administration is "dithering" on crude exports when it has taken steps to approve natural gas exports. Moniz drew a distinction between the two commodities. [read more …]

Key Democrat to vote against House crude export bill

Hannah Northey, E&E reporter • • Posted October 7, 2015

Democratic Rep. Gene Green of Texas last night said he would vote against a House bill to lift the country's crude oil export ban, a decision that took the legislation's Republican author, also from Texas, by surprise. Green said he recently offered two amendments ahead of today's Rules Committee markup and Friday's floor vote, but he quickly added that Barton wouldn't budge. [read more …]

Senate panel probes whether VW abused tax break program

Sean Reilly, E&E reporter • • Posted October 7, 2015

The Senate Finance Committee is investigating whether Volkswagen, already in trouble over emissions cheating, also illegally claimed millions of dollars in tax credits under a program to spur sales of fuel-efficient vehicles. In a letter yesterday to top executives with the German automaker, Finance Chairman Orrin Hatch (R-Utah) and ranking member Ron Wyden (D-Ore.) said that VW claimed the "advanced lean-burn technology" credit — worth in some cases $1,300 per car — on some of the same diesel models recently found to have "defeat devices" intended to foil emission-testing requirements. [read more …]

Biofuel from whisky byproducts better than ethanol, says maker

BY JIM DRURY, Reuters • • Posted October 7, 2015

A Scottish company has developed a commercial scale method of producing biofuel capable of fuelling cars from the unwanted residue of the whisky fermentation process. Edinburgh-based Celtic Renewables developed its process of producing biobutanol at industrial scale in Belgium and was recently awarded a £11 million ($16.7 million USD) grant by the British government to build a bespoke facility of its own in central Scotland.
[read more …]

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- Republican senators took advantage of a committee hearing on the Strategic Petroleum Reserve to grill Energy Secretary Ernest Moniz on the possibility of repealing the crude oil export ban. Lifting the ban is becoming a priority for GOP lawmakers, but the Obama administration isn't budging on its opposition. (Morning Consult)

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Barani Krishnan, Reuters

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Oil Export Ban Dominates Hearing on Strategic Petroleum Reserve
Deirdra O'Regan, Morning Consult

Energy Secretary Ernest Moniz was ostensibly on Capitol Hill to answer questions on the modernization of the Strategic Petroleum Reserve (SPR). But he spent much of his time in front of the Senate Energy and Natural Resources Committee deflecting a barrage of questions relating to the 1970's-era ban on crude oil exports.

Volkswagen Scandal Could Drive Crude Demand, Says EIA Chief
Kevin Baxter, The Wall Street Journal

The recent scandal involving Volkswagen's diesel engine testing could increase crude oil demand due to higher gasoline consumption, according to Adam Sieminski, administrator for the U.S. Energy Information Administration. Mr. Sieminski reasoned that if more light automobiles switched from diesel, crude demand would grow due to more oil being needed to process gasoline.

Chevron CEO: We maybe have gotten sloppy in the past few years
Suzanne Edwards, Houston Business Journal

California-based Chevron Corp. laments the "sloppy" habits formed during the go-go years of high oil prices, as chairman and CEO John Watson explained at the Great Houston Partnership's State of Energy Luncheon in Houston on Oct. 5… Of the large-cap energy companies, Chevron is the most over-leveraged…

Freeport-McMoRan Reviewing Options for Oil-and-Gas Business
Tess Stynes, The Wall Street Journal

Freeport-McMoRan Inc. said it is reviewing options for its oil-and-gas business, adding that the potential public offering of a minority interest in the business remains an alternative. Phoenix-based Freeport also said it cut its board to nine members from 16 members, with five of the departing members named to an oil-and-gas board of directors and two others retiring.

Natural Gas Makes Small Gains Ahead of Winter Heating Season
Timothy Puko, The Wall Street Journal

Natural gas made small gains Tuesday but is still lingering near three-year lows as healthy supplies cap any rally ahead of the winter heating season. Prices for the front-month November contract settled up 2 cents, or 0.8%, to $2.47 a million British thermal units on the New York Mercantile Exchange.

Utilities & Infrastructure

Energy Department Predicts Lower Winter Fuel Bills
Clifford Krauss, The New York Times

American consumers will again spend considerably less on energy this winter because of lower oil and natural gas prices and expected warmer weather, the Energy Department projected on Tuesday. The department's Energy Information Administration, in its Winter Fuels Outlook report, forecast a 6 percent decline in residential natural gas consumption this winter.

Washington mayor announces proposed deal to save Pepco-Exelon merger
Diane Bartz, Reuters

Washington Mayor Muriel Bowser announced a proposed settlement on Tuesday that she said she hoped would prompt the city's utilities regulator to approve a plan for Exelon Corp and Pepco Holdings Inc to merge. The settlement increases Exelon's proposed investment in the city to $78 million from $14 million, the DC government said in a statement.

EPA gave special treatment to Alaska mine opponents, report says
Timothy Cama, The Hill

The Environmental Protection Agency (EPA) gave special treatment to groups that wanted to block a massive copper and gold mine in Alaska, according to a new report. The Tuesday report was commissioned by the Pebble Partnership, which is trying to develop the Pebble Mine in southwest Alaska.

Renewables

Oil-Producing Solar Farm Nears Construction Start by Glasspoint
Anna Hirtenstein, Bloomberg News

GlassPoint Solar Inc will begin work on one of the world's largest solar park this month, with completion planned for late 2017. The 1-gigawatt solar-thermal project will turn water into steam for injection into an oilfield in Oman.

SunEdison Won't Complete $700 Million Buyout of Latin America Power
Liz Hoffman, The Wall Street Journal

SunEdison Inc. won't complete its roughly $700 million planned acquisition of Latin American Power as the U.S. solar-energy producer's woes mount. Private-equity-owned Latin American Power walked away from its sale to SunEdison, which was to close Sept. 30, according to people familiar with the matter.

Wind And Solar Closing The Gap With Gas And Coal
Joshua S Hill, Clean Technica

A new report from Bloomberg New Energy Finance has concluded that the levelized cost of electricity is closing between wind and solar with gas and coal. Bloomberg New Energy Finance (BNEF) published its Levelised Cost of Electricity Update for the second half of 2015 this week, and concluded that onshore wind is fully competitive with gas and coal in certain parts of the world, while the gap continues to close for the remainder of wind and solar around the world.

Coal

Patriot Coal, West Virginia Agree on $50 Million Cleanup
Jacqueline Palank, The Wall Street Journal

Patriot Coal Corp. and state regulators overseeing its West Virginia mines on Tuesday struck a deal that provides $50 million to cover cleanup costs and resolves a sticking point to the coal company's efforts to move forward with its debt-payment plan. The deal announced on Tuesday would see Patriot post $12.5 million in cash to assure its performance of land-reclamation and water-treatment obligations in West Virginia, provided by the hedge funds currently financing Patriot's chapter 11 case.

Bankrupt Patriot Coal issues new notice for its workers
Rachel Chitra, Reuters

Bankrupt miner Patriot Coal Corp , which is in the midst of auctioning off its assets, has issued a new WARN (Worker Adjustment and Retraining Notification Act) notice to its employees. Patriot Coal expects to lay off more than 2,000 workers in West Virginia, the Associated Press reported Tuesday.

Glencore's Coal Chief Seeks to Calm Investors Amid Rout
Rhiannon Hoyle, The Wall Street Journal

Glencore PLC's coal chief on Wednesday played down concerns over workings of its secretive trading arm, as the company continued to assure investors about the health of its business model. Some investors have described Glencore's marketing unit as a "black box" in which the risks are impossible to value, leading to wild swings in the resources giant's share price in recent weeks.

Greenpeace Says Can Find Cash to Buy Vattenfall Coal Assets
Niklas Magnusson et al., Bloomberg News

Greenpeace is exploring funding options to buy Vattenfall AB's lignite operations in Germany as it seeks to shut the power plants and prevent others from starting new coal mines. The environmental group wants to start discussions with Vattenfall after the Swedish state-owned utility put the assets up for sale, Annika Jacobson, head of Greenpeace in Sweden, said in an e-mailed statement on Tuesday.

U.K. Said to Consider Closing All Coal-Fired Plants by 2023
Alex Morales and Rachel Morison, Bloomberg News

The U.K. is considering whether to close all of its 12 coal-fired power plants by 2023 as part of its effort to reduce the greenhouse gases blamed for global warming, an official with knowledge of the discussions said. Europe's second-biggest polluter is also considering whether to make the announcement before Nov. 30, when United Nations climate talks start in Paris, according to the official, who asked not to be identified because the talks haven't yet reached a conclusion.

Nuclear

Chernobyl Wildlife Make a Comeback Despite Contamination
Mike Wood et al., Scientific American

The accident at the Chernobyl Nuclear Power Plant in 1986 had a devastating impact on the local population and forced 116,000 people to permanently leave their homes. But now researchers have discovered that, while the people may not have returned, the contaminated area of Belarus is teeming with wild animals, including elk, wild

boar, deer and wolves.

Climate

UN climate science panel elects first new leader in 13 years
Suzanne Goldenberg, The Guardian

The United Nations Nobel-winning climate science panel – the ultimate authority tracking the extent of global warming and its consequences for humanity – has a new leader after 13 years. Governments chose Hoesung Lee, the long-serving vice-chair of the climate panel, to replace Rajendra Pachauri, who was forced to step down after being accused of sexual harassment by a female employee at his research institute in India.

Climate Treaty Forecast: Cloudy With a Chance of Disaster
Naveena Sadasivam, InsideClimate News

If the climate pledges countries have submitted are any indication of whether the world can save itself with a global climate treaty, the planet doesn't stand a chance. More than 140 countries have submitted plans to the United Nations Framework Convention on Climate Change on how they will reduce carbon dioxide emissions to fight climate change.

Opinions, Editorials & Perspectives

The Misguided Efforts of American Energy Companies
David L. Goldwyn, The New York Times

The reality in the United States, however, is that any opening of exports must be balanced with progress on the environment. Regrettably, America's leading energy companies are more focused on fighting domestic efforts to reduce carbon emissions than on gaining the freedom to compete abroad.

Renewables: does the IEA underestimate them?
Karel Beckman, Energy Post

In its latest annual Renewable Energy Medium-Term Market Report, published on 2 October, the IEA could hardly have been more positive about the prospects of renewables. This is significant, as the IEA, founded in the 1970s to coordinate the oil emergency stocks OECD member nations keep on hand in case of an oil supply crisis, is today arguably the world's most influential energy think tank.

Stuff Happens to the Environment, Like Climate Change
Thomas L. Friedman, The New York Times

Heading into the United Nations climate summit meeting in Paris in December, all the world's largest industrial economies are now taking climate change more seriously. This includes the United States — except for some of the knuckleheads running to be our next president, which is not a small problem.

EPA's ozone decision is about politics, and that's OK
Stuart Shapiro, The Hill

Earlier this week, the Environmental Protection Agency (EPA) issued its much-awaited ozone standard. The EPA regulation lowered the standard to 70 parts per billion (ppb) of ozone. The Obama administration had considered a change in 2011, but postponed it in part due to strong industry opposition and the approach of the president's reelection.

Research Reports, Issue Briefs & Case Studies

2015 Federal Employee Viewpoint Survey
Office of Personnel Management

The Federal Employee Viewpoint Survey (FEVS) is a tool that measures employees' perceptions of whether, and to what extent, conditions characterizing successful organizations are present in their agencies. Survey results provide valuable insight into the challenges agency leaders face in ensuring the Federal Government has an effective civilian workforce and how well they are responding.

Wind and Solar Boost Cost-Competitiveness Versus Fossil Fuels
Bloomberg New Energy Finance

This year has brought a significant shift in the generating cost comparison between renewable energy and fossil fuels, according to detailed analysis by technology and region, published this week by Bloomberg New Energy Finance. The research company's Levelised Cost of Electricity Update for the second half of 2015, based on thousands of data points related to individual deals and projects around the world, shows that onshore wind and crystalline silicon photovoltaics – the two most widespread renewable technologies – have both reduced costs this year, while costs have gone up for gas-fired and coal-fired generation.

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From: energy@morningconsult.cpro30.com
Sent: Wed 10/7/2015 12:14:57 PM
Subject: Morning Consult Energy: McConnell Moves Forward with $35.4 Billion Energy and Water Bill; Oil Jumps $2 After Execs Warn of 'Dramatic' Decline in U.S. Output

By Deirdra O'Regan

Today's Washington Brief

- Senate Majority Leader Mitch McConnell (R-Ky.) is pushing forward with a controversial $35.4 billion energy and water spending bill that has riled Democrats because it contains riders that would undercut the Environmental Protection Agency and divert clean-energy funding toward fossil and nuclear energy programs. (Washington Examiner)

- Republican senators took advantage of a committee hearing on the Strategic Petroleum Reserve to grill Energy Secretary Ernest Moniz on the possibility of repealing the crude oil export ban. Lifting the ban is becoming a priority for GOP lawmakers, but the Obama administration isn't budging on its opposition. (Morning Consult)

- Philip Moeller, a Republican member of the Federal Energy Regulatory Commission, is stepping down at the end of the month. President Obama has yet to nominate a replacement, though Patrick McCormick, a senior GOP aide on the Senate Energy and Natural Resources Committee, could be next in line. (The Hill)

Today's Business Brief

- Oil jumped $2 a barrel on Tuesday after remarks from senior oil executives warned of a "dramatic" decline in U.S. output that could lead to a price spike if fuel demand escalates. (Reuters)

- Energy efficiency saved large U.S. manufacturers an estimated $2.4 billion in energy costs over the past five years and could generate more than $11 billion in annual savings by 2020, according to the Department of Energy. At the same time, the figures account for just 11.4 percent of America's total manufacturing energy footprint. (Clean Technica)

- Consumers are projected to spend considerably less on energy this winter because of lower oil and natural gas prices combined with a forecast for warmer weather, according to the Energy Department. Gas customers can expect an

overall 10 percent decline, while households that rely on oil can expect to save a total of 25 percent. (The New York Times)

Today's Chart Review

Origin country of uranium purchased for U.S. commercial nuclear reactors, 2007-14
PennEnergy

Mark Your Calendars (All Times Eastern)

Wednesday
AFPM Q&A technology forum @ 7:30 a.m.
Congressional Hispanic Caucus Institute annual Public Policy Conference @ 8 a.m.
FERC environmental review & compliance for natural gas facilities seminar @ 8 a.m.
Society of Environmental Journalists annual conference @ 9 a.m.
USEA annual energy supply forum @ 9:30 a.m.
Senate EPW oversight of the NRC @ 10 a.m.
House E&C hearing on the Clean Power Plan @ 10 a.m.
House Science, Space, & Technology Environment Subcommittee and Oversight Hearing Subcommittee hearing on EPA's new ozone standard @ 10 a.m.
Resources for the Future seminar on shipping in the Arctic @ 12:45 p.m.
NRC Advisory Committee on Reactor Safeguards meeting @ 2 p.m.
House Oversight Interior Subcommittee hearing on invasive species policy @ 2 p.m.

Thursday
Society of Environmental Journalists annual conference @ 5:30 a.m.
FERC environmental review & compliance for natural gas facilities seminar @ 8 a.m.
NRC Advisory Committee on Reactor Safeguards meeting @ 8:30 a.m.
Congressional Hispanic Caucus Institute annual Public Policy Conference @ 9 a.m.
USEA annual energy supply forum @ 9 a.m.
Sen. Energy & Nat. Resources hearing on six bills @ 9:30 a.m.
House E&C Oversight and Investigations Subcommittee hearing on Volkswagen's emissions scandal @ 10 a.m.
House Small Business Investigations, Oversight and Regulations Subcommittee hearing on DOL's overtime rule @ 10 a.m.
Clean Energy States Alliance webinar on fuel cells for educational facilities @ 1 p.m.
Sen. Energy & Nat. Resources Public Lands, Forests and Mining Subcommittee legislative hearing @ 2:30 p.m.
EESI webinar on energy efficiency in Iowa @ 2:30 p.m.

Friday

NRC Advisory Committee on Reactor Safeguards meeting @ 8:30 a.m.
Society of Environmental Journalists annual conference @ 9 a.m.
CATO talk on regressive regulation to boost U.S. economic growth @ 12 p.m.

General

McConnell looks to pick a fight with Dems over energy
John Siciliano, Washington Examiner

Senate Majority Leader Mitch McConnell Tuesday plans to begin debate on an energy spending bill that stoked controversy among Democrats earlier this year over riders looking to undercut the Environmental Protection Agency and clean energy. The Kentucky Republican moved Tuesday to push the spending bill forward.

GOP energy commissioner to step down this month
Devin Henry, The Hill

Philip Moeller, a Republican member of the Federal Energy Regulatory Commission (FERC), will step down from his post at the end of October, he announced Tuesday… President Obama has yet to nominate a replacement for Moeller, though it has long been rumored that Patrick McCormick, a senior GOP aide on the Senate Energy and Natural Resources Committee, would be the pick.

Energy Efficiency Saves US Manufacturers $2.4 Billion
Silvio Marcacci, Clean Technica

Energy efficiency has saved large manufacturers in the United States an estimated $2.4 billion in energy costs over the past five years, and could generate over $11 billion in annual energy savings by 2020. These eye-popping stats come from the US Department of Energy's Better Plants Program, a multi-sector initiative to improve the energy efficiency of America's commercial, residential, and industrial buildings.

Senators dismiss tying conservation fund to chemical reform
Devin Henry, The Hill

Senators pushing for an overhaul of federal chemical safety laws are dismissing a push to link the measure to one reviving a lapsed conservation fund. Sen. James Inhofe (R-Okla.) said a pair of Republican senators will have to find a different way to bring a renewal of the Land and Water Conservation Fund (LWCF) to the floor rather than blocking a chemical bill they hope to attach it to.

U.S. Index Futures Rise, Tracking Oil, Commodity Gains in Europe
Alan Soughley and Camila Russo, Bloomberg News

S&P 500 E-mini contracts expiring in December rose 0.7 percent to 1,981.75 at 7:29

a.m. in New York. The index slid yesterday, once again faltering near where an advance petered out at the end of August, and a September rally stalled after the Federal Reserve held its fire on interest rates. Dow Jones Industrial Average contracts gained 117 points, or 0.7 percent, to 16,789 today, while those on the Nasdaq 100 Index rose 0.8 percent.

Oil & Natural Gas

U.S. Oil Approaching $50 Boosts Stocks as Emerging Markets Surge
Nick Gentle and Daniel Tilles, Bloomberg News

Stocks rose around the world as U.S. oil approached $50 a barrel for the first time since July, spurring gains by emerging markets and the currencies of commodity-producing nations… Crude rose for the fourth session, boosting energy producers and miners, even as the prospect of rising fuel prices dented the shares of airlines.

Oil jumps $2, breaking range as supply seen ebbing
Barani Krishnan, Reuters

Oil prices jumped more than $2 a barrel on Tuesday, breaking out of a month-long trading range on technical buying and industry talk as well as U.S. government data suggesting the global supply glut could be ebbing. Earlier, oil executives at an industry conference in London warned of a "dramatic" decline in U.S. output that could lead to a price spike if fuel demand escalates.

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From: Brooks, Phillip
Sent: Wed 10/7/2015 12:22:48 PM
Subject: FW: Per our discussion
2015-10-05 FINAL 07 Responses to Peter Spencer-CLEAN_Post Call.docx

From: Ex. 7
Sent: Monday, October 05, 2015 10:17 PM
To: Brooks, Phillip
Subject: Per our discussion

See attached.

Ex. 7

To: Snyder, Jim[Snyder.Jim@epa.gov]; Giles, Michael (EEO)[michael.giles@vw.com]
Cc: Allen, Gregory (EEO)[Gregory.Allen@vw.com]
From: Rodgers, William (EEO)
Sent: Wed 10/7/2015 12:39:20 PM
Subject: RE: VW Group - MY16 Audi A3 e-tron updated application

Jim,
Garett Horton and myself are at the EPA today (Wednesday) and tomorrow for the confirmatory testing, stop over to discuss your findings once you are able to talk to Dan.

Regards,

Bill Rodgers
Emissions Certification Engineer
Volkswagen Group
3800 Hamlin Rd
Auburn Hills, MI 48326
p. (248) 754-4219

-----Original Message-----
From: Snyder, Jim [mailto:Snyder.Jim@epa.gov]
Sent: Tuesday, October 06, 2015 4:08 PM
To: Giles, Michael (EEO)
Cc: Rodgers, William (EEO); Allen, Gregory (EEO)
Subject: RE: VW Group - MY16 Audi A3 e-tron updated application

I'll give it a quick look but 4 other cert requests came in this week before it. On another point, I've heard back from the lab about the CD data format. I think there is an output that we can get you when Dan gets back

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Wed 10/7/2015 12:41:53 PM
Subject: A.M. NEWSCAST: U.S. probes ISIS use of Toyota trucks | At VW, a recall, an apology, a drop in resale value | Subaru global platform | Last Mitsu Evo | Life-saving technology

October 7, 2015

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Cc: Brooks, Phillip[Brooks.Phillip@epa.gov]; Shinkman, Susan[Shinkman.Susan@epa.gov]; Kelley, Rosemarie[Kelley.Rosemarie@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]
From: Giles-AA, Cynthia
Sent: Wed 10/7/2015 1:00:29 PM
Subject: Hearing tomorrow

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http://www.reuters.com/article/2015/10/06/volkswagen-emissions-congress-idUSL1N12602020151006

To: Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Charmley, William[charmley.william@epa.gov]; Alson, Jeff[alson.jeff@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Moran, Robin[moran.robin@epa.gov]
From: Birgfeld, Erin
Sent: Wed 10/7/2015 1:01:36 PM
Subject: Fwd: NYTimes.com: Volkswagen Sought a Green Seal for Its Diesel Cars

FYI- Margo on VW and the GHG rules.

Sent from my iPhone

Begin forwarded message:

From: "Valentine, Julia" <Valentine.Julia@epa.gov>
Date: October 7, 2015 at 8:47:18 AM EDT
To: "Allen, Laura" <Allen.Laura@epa.gov>, "Purchia, Liz" <Purchia.Liz@epa.gov>, "Harrison, Melissa" <Harrison.Melissa@epa.gov>, "Conger, Nick" <Conger.Nick@epa.gov>, "Birgfeld, Erin" <Birgfeld.Erin@epa.gov>, "Millett, John" <Millett.John@epa.gov>, "Hengst, Benjamin" <Hengst.Benjamin@epa.gov>, "Senn, John" <Senn.John@epa.gov>
Subject: NYTimes.com: Volkswagen Sought a Green Seal for Its Diesel Cars

Volkswagen Sought a Green Seal for Its Diesel Cars

• • •

President Obama announcing new emissions targets for vehicles, with auto executives behind him, in July 2011.
JASON REED / REUTERS

By AARON M. KESSLER

OCTOBER 6, 2015

WASHINGTON — In July 2011, President Obama took the stage here to announce sweeping new fuel economy and carbon emissions targets for vehicles in the United States. Joining him were top executives from nearly every automaker, representing 90 percent of vehicles sold domestically.

But one automaker in particular was missing from the stage: Volkswagen.

The German automaker, now at the center of a firestorm over its cheating on diesel emissions tests, boycotted the announcement and refused to pledge support for the deal.

Behind the scenes, its main complaint, according to a former top official at the Environmental Protection Agency, involved the diesel engines it is now accused of rigging. Volkswagen has admitted selling 11 million cars worldwide with engines that spew far more pollution than allowed under the Clean Air Act.

But Volkswagen lobbied hard before the announcement, demanding that its diesel engines receive special fuel economy credits for their environmental friendliness, just as zero-emission electric cars were receiving. The credits are helpful to automakers' efforts to achieve the new standard — a 54.5-mile-per-gallon fleet average by 2025.

"They wanted a special deal for diesel cars that we now know weren't even meeting the standard," said Margo Oge, a former director of the E.P.A. Office of Transportation and Air Quality, who helped lead negotiations with the automakers, including Volkswagen, at the time.

Volkswagen did not just consider its clean diesels comparable to hybrids or plug-in electrics; it believed they were superior, Ms. Oge said.

"These people had religion," she said. "And that religion was diesel. They simply did not believe in electric powertrains and thought they were a waste of time."

One of the most devout followers was a top Volkswagen executive from Germany who has been suspended in the wake of the emissions scandal. The executive, Wolfgang Hatz, most recently led Porsche's research and development efforts, but had been in charge of Volkswagen's powertrain division.

"He said the company simply did not believe in electric powertrains or hybrids," Ms. Oge said. "The Volkswagen management was extraordinarily arrogant. They thought they were the kings of diesel."

While German rivals like BMW had been developing electric cars, and Mercedes-Benz — which also boycotted the announcement over concerns the rules favored American trucks — had invested in alternatives like fuel cell technology, Volkswagen had thrown its entire weight behind the promise of clean diesels.

Without special incentives, the company would have a tougher time meeting the requirements of the new regulations.

But American officials were not swayed. Hybrids would not get such special credits (which Toyota had requested), because regulators considered the technology sufficiently mature. By comparison, diesel engines had been around for a century.

Their verdict was not well received.

"They were very upset they didn't get extra credits for diesel," said Ms. Oge, the vice chairman of DeltaWing Technologies, a company that aims to use racecar technology to improve street vehicles' efficiency.

A former Volkswagen employee familiar with the 2011 negotiations confirmed that the diesel issue was responsible for the company's lack of public support at Mr. Obama's announcement.

It was mainly Volkswagen representatives from Germany, as opposed to American-based executives, who dominated the discussions and tended to dismiss the regulators' concerns and questions, Ms. Oge said.

"I never had a problem dealing with the Americans. The U.S. Volkswagen people would always come and apologize to us after meeting with the Germans," she said. "My sense was

that things were being dictated by Germany."
What remains unknown is whether Mr. Hatz knew of the emissions cheating when he was negotiating with American regulators in 2011.
He did not respond to an email requesting a comment on Tuesday. A spokesman for Porsche said that Mr. Hatz was contesting the implication that he was involved in the emissions cheating. Volkswagen's American headquarters did not respond to a request for comment.
But the suggestion that Mr. Hatz, 56, may have played a role in the scandal has been a shock in German car industry circles, where he has been a prominent figure in engine development.
Unlike many Volkswagen executives, including the new chief executive, Matthias Müller, Mr. Hatz has not spent his entire career at the company. After studying machine tool construction, he began his career at Porsche before its acquisition by Volkswagen. Later he worked at BMW, General Motors' Opel unit, and Fiat, always in positions that involved designing engines, in some cases racecar engines.
Mr. Hatz joined Volkswagen's Audi division in 2001, becoming director of engine and transmission development for all Volkswagen brands in 2007. He was part of a new team that took over responsibility for developing important engines, including the EA 189 line that contains the illegal emissions software at the center of the scandal — which sets off the proper emissions controls only when the vehicle is being tested for compliance.
Volkswagen has promised to submit proposed fixes for its European diesel engines this week. But those proposals will not apply to American cars.
And on Thursday, Volkswagen of America's chief executive, Michael Horn, is set to testify before a House committee investigating the emissions scandal.
Jack Ewing contributed reporting from Frankfurt and Bill Vlasic from Detroit.

Sent from USEPA iPhone

Begin forwarded message:

From: "Valentine, Julia" <Valentine.Julia@epa.gov>
Date: October 7, 2015 at 8:38:44 AM EDT
To: "Valentine, Julia" <Valentine.Julia@epa.gov>
Subject: NYTimes.com: Volkswagen Sought a Green Seal for Its Diesel Cars

From The New York Times:

Volkswagen Sought a Green Seal for Its Diesel Cars

Behind the scenes, Volkswagen's main complaint involved the diesel engines it is accused of rigging, according to a former official at the Environmental Protection Agency.

http://www.nytimes.com/2015/10/07/business/international/volkswagen-sought-a-

green-seal-for-its-diesel-cars.html?mwrsm=Email

Sent from USEPA iPhone

To: Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Shinkman, Susan[Shinkman.Susan@epa.gov]; Kelley, Rosemarie[Kelley.Rosemarie@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 1:01:56 PM
Subject: Re: Hearing tomorrow

Yes. This does not impact US vehicles but have asked our contact to triple check

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 9:00 AM, Giles-AA, Cynthia <Giles-AA.Cynthia@epa.gov> wrote:

> Assume you saw this, but just in case
>
> http://www.reuters.com/article/2015/10/06/volkswagen-emissions-congress-idUSL1N12602020151006

To: Gairola, Sounjay[Gairola.Sounjay@epa.gov]
From: Kaul, Meetu
Sent: Wed 10/7/2015 1:14:08 PM
Subject: Information for VW CBI disclosure letter
EPA 208 Request to VW 09.24.2015.pdf
VW NOV Final Executed 09-18-15.pdf
VW 208 Request 09.24.2015.docx

Here are the only two documents we've issued in the VW case so far.

Ex. 5, 7

Including a word copy of the 208 so you can cut and paste the contact info.

Thanks, Sounjay!

-mk

Ms.Meetu Kaul, Attorney-Advisor

Air Enforcement Division
United States Environmental Protection Agency
Direct: 202-564-5472
Email: kaul.meetu@epa.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 18 2015

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Volkswagen AG
Audi AG
Volkswagen Group of America, Inc.
Thru:

David Geanacopoulos
Executive Vice President Public Affairs and General Counsel
Volkswagen Group of America, Inc.
2200 Ferdinand Porsche Drive
Herndon, VA 20171

Stuart Johnson
General Manager
Engineering and Environmental Office
Volkswagen Group of America, Inc.
3800 Hamlin Road
Auburn Hills, MI 48326

Re: Notice of Violation

Dear Mr. Geanacopoulos and Mr. Johnson:

The United States Environmental Protection Agency (EPA) has investigated and continues to investigate Volkswagen AG, Audi AG, and Volkswagen Group of America (collectively, VW) for compliance with the Clean Air Act (CAA), 42 U.S.C. §§ 7401–7671q, and its implementing regulations. As detailed in this Notice of Violation (NOV), the EPA has determined that VW manufactured and installed defeat devices in certain model year 2009 through 2015 diesel light-duty vehicles equipped with 2.0 liter engines. These defeat devices bypass, defeat, or render inoperative elements of the vehicles' emission control system that exist to comply with CAA emission standards. Therefore, VW violated section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B). Additionally, the EPA has determined that, due to the existence of the defeat

VW FOIA, EPA 06/20/2017 2017-FFP_029658

devices in these vehicles, these vehicles do not conform in all material respects to the vehicle specifications described in the applications for the certificates of conformity that purportedly cover them. Therefore, VW also violated section 203(a)(1) of the CAA, 42 U.S.C. § 7522(a)(1), by selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing these vehicles, or for causing any of the foregoing acts.

Law Governing Alleged Violations

This NOV arises under Part A of Title II of the CAA, 42 U.S.C. §§ 7521–7554, and the regulations promulgated thereunder. In creating the CAA, Congress found, in part, that "the increasing use of motor vehicles . . . has resulted in mounting dangers to the public health and welfare." CAA § 101(a)(2), 42 U.S.C. § 7401(a)(2). Congress' purpose in creating the CAA, in part, was "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population," and "to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution." CAA § 101(b)(1)–(2), 42 U.S.C. § 7401(b)(1)–(2). The CAA and the regulations promulgated thereunder aim to protect human health and the environment by reducing emissions of nitrogen oxides (NOx) and other pollutants from mobile sources of air pollution. Nitrogen oxides are a family of highly reactive gases that play a major role in the atmospheric reactions with volatile organic compounds (VOCs) that produce ozone (smog) on hot summer days. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. Breathing ozone can also worsen bronchitis, emphysema, and asthma. Children are at greatest risk of experiencing negative health impacts from exposure to ozone.

The EPA's allegations here concern light-duty motor vehicles for which 40 C.F.R. Part 86 sets emission standards and test procedures and section 203 of the CAA, 42 U.S.C. § 7522, sets compliance provisions. Light-duty vehicles must satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. § 86.1811-04. The EPA administers a certification program to ensure that every vehicle introduced into United States commerce satisfies applicable emission standards. Under this program, the EPA issues certificates of conformity (COCs), and thereby approves the introduction of vehicles into United States commerce.

To obtain a COC, a light-duty vehicle manufacturer must submit a COC application to the EPA for each test group of vehicles that it intends to enter into United States commerce. 40 C.F.R. § 86.1843-01. The COC application must include, among other things, a list of all auxiliary emission control devices (AECDs) installed on the vehicles. 40 C.F.R. § 86.1844-01(d)(11). An AECD is "any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system." 40 C.F.R. § 86.1803-01. The COC application must also include "a justification for each AECD, the parameters they sense and control, a detailed justification of each AECD that results in a reduction in effectiveness of the emission control system, and [a] rationale for why it is not a defeat device." 40 C.F.R. § 86.1844-01(d)(11).

A defeat device is an AECD "that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and

use, unless: (1) Such conditions are substantially included in the Federal emission test procedure; (2) The need for the AECD is justified in terms of protecting the vehicle against damage or accident; (3) The AECD does not go beyond the requirements of engine starting; or (4) The AECD applies only for emergency vehicles . . . ." 40 C.F.R. § 86.1803-01.

Motor vehicles equipped with defeat devices, such as those at issue here, cannot be certified. EPA, *Advisory Circular Number 24: Prohibition on use of Emission Control Defeat Device* (Dec. 11, 1972); *see also* 40 C.F.R. §§ 86-1809-01, 86-1809-10, 86-1809-12. Electronic control systems which may receive inputs from multiple sensors and control multiple actuators that affect the emission control system's performance are AECDs. EPA, *Advisory Circular Number 24-2: Prohibition of Emission Control Defeat Devices – Optional Objective Criteria* (Dec. 6, 1978). "Such elements of design could be control system logic (i.e., computer software), and/or calibrations, and/or hardware items." *Id.*

"Vehicles are covered by a certificate of conformity only if they are in all material respects as described in the manufacturer's application for certification . . . ." 40 C.F.R. § 86.1848-10(c)(6). Similarly, a COC issued by EPA, including those issued to VW, state expressly, "[t]his certificate covers only those new motor vehicles or vehicle engines which conform, in all material respects, to the design specifications" described in the application for that COC. *See also* 40 C.F.R. §§ 86.1844-01 (listing required content for COC applications), 86.1848-01(b) (authorizing the EPA to issue COCs on any terms that are necessary or appropriate to assure that new motor vehicles satisfy the requirements of the CAA and its regulations).

The CAA makes it a violation "for any person to manufacture or sell, or offer to sell, or install, any part or component intended for use with, or as part of, any motor vehicle or motor vehicle engine, where a principal effect of the part or component is to bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use." CAA § 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B); 40 C.F.R. § 86.1854-12(a)(3)(ii). Additionally, manufacturers are prohibited from selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing, any new motor vehicle unless that vehicle is covered by an EPA-issued COC. CAA § 203(a)(1), 42 U.S.C. § 7522(a)(1); 40 C.F.R. § 86.1854-12(a)(1). It is also a violation to cause any of the foregoing acts. CAA § 203(a), 42 U.S.C. § 7522(a); 40 C.F.R. § 86-1854-12(a).

Alleged Violations

Each VW vehicle identified by the table below has AECDs that were not described in the application for the COC that purportedly covers the vehicle. Specifically, VW manufactured and installed software in the electronic control module (ECM) of these vehicles that sensed when the vehicle was being tested for compliance with EPA emission standards. For ease of reference, the EPA is calling this the "switch." The "switch" senses whether the vehicle is being tested or not based on various inputs including the position of the steering wheel, vehicle speed, the duration of the engine's operation, and barometric pressure. These inputs precisely track the parameters of the federal test procedure used for emission testing for EPA certification purposes. During EPA

emission testing, the vehicles' ECM ran software which produced compliant emission results under an ECM calibration that VW referred to as the "dyno calibration" (referring to the equipment used in emissions testing, called a dynamometer). At all other times during normal vehicle operation, the "switch" was activated and the vehicle ECM software ran a separate "road calibration" which reduced the effectiveness of the emission control system (specifically the selective catalytic reduction or the lean NOx trap). As a result, emissions of NOx increased by a factor of 10 to 40 times above the EPA compliant levels, depending on the type of drive cycle (e.g., city, highway).

The California Air Resources Board (CARB) and the EPA were alerted to emissions problems with these vehicles in May 2014 when the West Virginia University's (WVU) Center for Alternative Fuels, Engines & Emissions published results of a study commissioned by the International Council on Clean Transportation that found significantly higher in-use emissions from two light duty diesel vehicles (a 2012 Jetta and a 2013 Passat). Over the course of the year following the publication of the WVU study, VW continued to assert to CARB and the EPA that the increased emissions from these vehicles could be attributed to various technical issues and unexpected in-use conditions. VW issued a voluntary recall in December 2014 to address the issue. CARB, in coordination with the EPA, conducted follow up testing of these vehicles both in the laboratory and during normal road operation to confirm the efficacy of the recall. When the testing showed only a limited benefit to the recall, CARB broadened the testing to pinpoint the exact technical nature of the vehicles' poor performance, and to investigate why the vehicles' onboard diagnostic system was not detecting the increased emissions. None of the potential technical issues suggested by VW explained the higher test results consistently confirmed during CARB's testing. It became clear that CARB and the EPA would not approve certificates of conformity for VW's 2016 model year diesel vehicles until VW could adequately explain the anomalous emissions and ensure the agencies that the 2016 model year vehicles would not have similar issues. Only then did VW admit it had designed and installed a defeat device in these vehicles in the form of a sophisticated software algorithm that detected when a vehicle was undergoing emissions testing.

VW knew or should have known that its "road calibration" and "switch" together bypass, defeat, or render inoperative elements of the vehicle design related to compliance with the CAA emission standards. This is apparent given the design of these defeat devices. As described above, the software was designed to track the parameters of the federal test procedure and cause emission control systems to underperform when the software determined that the vehicle was not undergoing the federal test procedure.

VW's "road calibration" and "switch" are AECDs[1] that were neither described nor justified in the applicable COC applications, and are illegal defeat devices. Therefore each vehicle identified by the table below does not conform in a material respect to the vehicle specifications described in the COC application. As such, VW violated section 203(a)(1) of the CAA, 42 U.S.C. § 7522(a)(1), each time it sold, offered for sale, introduced into commerce, delivered for introduction into commerce, or imported (or caused any of the foregoing with respect to) one of the hundreds of thousands of new motor vehicles within these test groups. Additionally, VW

[1] There may be numerous engine maps associated with VW's "road calibration" that are AECDs, and that may also be defeat devices. For ease of description, the EPA is referring to these maps collectively as the "road calibration."

VW FOIA, EPA 06/20/2017 2017-FFP_029661

violated section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B), each time it manufactured and installed into these vehicles an ECM equipped with the "switch" and "road calibration."

The vehicles are identified by the table below. All vehicles are equipped with 2.0 liter diesel engines.

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

Enforcement

The EPA's investigation into this matter is continuing. The above table represents specific violations that the EPA believes, at this point, are sufficiently supported by evidence to warrant the allegations in this NOV. The EPA may find additional violations as the investigation continues.

The EPA is authorized to refer this matter to the United States Department of Justice for initiation of appropriate enforcement action. Among other things, persons who violate section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B), are subject to a civil penalty of up to $3,750 for each violation that occurred on or after January 13, 2009;[1] CAA § 205(a), 42 U.S.C. § 7524(a); 40 C.F.R. § 19.4. In addition, any manufacturer who, on or after January 13, 2009, sold, offered for sale, introduced into commerce, delivered for introduction into commerce, imported, or caused any of the foregoing acts with respect to any new motor vehicle that was not covered by an EPA-issued COC is subject, among other things, to a civil penalty of up to $37,500 for each violation.[2] CAA § 205(a), 42 U.S.C. § 7524(a); 40 C.F.R. § 19.4. The EPA may seek, and district courts may order, equitable remedies to further address these alleged violations. CAA § 204(a), 42 U.S.C. § 7523(a).

[1] $2,750 for violations occurring prior to January 13, 2009.
[2] $32,500 for violations occurring prior to January 13, 2009.

VW FOIA, EPA 06/20/2017 2017-FFP_029662

The EPA is available to discuss this matter with you. Please contact Meetu Kaul, the EPA attorney assigned to this matter, to discuss this NOV. Ms. Kaul can be reached as follows:

Meetu Kaul
U.S. EPA, Air Enforcement Division
1200 Pennsylvania Avenue, NW
William Jefferson Clinton Federal Building
Washington, DC 20460
(202) 564-5472
kaul.meetu@epa.gov

Sincerely,

Phillip A. Brooks
Director
Air Enforcement Division
Office of Civil Enforcement

Copy:
Todd Sax, California Air Resources Board
Walter Benjamin Fisherow, United States Department of Justice
Stuart Drake, Kirkland & Ellis LLP

VW FOIA, EPA 06/20/2017 2017-FFP_029663

To: Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 1:18:21 PM
Subject: Re: Hearing tomorrow

Roger. Thanks.

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 9:16 AM, Giles-AA, Cynthia <Giles-AA.Cynthia@epa.gov> wrote:

I sent it more for the questions expected to be asked of EPA at the hearing tomorrow.

From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 9:02 AM
To: Giles-AA, Cynthia
Cc: McCabe, Janet; Brooks, Phillip; Shinkman, Susan; Kelley, Rosemarie; Starfield, Lawrence
Subject: Re: Hearing tomorrow

Yes. This does not impact US vehicles but have asked our contact to triple check

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. EPA

202-564-1682 (DC)

734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 9:00 AM, Giles-AA, Cynthia <Giles-AA.Cynthia@epa.gov> wrote:

Assume you saw this, but just in case

http://www.reuters.com/article/2015/10/06/volkswagen-emissions-congress-idUSL1N12602020151006

To: Werner, Jacqueline[Werner.Jacqueline@epa.gov]
From: Kaul, Meetu
Sent: Wed 10/7/2015 1:20:38 PM
Subject: FYI - DOJ coordination meeting FW: VW - weekly meeting agenda
ENV_ENFORCEMENT-#2550358-v1-VW__weekly_meeting_agenda.doc

Ms.Meetu Kaul, Attorney-Advisor

Air Enforcement Division
United States Environmental Protection Agency
Direct: 202-564-5472
Email: kaul.meetu@epa.gov

From: Ex. 7
Sent: Wednesday, October 07, 2015 6:59 AM
To: Ex. 7
Ex. 7
Ex. 7 'brooks.phillips@epa.gov'; Belser, Evan; Kaul, Meetu; Orehowsky, Gregory
Subject: VW - weekly meeting agenda

Morning all. Attached is an agenda for today's meeting. For those in PHB, we will be in 6501A. Conference line 866.410.9426, code Non-Responsive Feel free to invite any in your organization that I missed. EPA folks – let me know if you will be joining in person so we can grab you from the lobby.

Thanks,

Ex. 7

Trial Attorney

Environmental Enforcement Section

United States Department of Justice

PO Box 7611, Ben Franklin Station

Washington, DC 20044-7611

Ex. 7

202.616.2427 (fax)

Overnight Deliveries

601 D Street NW, Room 6915

Washington, DC 20004

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

From: McCabe, Janet
Required Attendees: Grundler, Christopher; Hengst, Benjamin; Bunker, Byron; Giles-AA, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan
Optional Attendees: Huffman, Linda
Location: WJC-N 5400 + 1-866-299-3188; Participant Code: Non-Responsive
Importance: Normal
Subject: VW Update
Categories: Green Category
Start Date/Time: Wed 10/7/2015 9:00:00 PM
End Date/Time: Wed 10/7/2015 10:00:00 PM
Today's Meeting Participants

To: McCabe, Janet; Giles, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

To: Bunker, Byron[bunker.byron@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]
Cc: Grundler, Christopher[grundler.christopher@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
From: Simon, Karl
Sent: Wed 10/7/2015 1:58:48 PM
Subject: VW senate interest

FYI

Senate panel probes whether VW abused tax break program

Sean Reilly, E&E reporter

Published: Wednesday, October 7, 2015

The Senate Finance Committee is investigating whether Volkswagen, already in trouble over emissions cheating, also illegally claimed millions of dollars in tax credits under a program to spur sales of fuel-efficient vehicles.

In a letter yesterday to top executives with the German automaker, Finance Chairman Orrin Hatch (R-Utah) and ranking member Ron Wyden (D-Ore.) said that VW claimed the "advanced lean-burn technology" credit -- worth in some cases $1,300 per car -- on some of the same diesel models recently found to have "defeat devices" intended to foil emission-testing requirements (*Greenwire*, Sept. 18).

"This activity raises questions of whether Volkswagen made false representations to the U.S. government in its certification for federal tax subsidies," Hatch and Wyden wrote.

Based on sales figures, buyers of those cars may have claimed more than $50 million in credits. They asked VW to turn over all certifications, quarterly reports and related documents from 2007 through 2011 related to eligibility for the credit and asked whether the company made any "false or misleading assertions" along the way.

A Volkswagen spokesman could not immediately be reached for comment yesterday evening.

The letter, which asks Volkswagen to supply the requested information by Oct. 30, is addressed to Matthias Müller, the newly named CEO of Volkswagen AG in Germany, and Michael Horn, the head of the carmaker's American arm.

Horn is scheduled to testify on the emissions scheme at a hearing tomorrow by the House Energy and Commerce Subcommittee on Oversight and Investigations. Also on the witness list are two U.S. EPA officials: Christopher Grundler, head of the agency's Office of Transportation and Air Quality; and Phillip Brooks, director of the air enforcement division.

Driving Innovation in Clean Transportation

To: Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]
Cc: Millett, John[Millett.John@epa.gov]
From: Stewart, Lori
Sent: Wed 10/7/2015 2:05:41 PM
Subject: VW hearing press

You may have seen this, but Cynthia Giles sent this clip to Janet:

http://www.reuters.com/article/2015/10/06/volkswagen-emissions-congress-idUSL1N12602020151006

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

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U.S. EPA

Washington, D.C. 20460

202-564-3139

To: Sutton, Tia[sutton.tia@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 5:13:12 PM
Subject: Tier 2 support

Pls find out if VW supported final tier 2 stds

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

To: Werner, Jacqueline[Werner.Jacqueline@epa.gov]
From: Kaul, Meetu
Sent: Wed 10/7/2015 5:13:19 PM
Subject: VW summary
Volkswagen Investigation Oct 7 2015.docx

Ms.Meetu Kaul, Attorney-Advisor

Air Enforcement Division
United States Environmental Protection Agency
Direct: 202-564-5472
Email: kaul.meetu@epa.gov

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Sutton, Tia
Sent: Wed 10/7/2015 6:07:05 PM
Subject: RE: Tier 2 support

On it!

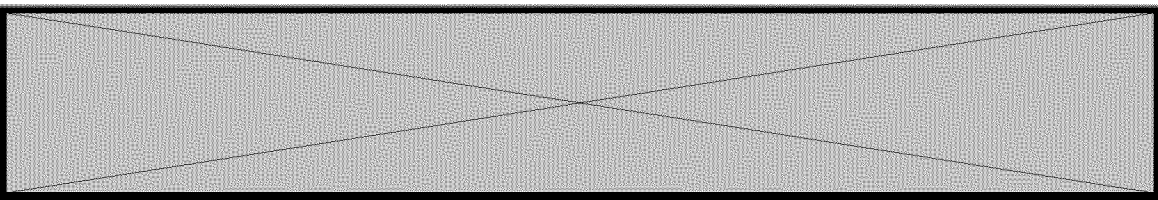
-----Original Message-----
From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 1:13 PM
To: Sutton, Tia
Subject: Tier 2 support

Pls find out if VW supported final tier 2 stds

Christopher Grundler, Director
Office of Transportation and Air Quality U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

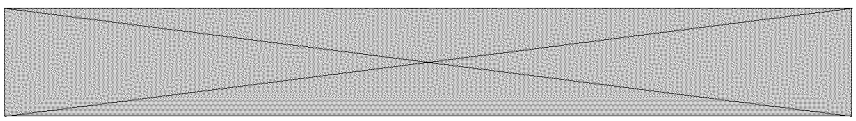
To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Fleets & Fuels
Sent: Wed 10/7/2015 6:07:05 PM
Subject: Eaton exits heavy EVSE, CWI for the ISL G Near Zero, Neste bio-propane

Having trouble viewing this email? Click here



News Brief
-- October 7, 2015

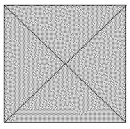
Business Intelligence for Clean Transportation
www.fleetsandfuels.com



Top News

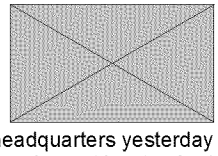
- ***Late Breaking!*** Eaton Exits Commercial EVSE
- CWI Gets EPA Certification, Details Plans for ISL G Near Zero
- Neste Breaks Ground for Bio LPG (Propane) in Rotterdam
- Proterra Opens NorCal HQ, Reveals 35-Foot Bus Plans
- Renewable Diesel for Fleets in Oakland and Eugene
- Parker Says Hydraulic Hybrid Could Satisfy EPA-NHTSA
- EDI and Greenkraft Unveil CNG-Fueled Plug-In Hybrid
- Georgia Power Adds EV Charging and Plans for More
- Union Gas Enables Hamilton CNG Transit Fleet Expansion
- Fisker Renames Itself Karma Automotive
- Propel Fuels Extends Renewable Diesel to Hayward
- TruStar Time-Fill CNG for All Waste Fleet in Connecticut
- Hexagon Indicates Extension of Supply Contract with MAN
- Amphenol Promotes High-Amp Connectors for HEVs
- PERC Honors Propane Autogas Fleets at BusCon
- SoCalGas-Fox Webinar on Clean CNG Trucks **Today**
- Clean Tech Forum in Sacramento **October 14-15**
- Agility Grand Opening in North Carolina on **October 21**
- **Event Preview:** October's **HHP Summit 2015** in Dallas

CWI Gets EPA Nod for ISL G Near Zero



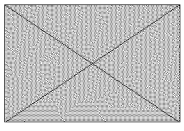
Cummins Westport has begun marketing its Near Zero ISL G dedicated-natural gas engine as the ISL G NZ, having secured certification of nitrogen oxide emissions at just 0.02 grams per brake-horsepower - 90% below 2010 U.S. EPA requirements.

Proterra Plans a 35-Foot Battery Bus

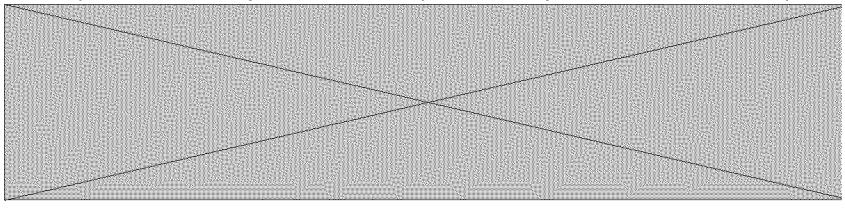


Proterra celebrated the opening of its new Northern California headquarters yesterday evening, and unveiled a new, 'nimbler"'35-foot Catalyst bus to complement its standard 40-foot offerings. 'Our goal,' said CEO Ryan Popple, 'is to replace every single fossil fuel transit vehicle on the road.'

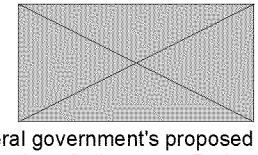
Neste to Produce Bio-Based Propane



Neste has broken ground for a facility in Rotterdam it says will be the first to produce propane, aka LPG for liquefied petroleum gas, from renewable feedstocks. The $67 million plant is to be ready in late 2016. Output will initially will be available in Europe.

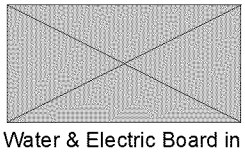


Parker Pitches Hydraulic Hybrid for GHG



Heavy duty vehicle manufacturers worried about the federal government's proposed greenhouse gas emission and fuel use rules need look no further, says Parker Hannifin: the firm's RunWise hydraulic hybrid drive is already commercially available on Autocar refuse trucks.

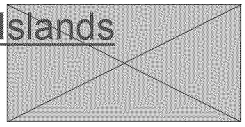
Renewable Diesel in Oakland and Oregon



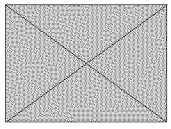
Fleets including the City of Oakland, Calif. and the Eugene Water & Electric Board in Oregon report switching their diesel vehicles to renewable diesel. Both are using imported NEXBTL-process fuel refined by Neste.

EDI-Greenkraft CNG Plug-In Hybrid

Georgia Power Adds EV Charging Islands

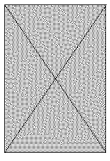


Efficient Drivetrains, Inc. has unveiled a CNG-fueled plug-in hybrid electric Class 4 logistics truck developed on Greenkraft-furnished chassis with California Energy Commission backing. The truck was unveiled at a Calstart-hosted event at the Southern California Gas Energy Resource Center in Downey on Tuesday.



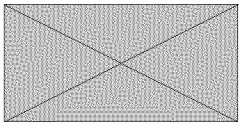
Georgia Power has opened 11 new public electric vehicle charging islands at utility properties across the state. They mark the completion of the first phase of planned charging infrastructure being developed by the company which will include approximately 61 community charging islands for public use statewide by the end of 2016.

Union Gas Fuels HSR's CNG Transit Buses



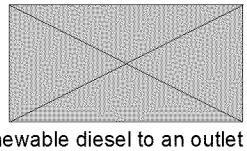
Officials from Ontario's City of Hamilton and the Union Gas utility last week celebrated the opening of a CNG fueling station for Hamilton Street Railway buses. The ANGI Energy installation at Hamilton's Mountain Transit Centre facility has capacity enough to allow the city's fleet of natural gas buses to grow from the current complement of 35 to a total of 120 vehicles over the next six years.

TruStar Time-Fill CNG for All Waste



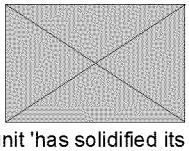
TruStar Energy reported the opening of a time-fill compressed natural gas fueling facility for All Waste, Inc. in Hartford, Conn. 'All Waste, one of the largest privately held refuse haulers in the state, is in the midst of a five-year process of converting 60 of its 80 trucks to CNG,' TruStar said.

Propel Offers Renewable Diesel in Hayward



Propel Fuels has extended availability of its Diesel HPR renewable diesel to an outlet in Hayward, Calif., south of Oakland. Propel's 100% drop-in renewable diesel is made using NEXBTL from Neste, cites the product as a way to improve air quality in light of the Volkswagen scandal.

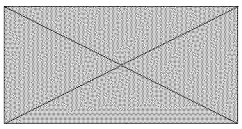
Hexagon Extols Relationship with MAN



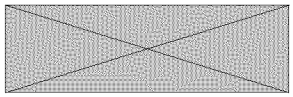
Hexagon Composites reports that its Hexagon Bus Systems unit 'has solidified its leading position in the European transit bus market with the nomination by MAN Truck & Bus AG for the continued supply of compressed natural gas fuel systems.'

Fisker is Re-Named Karma Automotive

Clean Tech Forum in Sacramento

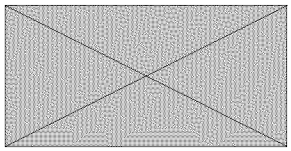


Fisker said last week that the company's name is being changed to Karma Automotive - the name of Fisker's now-discontinued luxury range-extended electric vehicle. 'With new ownership, a new management team, and a new production site, all here in California, it was time to communicate change,' state a release. A new vehicle is to be unveiled next year.



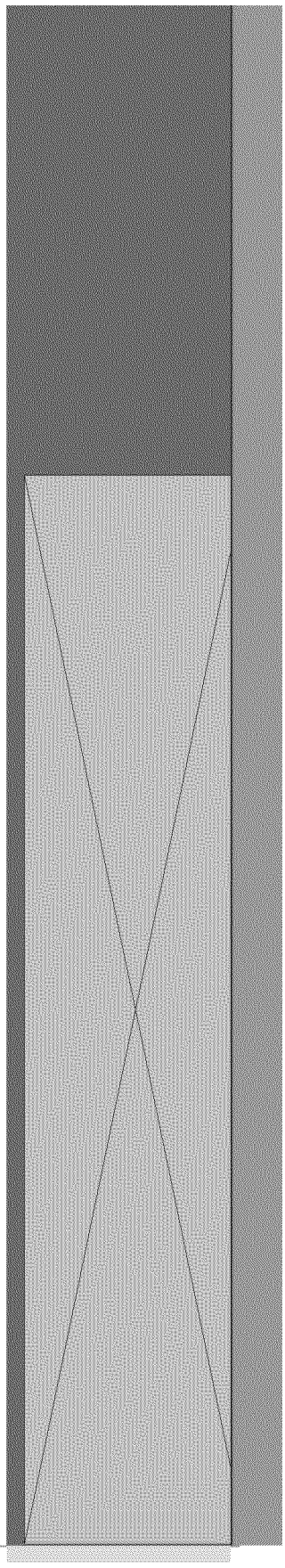
The Sacramento Clean Cities Coalition will hold its Northern California Clean Technology Forum on **October 14-15** at the California Automobile Museum in Sacramento. Activities on Wednesday include a tour of the new compressed natural gas fueling station operated by Sacramento County and an evening Clean Cities Stakeholder Appreciation Reception and Toyota Mirai Launch.

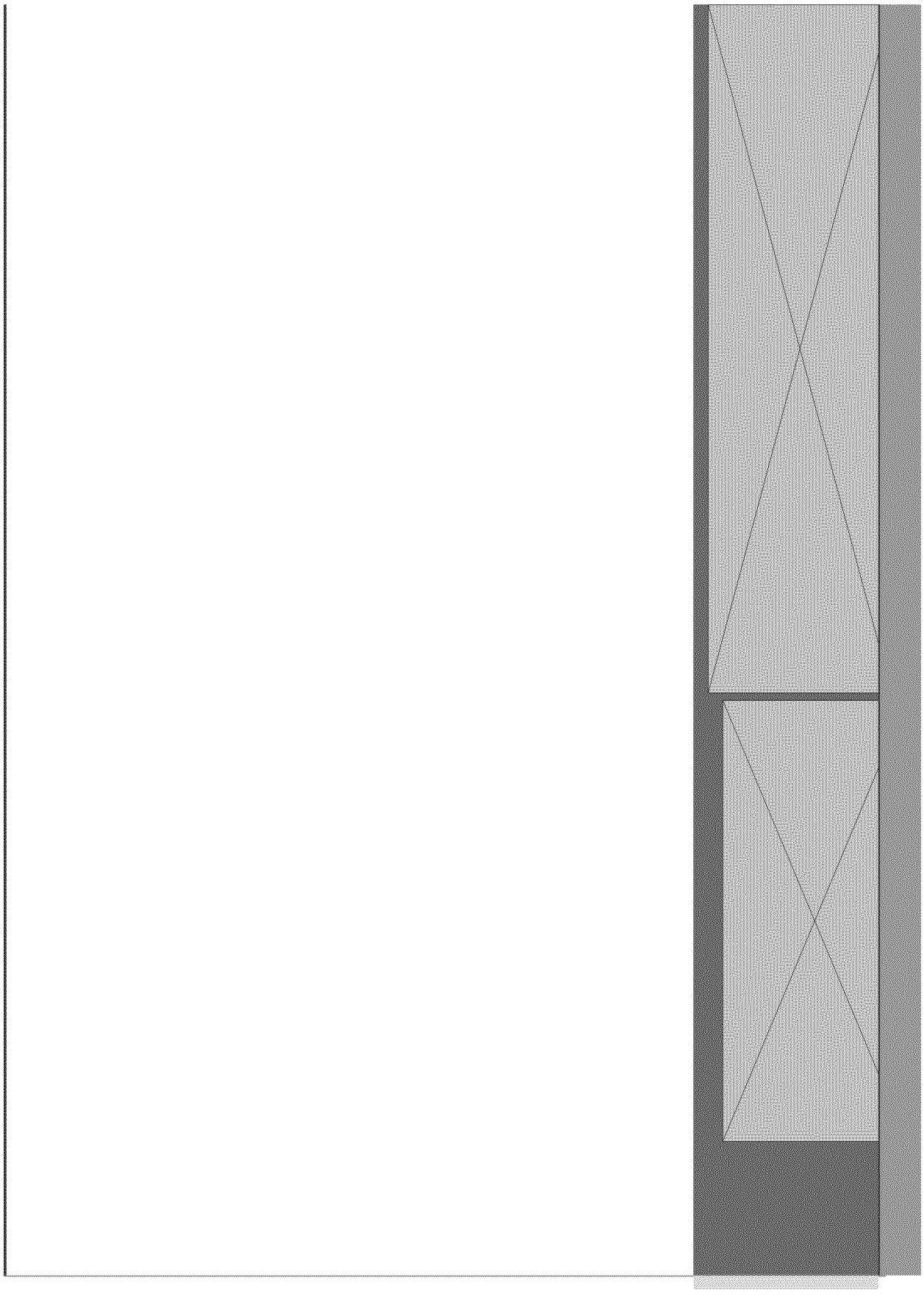
HHP Summit 2015 **This Month** in Dallas

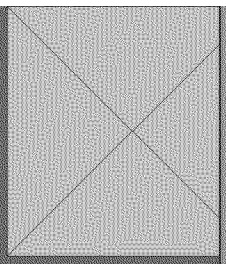


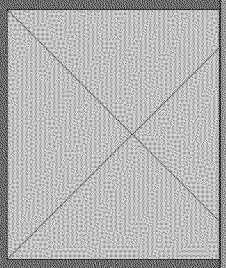
Organizers of the 2015 High Horsepower Summit have released the full line-up of speakers for the end-of-month event at the Kay Bailey Hutchison Convention Center in Dallas. Sign up to hear from early adopters of natural gas technologies - they'll provide first-hand insight on how to significantly reduce fuel costs and emissions. HHP Summit 2015 takes place **October 27-29.** Registrations are discounted until **October 12.**

A premium subscription gives you access to contact information for the people interviewed in each article. Learn more.









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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Wed 10/7/2015 6:54:53 PM
Subject: P.M. NEWSCAST: VW draws tax-fraud probe, names chairman | UAW-FCA deadline looms | Volvo boss: U.S. needs autonomous-car rules | Kia expands EV sales | Volt vs. green rivals

October 7, 2015

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-----Original Message-----

From: Ex. 6 @indiana.edu]

Sent: Thursday, September 24, 2015 3:11 PM

To: 'Janet McCabe'

Subject: RE: up date and congrats

Janet,

Gosh, so neat I did not have to change the subject line....I have been bragging on you and your Office regarding the VW bust. Really nice work!

Hope you guys enjoyed the Pope and his message today.

So, I just talked to Ex. 6 and we sure want you here when you can. We have big plans for your visit!

Best,

Ex. 6

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Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029711

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029712

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

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In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029713

To: Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Shinkman, Susan[Shinkman.Susan@epa.gov]; Kelley, Rosemarie[Kelley.Rosemarie@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Fisher, Mike[Fisher.Mike@epa.gov]
Cc: Folkemer, Nathaniel[Folkemer.Nathaniel@epa.gov]
From: Emmerson, Caroline
Sent: Wed 10/7/2015 7:20:11 PM
Subject: FW: Horn testimony, FYI
2015-10-08 Horn Testimony.pdf

Attached is Michael Horn's (VW America, Pres. & CEO) testimony for tomorrow.

From: Haman, Patricia
Sent: Wednesday, October 07, 2015 3:11 PM
To: Sutton, Tia; Hengst, Benjamin; Emmerson, Caroline
Cc: Levine, Carolyn
Subject: Horn testimony, FYI

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

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In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029715

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

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Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029716

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

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Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029717

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Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

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VW FOIA, EPA 06/20/2017 2017-FFP_029718

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VW FOIA, EPA 06/20/2017 2017-FFP_029719

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* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029720

To: Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Millett, John[Millett.John@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Valentine, Julia
Sent: Wed 10/7/2015 7:44:24 PM
Subject: Fwd: Horn testimony, FYI
2015-10-08 Horn Testimony.pdf
ATT00001.htm

Sent from USEPA iPhone

Begin forwarded message:

From: "Conger, Nick" <Conger.Nick@epa.gov>
Date: October 7, 2015 at 3:33:31 PM EDT
To: "Valentine, Julia" <Valentine.Julia@epa.gov>, "Allen, Laura" <Allen.Laura@epa.gov>
Subject: FW: Horn testimony, FYI

From: Giles-AA, Cynthia
Sent: Wednesday, October 07, 2015 3:28 PM
To: Purchia, Liz; Conger, Nick
Subject: FW: Horn testimony, FYI

From: Emmerson, Caroline
Sent: Wednesday, October 07, 2015 3:20 PM
To: Giles-AA, Cynthia; Starfield, Lawrence; Brooks, Phillip; Shinkman, Susan; Kelley, Rosemarie; Belser, Evan; Werner, Jacqueline; Fisher, Mike
Cc: Folkemer, Nathaniel
Subject: FW: Horn testimony, FYI

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From: Haman, Patricia
Sent: Wednesday, October 07, 2015 3:11 PM
To: Sutton, Tia; Hengst, Benjamin; Emmerson, Caroline
Cc: Levine, Carolyn
Subject: Horn testimony, FYI

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Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

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VW FOIA, EPA 06/20/2017 2017-FFP_029723

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These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

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VW FOIA, EPA 06/20/2017 2017-FFP_029724

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* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029725

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Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

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VW FOIA, EPA 06/20/2017 2017-FFP_029726

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VW FOIA, EPA 06/20/2017 2017-FFP_029727

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VW FOIA, EPA 06/20/2017 2017-FFP_029728

To: Kaul, Meetu[Kaul.Meetu@epa.gov]
From: E&E Publishing
Sent: Wed 10/7/2015 8:19:50 PM
Subject: October 7 -- E&ENews PM is ready

Read today's E&ENews PM on the web

AN E&E PUBLISHING SERVICE

E&ENEWS PM — Wed., October 7, 2015

READ FULL EDITION

1.OIL:

White House threatens veto of House crude exports bill

The White House is threatening to veto House Republican legislation to repeal the long-standing ban on exporting crude oil, calling it unnecessary.

THIS AFTERNOON'S STORIES

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3.VEHICLES:

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5.ENDANGERED SPECIES:

FWS proposes listing fish in Ky. coal mining area

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8.COAL:

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E&ETV'S ONPOINT

11.EMISSIONS:

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UPCOMING HEARINGS AND MARKUPS

12.CALENDAR:

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E&ENews PM is written and produced by the staff of E&E Publishing, LLC. A late afternoon roundup providing coverage of all the breaking and developing policy news from Capitol Hill, around the country and around the world, E&ENews PM is a must-read for the key players who need to be ahead of the next day's headlines. E&ENews PM publishes daily at 4:30 p.m.

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White House threatens veto of House crude exports bill

The White House is threatening to veto House Republican legislation to repeal the long-standing ban on exporting crude oil, calling it unnecessary.

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To: Grundler, Christopher[grundler.christopher@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
From: Birgfeld, Erin
Sent: Wed 10/7/2015 8:26:50 PM
Subject: FW: ALERT: VW withdraws EPA application for 2016 diesels

From: Automotive News [mailto:autonews@CrainAlerts.com]
Sent: Wednesday, October 07, 2015 3:56 PM
To: Birgfeld, Erin
Subject: ALERT: VW withdraws EPA application for 2016 diesels

October 7, 2015

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VW withdraws EPA application for 2016 diesels

Ryan Beene

Volkswagen has withdrawn its application for EPA certification that its 2016 model year diesel vehicles comply with U.S. emissions standards. Without EPA certification, the cars can't be sold, which means there could be a longer wait for the diesel models.

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From: Grundler, Christopher
Sent: Wed 10/7/2015 8:28:32 PM
Subject: Close Hold
EPA testimony- HEC Oversight hearing -VW.docx

From: Levine, Carolyn
Sent: Tuesday, October 06, 2015 2:59 PM
To: Grundler, Christopher; Brooks, Phillip; Belser, Evan; Haman, Patricia; Bunker, Byron; Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Rackoff, Jonathan; Werner, Jacqueline; Emmerson, Caroline
Subject: Cleared EPA testimony- October 8 Oversight hearing on VW Emissions Cheating Allegations

Hi all,

Attached is EPA's cleared testimony.

FYI, the "official" statement that I am submitting for EPA's website and to the Committee is visually slightly different to comply with standard font/formatting and adding "the" before EPA-- no substantive edits. I am only attaching the oral statement that you all reviewed and concurred on earlier so as not to confuse (because Chris won't have time to speak all the "the EPA's" in his 5 minutes!)

Thanks and let me know any Qs.

Carolyn Levine

Office of Congressional and Intergovernmental Relations

U.S. EPA

(202) 564-1859

levine.carolyn@epa.gov

Statement of
Christopher Grundler, Director
Office of Transportation and Air Quality
Office of Air and Radiation
and
Phillip Brooks, Director
Office of Civil Enforcement—Air Enforcement Division,
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
U.S. House of Representatives

October 8, 2015

Chairman Murphy, Ranking Member DeGette and other members of the Subcommittee, we appreciate the opportunity to testify on the matter of the Environmental Protection Agency's Notice of Violation issued to Volkswagen.

I am Chris Grundler, and I direct EPA's Office of Transportation and Air Quality, which is responsible for EPA's air pollution compliance program for all mobile vehicles, engines and equipment, including cars and trucks. I am joined today by my colleague Phil Brooks, Director of the Office of Civil Enforcement's Air Enforcement Division. EPA's Civil Enforcement program develops and prosecutes civil administrative and judicial cases.

On September 18, 2015, EPA sent a Notice of Violation (NOV) of the Clean Air Act to Volkswagen (Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc.) alleging that four-cylinder Volkswagen and Audi diesel cars sold in the U.S. from model years 2009 to 2015 include software that

VW FOIA, EPA 06/20/2017 2017-FFP_029738

circumvents EPA emissions standards. Volkswagen manufactured and installed software in the electronic control module of these vehicles that sensed when the vehicle was being tested for compliance with EPA emission standards. Put simply, these cars contain software that turns off or significantly reduces the effectiveness of emissions controls when driving normally, and turns them on when the car is undergoing an emission test.

Known as a "defeat device," this design feature results in the cars emitting up to 40 times the emissions that are allowed to ensure public health is protected. These devices contain a "switch" that senses whether the vehicle is being tested or not based on various inputs, including the position of the steering wheel, vehicle speed, the duration of the engine's operation, and barometric pressure. The NOV that EPA issued covers roughly 482,000 diesel cars.

All new cars sold in the United States must have an EPA-issued "certificate of conformity" demonstrating that the car meets applicable federal emission standards to control air pollution. By making and selling vehicles with defeat devices that allowed for higher levels of air emissions than were certified to EPA, VW violated multiple important Clean Air Act provisions. These violations are very serious. Not only because the illegal defeat device results in excess emissions many times the allowable standard, but also because after the high emissions were discovered, VW concealed the facts from EPA, the State of California, and from consumers.

These vehicles are emitting more nitrogen oxides, or "NOx," than regulations allow. NOx pollution contributes to ground-level ozone and

VW FOIA, EPA 06/20/2017 2017-FFP_029739

particulate matter. Exposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

* * *

EPA is in the midst of the ongoing investigation into VW's actions. We will be working closely with the U.S. Department of Justice throughout this investigation, and determinations regarding potential penalties and other remedies will be assessed as part of the investigation. However, at this point we are unable to provide further details of the investigation because the release of such information could jeopardize this ongoing enforcement investigation.

EPA will continue to work closely with the California Air Resources Board during the investigation. CARB led and contributed much of the effort to get us to this point – our agencies work closely together on the implementation and oversight of the vehicle emissions programs.

As part of the investigation, we intend to assess the scope of VW's liability under the Clean Air Act, and whether there are additional vehicles with defeat devices. We intend to assess the economic benefit to VW of noncompliance and pursue appropriate penalties, as well as assess the excess pollution from VW's violations and appropriate ways to mitigate that harm.

While our enforcement authority concerns air pollution, we are acutely aware of the impact of these Clean Air Act violations on consumers, and we

VW FOIA, EPA 06/20/2017 2017-FFP_029740

have provided frequently asked questions for consumers on our website, such as whether the cars are safe to drive and whether EPA is officially recalling the vehicles at this point.

* * *

On September 25th, my office sent a letter to all auto manufacturers notifying them that we are stepping up our testing activities in response to VW's alleged violations. Over the 40-plus year history of our program, we have continuously updated and adapted our approaches to compliance oversight as technologies and situations changed. We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations. It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for.

Again, we thank you for the opportunity to appear as witnesses at this hearing for the Subcommittee, and we welcome your questions.

VW FOIA, EPA 06/20/2017 2017-FFP_029741

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029742

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029743

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029744

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Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
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VW FOIA, EPA 06/20/2017 2017-FFP_029745

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VW FOIA, EPA 06/20/2017 2017-FFP_029746

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* * *

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Wed 10/7/2015 8:43:55 PM
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FCA, UAW back at table as strike threat looms

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Bosch's popular diesel engine software was not preprogrammed to cheat

U.S. hearing into VW violations puts industry, EPA under scrutiny

New VW chairman says it will take time to clear up emissions scandal

THE VW DIESEL CRISIS

VW board in crisis talks ahead of emissions scandal deadlines

VW to recall Europe diesels starting in January; U.S. sales to continue for now

U.S. House panel prepares to grill VW on cheating timeline

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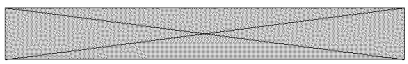

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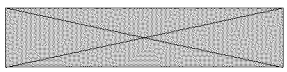

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Bunker, Byron
Sent: Wed 10/7/2015 8:52:17 PM
Subject: RE: you reach David G at VW?

Out of office. His secretary is trying to reach him on his cellphone with instructions to call me back.

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

****

From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 4:46 PM
To: Bunker, Byron
Subject: you reach David G at VW?

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029753

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029754

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

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These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

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VW FOIA, EPA 06/20/2017 2017-FFP_029755

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

October 6, 2015

TO: Members, Subcommittee on Oversight and Investigations

FROM: Committee Majority Staff

RE: Hearing on "Volkswagen's Emissions Cheating Allegations: Initial Questions"

I. INTRODUCTION

On Thursday, October 8, 2015, at 10:00 a.m. in 2123 Rayburn House Office Building, the Subcommittee on Oversight and Investigations will hold a hearing entitled "Volkswagen's Emissions Cheating Allegations: Initial Questions." This hearing will examine the available facts and the initial compliance and consumer issues stemming from Volkswagen AG's reported use of engine software that would reduce the effectiveness of emissions control systems in certain make and model year diesel passenger vehicles in the United States, in apparent violation of the Clean Air Act and its implementing regulations.

II. WITNESSES

There will be two witness panels:

Panel 1:

- Michael Horn, President and Chief Executive Officer, Volkswagen Group of America

Panel 2:

- Christopher Grundler, Director, Office of Transportation and Air Quality, Office of Air and Radiation; and

- Phillip Brooks, Director , Air Enforcement Division, Office of Enforcement and Compliance Assurance, U.S. Environmental Protection Agency

III. SUMMARY

On September 18, 2015, the Environmental Protection Agency (EPA) issued a Notice of Violation (NOV) to Volkswagen AG, Audi AG, and Volkswagen Group of America (collectively, VW) based on a determination "that VW manufactured and installed defeat

devices" in certain model year Volkswagen and Audi diesel passenger cars.[1] The agency alleged that VW installed engine software that "sensed" when the vehicles were undergoing emissions testing and ensured emissions control systems were operating to pass the tests. During normal vehicle use, according to the agency, the software would "switch" to a different mode that produced emissions of nitrogen oxides (NOx) up to 10 to 40 times above current EPA standards. The California Air Resource Board (CARB), which investigated the matter with EPA, issued its own "In-Use Compliance Letter" to VW at the same time.[2]

The installation and use of a component — in this case engine software — to "bypass, defeat, or render inoperative elements of the vehicles' emission control system," would violate the Clean Air Act (CAA) and EPA regulations.[3] The alleged violations involve MY2009 to MY2015 VW and Audi vehicles equipped with 2.0 liter diesel engines, a vehicle population of approximately 480,000 in the United States.[4] Press reports in the wake of EPA's announcement suggest the violations could affect approximately 11 million vehicles worldwide.[5]

EPA and CARB have initiated enforcement investigations, which are ongoing. No fines or recalls to bring the vehicles into compliance have been announced to date. EPA also is expanding its review of other vehicles. The agency notified automakers on September 25, 2015, that it would add to its regimen of "confirmatory testing additional evaluations to look for additional defeat devices."[6] Multiple agencies and foreign governments also have launched their own investigations into VW's conduct.

VW has publically admitted and apologized for violating EPA's regulations and currently is conducting its own investigation and examining solutions to fix the software. The company also has announced significant changes to its leadership and corporate structure. On September 23, 2015, the company's CEO, Dr. Martin Winterkorn, resigned.[7] He was replaced by Matthias Muller, who most recently led the company's Porsche division. In addition, on September 25, 2015, the company has suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit. The company has set aside more than $7 billion to address this alleged violation.

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[1] Notice of Violation, EPA to Volkswagen AG, Audi AG and Volkswagen Group of America (September 18, 2015) *available at* http://www3.epa.gov/otaq/cert/documents/vw-nov-caa-09-18-15.pdf, at 1 (hereinafter, NOV).
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[3] NOV, at 1-2.
[4] Affected U.S. diesel models, according to EPA: MY2009 VW Jetta, Jetta Sportwagen; MY2010 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2011 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2012 to MY2015 VW Beetle, Beetle Convertible, Golf, Jetta, Jetta Sportwagen, Passat, and Audi A3.
[5] Mark Thompson and Ivana Kottasova, CNN Money, *Volkswagen scandal widens* (September 22, 2015) *available at,* http://money.cnn.com/2015/09/22/news/vw-recall-diesel/.
[6] EPA Update on Recent Volkswagen Announcement (September 25, 2015) *available at* http://yosemite.epa.gov/opa/admpress.nsf/Press%20Releases%20from%20Headquarters?OpenView
[7] Jack Ewing, N.Y. Times, *Volkswagen C.E.O. Martin Winterkorn Resigns Amid Emissions Scandal* (Sept. 23, 2015) *available at* http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html?_r=0

IV. BACKGROUND

A. Clean Air Act and EPA Regulations

The Clean Air Act and its implementing regulations are intended to protect human health and the environment by limiting pollution caused by emissions from various sources. Title II of the CAA grants EPA the authority to establish and regulate emissions standards for mobile sources, including automobiles. Among the pollutants regulated under Title II, significant attention is placed on NOx.[8] In combination with volatile organic compounds (VOCs), NOx contributes to the production of ground-level ozone.

Current emissions requirements for new motor vehicles, known as "Tier 2" standards, were promulgated in 2000 and phased in beginning in MY2004 vehicles, with full compliance required by MY2009.[9] The Tier 2 standards required manufacturers to reduce NOx emissions by 88% to 95%, depending on vehicle type, though compliance is based on fleet-wide emissions, rather than certification of each individual vehicle.[10] In 2014, new Tier 3 standards went into effect and will generally be phased in between MY2017 and MY2025.[11]

Compliance with EPA's motor vehicle emissions standards is governed by section 203 of the CAA. Prior to introducing a vehicle for sale in the United States, manufacturers must demonstrate that the vehicle meets emissions standards and obtain a certificate of conformity (COC) from the EPA. In the COC application submitted to the EPA, the manufacturer must list all auxiliary emission control devices (AECDs) installed on the vehicle.[12] An AECD is defined as "any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system."[13] The manufacturer must also justify each AECD and explain why it is not a "defeat device."[14] An AECD is considered a "defeat device" if it:

> . . . reduces the effectiveness of the emission control system under conditi ons which may reasonably be expected to be encountered in normal vehicle operation and use, unless: (1) Such conditions are substantially included in the Federal emission test procedure; (2) The need for the AECD is justified in terms of protecting the veh icle against damage or accident; (3) The AECD does not go beyond the requirements of engine starting; or (4) The AECD applies only to emergency vehicles . . . .[15]

It is a violation of the CAA to manufacture or sell any part or component if it will:

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[8] The EPA estimates that on-road vehicles account for 38% of NOx emissions.
[9] CRS Report R43497, *Tier 3 Motor Vehicle Standards* (April 28, 2014) at 1-2.
[10] *Id.*, at 2.
[11] *Id.,* at 3-4.
[12] NOV, at 2.
[13] 40 C.F.R. § 86.1803-01
[14] 40 C.F.R. § 86.1844-01(d)(11).
[15] 40 C.F.R. § 86.1803-01.

> . . . bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use.[16]

It is also a violation to sell, market, or import any new motor vehicle if it is not covered by a valid EPA-issued COC.[17] Violations of these provisions are subject to civil penalties of up to $3,750 and $37,500, respectively, for any vehicle sold, marketed, or imported on or after January 13, 2009.[18]

EPA's Office of Transportation and Air Quality (OTAQ) oversees a broad set of compliance activities to ensure that vehicles manufacturers satisfy regulatory requirements. These include the review of COC applications and a variety of testing and other requirements that occur over the life a vehicle. In addition to review of manufacturer supplied testing data, EPA's own testing may include so-called "confirmatory testing," both random and targeted, and in use compliance testing. In addition, OTAQ conducts defect reporting programs and recall programs. According to available historical data, emissions recalls affect about three million vehicles annually.[19]

B. Timeline

Set forth below is a timeline of key events related to the VW emissions allegations. Note that the Committee's investigation is ongoing and the Committee will be receiving documents and collecting information in coming weeks that will illuminate the facts and circumstances of these events.[20] The information in this timeline is largely drawn from public sources and is presented to assist Committee Members during the hearing before the Subcommittee.

- May 2014: A study conducted by independent researchers at West Virginia University (WVU) on behalf of the International Council for Clean Transportation (ICCT) identified significantly higher on-road NOx emissions from two VW vehicles – a 2012 Jetta and a 2013 Passat.[21] The results of this study were brought to the attention of the EPA, CARB, and VW.

- May 2014 to December 2014: CARB and EPA launched investigations into the higher emissions in VW vehicles. VW initiated testing to replicate the ICCT/WVU research and

[16] CAA Section 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B).
[17] CAA Section 203(a)(1), 42 U.S.C. § 7522(a)(1).
[18] NOV, at 5.
[19] *See* Vehicle & Engine Compliance Activities: 2009-2011 Compliance Report, *EPA, December 2013, available at http://www3.epa.gov/otaq/documents/cert/420r13006.pdf*.
[20] See Committee letters to VW and EPA, available at http://energycommerce.house.gov/letter/letters-volkswagen-and-epa-regarding-volkswagen-emissions-issues.
[21] NOV, at 4.

identify technical causes for the higher on-road emissions observed by the researchers.[22] VW asserted to EPA and CARB that "increased emissions from these vehicles could be attributed to various technical issues and unexpected in-use conditions."[23]

- December 2, 2014: VW shared testing results with EPA and CARB and proposed a "recalibration fix for the Gen1 (Lean NOx Trap technology) and Gen2 (Selective Catalytic Reduction (SCR) Technology) . . ."[24]

- December 2014: VW initiated a voluntary recall of approximately 500,000 vehicles in the United States. The recall included MY2009 to MY2014 diesel vehicles equipped with Gen1 and Gen2 technology.[25]

- May 6, 2015: CARB commenced testing to confirm that VW's recall solution addressed the higher on-road emissions.[26]

- May 6, 2015 to July 2015: CARB conducted laboratory and on-road testing to confirm the efficacy of the recall.[27] The testing showed limited improvement, prompting CARB to expand its investigation.[28]

- July 8, 2015: CARB shared test results with VW and the EPA, prompting a series of technical meetings. According to CARB, in the course of those meetings, "VW disclosed that Gen1, Gen2, and the 2015 model-year improved SCR vehicle (known as Gen3) had a second calibration intended to run only during confirmatory testing."[29]

- August 2015: EPA and CARB informed VW that they would not issue certificates of conformity for 2016 vehicles until VW could explain the higher emissions and provide assurance that they would not occur in 2016 vehicles.[30,31]

- September 3, 2015: VW admitted to EPA and CARB that it had designed and installed what was effectively a defeat device into these vehicles.

- September 18, 2015: EPA sent VW a Notice of Violation. CARB sent VW an in-use compliance letter.

- September 21, 2015: VW CEO, Dr. Martin Winterkorn, issued a public apology.

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[22] CARB Letter.
[23] NOV, at 4.
[24] CARB Letter, at 2.
[25] *Id.*
[26] *Id.*
[27] NOV, at 4.
[28] *Id.*
[29] CARB, at 2.
[30] NOV, at 4.
[31] EPA has not certified MY2016 vehicles and will not do so until it understands this issue.

- September 23, 2015: Dr. Winterkorn resigned from VW.

- September 25, 2015: EPA announced it is adding additional confirmatory testing of passenger vehicles intended as an effort to identify any additional defeat devices.

- September 25, 2015: VW suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit.

V. Questions and Issues:

The following issues may be addressed at the hearing:

- What has been Volkswagen's response to the EPA allegations?
- What are the available facts concerning VW's violations?
- What is EPA's role in any measures to bring affected VW's into compliance?
- What can VW consumers expect going forward?

VI. Staff Contacts

If you have any questions regarding this hearing, please contact Peter Spencer or John Ohly of the majority Committee staff at (202) 225-2927.

Statement of
Christopher Grundler, Director
Office of Transportation and Air Quality
Office of Air and Radiation
and
Phillip Brooks, Director
Office of Civil Enforcement—Air Enforcement Division,
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
U.S. House of Representatives

October 8, 2015

Chairman Murphy, Ranking Member DeGette and other members of the Subcommittee, we appreciate the opportunity to testify on the matter of the Environmental Protection Agency's Notice of Violation issued to Volkswagen.

I am Chris Grundler, and I direct EPA's Office of Transportation and Air Quality, which is responsible for EPA's air pollution compliance program for all mobile vehicles, engines and equipment, including cars and trucks. I am joined today by my colleague Phil Brooks, Director of the Office of Civil Enforcement's Air Enforcement Division. EPA's Civil Enforcement program develops and prosecutes civil administrative and judicial cases.

On September 18, 2015, EPA sent a Notice of Violation (NOV) of the Clean Air Act to Volkswagen (Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc.) alleging that four-cylinder Volkswagen and Audi diesel cars sold in the U.S. from model years 2009 to 2015 include software that

VW FOIA, EPA 06/20/2017 2017-FFP_029762

circumvents EPA emissions standards. Volkswagen manufactured and installed software in the electronic control module of these vehicles that sensed when the vehicle was being tested for compliance with EPA emission standards. Put simply, these cars contain software that turns off or significantly reduces the effectiveness of emissions controls when driving normally, and turns them on when the car is undergoing an emission test.

Known as a "defeat device," this design feature results in the cars emitting up to 40 times the emissions that are allowed to ensure public health is protected. These devices contain a "switch" that senses whether the vehicle is being tested or not based on various inputs, including the position of the steering wheel, vehicle speed, the duration of the engine's operation, and barometric pressure. The NOV that EPA issued covers roughly 482,000 diesel cars.

All new cars sold in the United States must have an EPA-issued "certificate of conformity" demonstrating that the car meets applicable federal emission standards to control air pollution. By making and selling vehicles with defeat devices that allowed for higher levels of air emissions than were certified to EPA, VW violated multiple important Clean Air Act provisions. These violations are very serious. Not only because the illegal defeat device results in excess emissions many times the allowable standard, but also because after the high emissions were discovered, VW concealed the facts from EPA, the State of California, and from consumers.

These vehicles are emitting more nitrogen oxides, or "NOx," than regulations allow. NOx pollution contributes to ground-level ozone and

VW FOIA, EPA 06/20/2017 2017-FFP_029763

particulate matter. Exposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

* * *

EPA is in the midst of the ongoing investigation into VW's actions. We will be working closely with the U.S. Department of Justice throughout this investigation, and determinations regarding potential penalties and other remedies will be assessed as part of the investigation. However, at this point we are unable to provide further details of the investigation because the release of such information could jeopardize this ongoing enforcement investigation.

EPA will continue to work closely with the California Air Resources Board during the investigation. CARB led and contributed much of the effort to get us to this point – our agencies work closely together on the implementation and oversight of the vehicle emissions programs.

As part of the investigation, we intend to assess the scope of VW's liability under the Clean Air Act, and whether there are additional vehicles with defeat devices. We intend to assess the economic benefit to VW of noncompliance and pursue appropriate penalties, as well as assess the excess pollution from VW's violations and appropriate ways to mitigate that harm.

While our enforcement authority concerns air pollution, we are acutely aware of the impact of these Clean Air Act violations on consumers, and we

VW FOIA, EPA 06/20/2017 2017-FFP_029764

have provided frequently asked questions for consumers on our website, such as whether the cars are safe to drive and whether EPA is officially recalling the vehicles at this point.

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On September 25th, my office sent a letter to all auto manufacturers notifying them that we are stepping up our testing activities in response to VW's alleged violations. Over the 40-plus year history of our program, we have continuously updated and adapted our approaches to compliance oversight as technologies and situations changed. We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations. It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for.

Again, we thank you for the opportunity to appear as witnesses at this hearing for the Subcommittee, and we welcome your questions.

VW FOIA, EPA 06/20/2017 2017-FFP_029765

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

October 6, 2015

TO: Members, Subcommittee on Oversight and Investigations

FROM: Committee Majority Staff

RE: Hearing on "Volkswagen's Emissions Cheating Allegations: Initial Questions"

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[5] Mark Thompson and Ivana Kottasova, CNN Money, *Volkswagen scandal widens* (September 22, 2015) *available at,* http://money.cnn.com/2015/09/22/news/vw-recall-diesel/.
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IV. BACKGROUND

A. Clean Air Act and EPA Regulations

The Clean Air Act and its implementing regulations are intended to protect human health and the environment by limiting pollution caused by emissions from various sources. Title II of the CAA grants EPA the authority to establish and regulate emissions standards for mobile sources, including automobiles. Among the pollutants regulated under Title II, significant attention is placed on NOx.[8] In combination with volatile organic compounds (VOCs), NOx contributes to the production of ground-level ozone.

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[9] CRS Report R43497, *Tier 3 Motor Vehicle Standards* (April 28, 2014) at 1-2.
[10] *Id.*, at 2.
[11] *Id.,* at 3-4.
[12] NOV, at 2.
[13] 40 C.F.R. § 86.1803-01
[14] 40 C.F.R. § 86.1844-01(d)(11).
[15] 40 C.F.R. § 86.1803-01.

> . . . bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use.[16]

It is also a violation to sell, market, or import any new motor vehicle if it is not covered by a valid EPA-issued COC.[17] Violations of these provisions are subject to civil penalties of up to $3,750 and $37,500, respectively, for any vehicle sold, marketed, or imported on or after January 13, 2009.[18]

EPA's Office of Transportation and Air Quality (OTAQ) oversees a broad set of compliance activities to ensure that vehicles manufacturers satisfy regulatory requirements. These include the review of COC applications and a variety of testing and other requirements that occur over the life a vehicle. In addition to review of manufacturer supplied testing data, EPA's own testing may include so-called "confirmatory testing," both random and targeted, and in use compliance testing. In addition, OTAQ conducts defect reporting programs and recall programs. According to available historical data, emissions recalls affect about three million vehicles annually.[19]

B. Timeline

Set forth below is a timeline of key events related to the VW emissions allegations. Note that the Committee's investigation is ongoing; the Committee will be receiving documents and collecting information in coming weeks that will illuminate the facts and circumstances of these events.[20] The information in this timeline is largely drawn from public sources and is presented to assist Committee Members during the hearing before the Subcommittee.

- May 2014: A study conducted by independent researchers at West Virginia University (WVU) on behalf of the International Council for Clean Transportation (ICCT) identified significantly higher on-road NOx emissions from two VW vehicles – a 2012 Jetta and a 2013 Passat.[21] The results of this study were brought to the attention of the EPA, CARB, and VW.

- May 2014 to December 2014: CARB and EPA launched investigations into the higher emissions in VW vehicles. VW initiated testing to replicate the ICCT/WVU research and

[16] CAA Section 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B).
[17] CAA Section 203(a)(1), 42 U.S.C. § 7522(a)(1).
[18] NOV, at 5.
[19] *See* Vehicle & Engine Compliance Activities: 2009-2011 Compliance Report, *EPA, December 2013, available at http://www3.epa.gov/otaq/documents/cert/420r13006.pdf*.
[20] See Committee letters to VW and EPA, available at http://energycommerce.house.gov/letter/letters-volkswagen-and-epa-regarding-volkswagen-emissions-issues.
[21] NOV, at 4.

identify technical causes for the higher on-road emissions observed by the researchers.[22] VW asserted to EPA and CARB that "increased emissions from these vehicles could be attributed to various technical issues and unexpected in-use conditions."[23]

- December 2, 2014: VW shared testing results with EPA and CARB and proposed a "recalibration fix for the Gen1 (Lean NOx Trap technology) and Gen2 (Selective Catalytic Reduction (SCR) Technology) . . ."[24]

- December 2014: VW initiated a voluntary recall of approximately 500,000 vehicles in the United States. The recall included MY2009 to MY2014 diesel vehicles equipped with Gen1 and Gen2 technology.[25]

- May 6, 2015: CARB commenced testing to confirm that VW's recall solution addressed the higher on-road emissions.[26]

- May 6, 2015 to July 2015: CARB conducted laboratory and on-road testing to confirm the efficacy of the recall.[27] The testing showed limited improvement, prompting CARB to expand its investigation.[28]

- July 8, 2015: CARB shared test results with VW and the EPA, prompting a series of technical meetings. According to CARB, in the course of those meetings, "VW disclosed that Gen1, Gen2, and the 2015 model-year improved SCR vehicle (known as Gen3) had a second calibration intended to run only during confirmatory testing."[29]

- August 2015: EPA and CARB informed VW that they would not issue certificates of conformity for 2016 vehicles until VW could explain the higher emissions and provide assurance that they would not occur in 2016 vehicles.[30,31]

- September 3, 2015: VW admitted to EPA and CARB that it had designed and installed what was effectively a defeat device into these vehicles.

- September 18, 2015: EPA sent VW a Notice of Violation. CARB sent VW an in-use compliance letter.

- September 21, 2015: VW CEO, Dr. Martin Winterkorn, issued a public apology.

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[22] CARB Letter.
[23] NOV, at 4.
[24] CARB Letter, at 2.
[25] *Id.*
[26] *Id.*
[27] NOV, at 4.
[28] *Id.*
[29] CARB, at 2.
[30] NOV, at 4.
[31] EPA has not certified MY2016 vehicles and will not do so until it understands this issue.

- September 23, 2015: Dr. Winterkorn resigned from VW.

- September 25, 2015: EPA announced it is adding additional confirmatory testing of passenger vehicles intended as an effort to identify any additional defeat devices.

- September 25, 2015: VW suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit.

V. Questions and Issues:

The following issues may be addressed at the hearing:

- What has been Volkswagen's response to the EPA allegations?
- What are the available facts concerning VW's violations?
- What is EPA's role in any measures to bring affected VW's into compliance?
- What can VW consumers expect going forward?

VI. Staff Contacts

If you have any questions regarding this hearing, please contact Peter Spencer or John Ohly of the majority Committee staff at (202) 225-2927.

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029772

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029773

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029774

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: EnergyGuardian
Sent: Wed 10/7/2015 9:31:44 PM
Subject: GOP, oil industry decry veto threat on crude export bill

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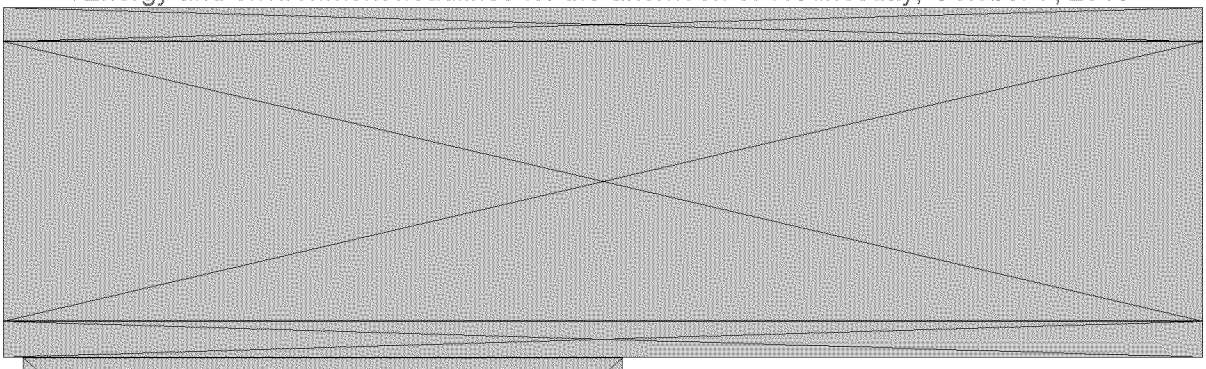
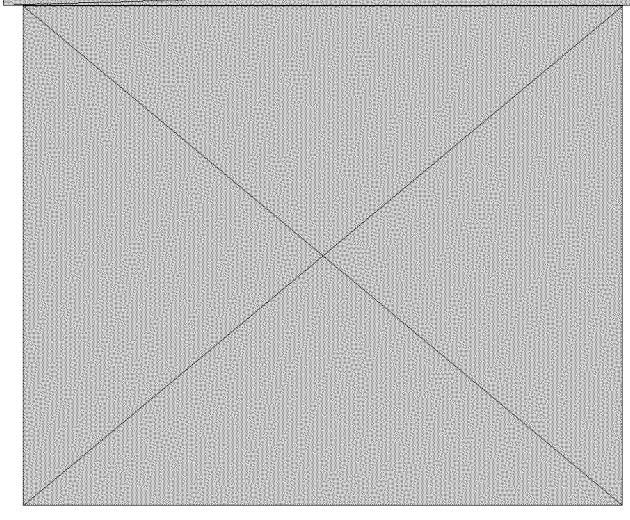
Energy and environment headlines for the afternoon of Wednesday, October 7, 2015





GOP, oil industry decry veto threat on crude export bill

By Kevin Rogers

The Obama administration on Wednesday threatened to veto a House bill that would lift the ban on crude oil exports, a position that Republicans and the oil industry said would benefit Iran and hurt American oil workers.

In an official Statement of Administration Policy released Wednesday, the Office of Management and Budget said it "strongly opposes" the legislation from Rep. Joe Barton, R-

Texas, that would end the 40-year-old ban. It instead urged Republicans to turn their focus to promoting cleaner energy sources.

"Congress should be focusing its efforts on supporting our transition to a low-carbon economy," OMB wrote. "It could do this through a variety of measures, including ending the billions of dollars a year in Federal subsidies provided to oil companies and instead investing in wind, solar, energy efficiency, and other clean technologies to meet America's energy needs."

While the White House has said that the power to lift or otherwise alter the ban lies with the Commerce Department, the veto threat made no mention of the department or its authorities.

The House is set to vote on the bill on Friday afternoon.

Ramon, speaking at a House Rules Committee meeting to set floor procedure for the bill, said he had hoped the White House would remain "neutral" on the bill.

"It is what it is, and we have to respect the president's decision," Ramon said.

Rep. Michael Burgess, R-Texas, slammed the announcement as "legislative irony," noting the bill's 137 co-sponsors.

"We have an administration that recently pushed a deal to lift sanctions on the country of Iran so they would be able to export their crude oil all over the world, but the United States of America can't export their oil," he said.

The veto threat was also panned by the oil industry.

"It's discouraging to see this White House negotiate a trans-pacific trade agreement and authorize Iran to export its oil, while America's energy producers are left tightening their belts and shutting down their rigs," Barry Russell, president of the Independent Petroleum Association of America, said in a statement. "The president should go to bat for American workers and businesses by directing the Department of Commerce to lift the ban on crude exports."

The White House on Wednesday also said it did not support a bill from Rep. Don Young, R-Alaska, that would relax energy regulations and environmental reviews for projects on Native American lands. While OMB stopped short on a veto threat, it said the bill in its current form would "undermine public participation and transparency of review."

Quick Links

Senate Dems push for LWCF while Bishop vows to keep blocking it

California aims to go half renewable under new climate law

Supporters of embattled Ex-Im Bank move to bypass GOP foes

VW's top US executive learned of emissions issues in 2014

VW CEO: Emissions fixes could take until end of next year

Bankruptcy judge approves chemical spill company's plan in W.Va.

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EPA: GHG up but methane down in oil and gas industry

Maritime provision could sink exports bill

Wind energy costs on a par with fossil fuels: Analysis

Lankford seeking to kill off wind PTC

Inhofe to 'adjust' NRC budget structure

Speaker candidate is fierce EPA critic

Oil drops as crude inventories grow

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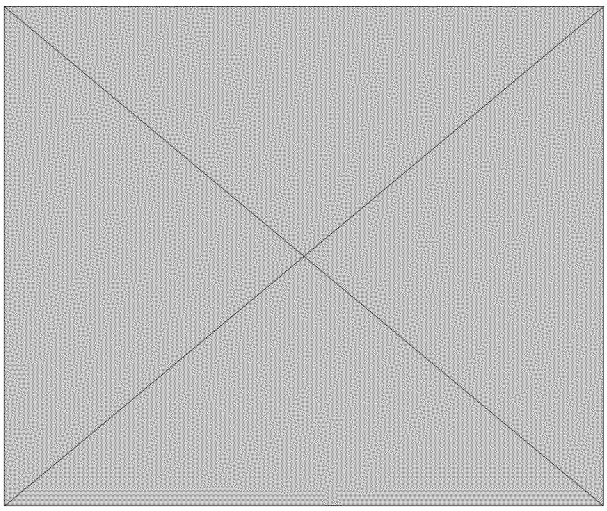
Senate Dems push for LWCF while Bishop vows to



keep blocking it

By Kevin Rogers

The politics around the Land and Water Conservation Fund got more pointed Wednesday, with Democrats calling for a Senate vote on reauthorizing the lapsed program, and the chairman of the House Natural Resources Committee vowing to keep the fund moribund until the executive branch gives him detailed information on what lands the federal government has acquired under the program.

In a letter to Senate Majority Leader Sen. Mitch McConnell, R-Ky., a group led by Minority Leader Sen. Harry Reid, D-Nev., criticized Republicans for allowing the 50-year-old fund to expire on Sept. 30. “Every state benefits from LWC,” they wrote. “Studies have consistently found that investing in land acquisition or improvements creates a significant return for taxpayers and local economies.”

But Rep. Rob Bishop, R-Utah, who chairs the House committee with jurisdiction over the fund, wrote a letter of his own, asking Interior Secretary Sally Jewell and Agriculture Secretary Tom Vilsack to provide information on all lands acquired by the government under LWCF, including potential wildfire vulnerabilities, details on non-contiguous acres, how those acres are marked, and how much public access has been granted to land acquired under the program.

Bishop said he wanted the information submitted to the committee by Nov. 2. He said that he wouldn't entertain reauthorization without analyzing the information and making appropriate reforms.

“To simply reauthorize the law, without first examining its successes and addressing its failures, would be irresponsible,” he wrote. “The Committee is concerned that land adjustment efforts, including conveyances and exchanges, are languishing while land management agencies are focusing almost solely on new acquisitions.”

The program, established in 1965, was intended to use funds from offshore energy production to support state and federal conservation efforts. Though originally intended to receive $900 million each year, it has never been funded to its full level.

The Democratic senators accused Republicans of wasting time on ideological votes and standing in the way of reauthorization to cater to the oil industry.

“It is troubling that the Senate has spent weeks pursuing doomed votes on efforts to take away women's health care and lock in mindless cuts to critical priorities, all the while knowing that the LWCF was set to expire,” they wrote, in reference to a bill to defund Planned Parenthood and appropriations bills adhering to Budget Control Act caps, which President Barack Obama said he would veto.

“We are also deeply concerned that some outside special interests funded by big oil companies are trying to undermine the LWCF as part of their campaign to effectively decimate the National Park system and federal programs to support conservation and outdoor recreation,” they continued.

Reid was joined by Minority Whip Sen. Dick Durbin, D-Ill., Democratic Policy Committee Chair Sen. Chuck Schumer, D-N.Y., Democratic Caucus Secretary Sen. Patty Murray, D-Wash., and Senate Energy and Natural Resources Ranking Member Sen. Maria Cantwell, D-Wash.

Last month, a bipartisan group of 53 senators tried unsuccessfully to amend a government funding bill to reauthorize the program.

“We urge you to bring a permanent reauthorization bill to the Senate floor that would provide full funding for the LWCF program as soon as possible,” the Democrats wrote Wednesday.

Don Stewart, a spokesman for McConnell, said in an email said that any motion to proceed on the legislation would require unanimous consent to move to debate and cloture on the measure, not just McConnell's approval.

Sen. Kelly Ayotte, R-N.H., called for unanimous consent for a short-term reauthorization last week, but it was blocked by Sen. Mike Lee, R-Utah.

Lee's objections echoed Bishop's: The fund is too often used by the federal government to purchase new land, they contend, instead of maintaining existing property. They argue that the program shouldn't be reauthorized without significant reform to minimize federal land acquisition.

The Democrats pushed back on that concern.

“The outdoor recreation economy generates $646 billion in economic activity each year and

creates 6.1 million direct jobs," they wrote. "There is a huge backlog of outdoor projects that need investment throughout the country."

California aims to go half renewable under new climate law

By Michael R. Blood and Judy Lin

LOS ANGELES (AP) — California Gov. Jerry Brown signed an ambitious climate change bill on Wednesday, aiming to increase the state's use of renewable electricity to 50 percent and making existing buildings twice as energy-efficient by 2030.

"The goal is clear, and California is in the forefront," Brown said at a signing ceremony at the hilltop Griffith Observatory, where a hazy downtown Los Angeles provided the backdrop.

Brown tried for an even stronger measure that would have also directed state regulators to enforce a 50 percent drop in petroleum use in the next 15 years, but oil interests defeated that part of the package.

He characterized the loss as a short-term setback, and insisted that the world needs to wean itself off fossil fuels as quickly as possible.

More

Supporters of embattled Ex-Im Bank move to bypass GOP foes

By Andrew Taylor

WASHINGTON (AP) — The federal Export-Import Bank is showing some signs of life.

More than three months after it expired, House Democrats and Republican backers have united to revive the charter of the small federal agency that helps U.S. companies sell their products overseas, by underwriting financing to foreign customers. The coalition is teaming up to bypass opposition from the tea party and top GOP leaders, including Rep. Kevin McCarthy, the favorite to become the new Speaker.

In a rarely used congressional maneuver, supporters are gathering signatures on a so-called "discharge petition" that would allow them to force a House vote on legislation.

The bank's charter expired June 30, and it's been unable to approve new applications or fulfill its mission of helping overseas buyers purchase U.S. products like airplanes and heavy

equipment, which the bank says helps sustain tens of thousands of U.S. manufacturing jobs.

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VW's top US executive learned of emissions issues in 2014

By Michael Biesecker and Tom Krisher

WASHINGTON (AP) — Volkswagen's top U.S.-based executive is expected to testify before Congress Thursday that he first learned in 2014 of emissions problems with the German automaker's four-cylinder diesel cars.

But in prepared remarks posted Wednesday, Volkswagen Group of America CEO Michael Horn doesn't directly address when he was first told his company had developed on-board computer software designed to deceive emissions tests.

Horn is scheduled to testify before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations, which was provided an advance copy of the executive's written testimony. It will be the first appearance on Capitol Hill by Horn, a German and veteran VW manager who took over the reins of the brand's American subsidiary last year.

After the written version of Horn's remarks became public, Volkswagen spokeswoman Jeannine Ginivan told The Associated Press that Horn would testify on Thursday that he only learned of the cheating software "over the past several weeks."

More

VW CEO: Emissions fixes could take until end of next year

By David McHugh and Geir Moulson

WOLFSBURG, Germany (AP) — Volkswagen said a recall of cars with software that can be used to evade emissions tests could start in Germany in January and last until the end of next year.

The recall does not yet include cars in the U.S., where the scandal engulfing the world's largest carmaker erupted. Any recall there will have to be approved by the Environmental Protection Agency, which disclosed the rigging last month, and the California Air Resources Board.

Confirmation of the planned launch date of the recall of 2.8 million cars in Germany came in

an interview with VW CEO Matthias Mueller published Wednesday in the daily Frankfurter Allgemeine Zeitung.

In it, he said many of the cars being recalled won't need much fixing, merely requiring an adjustment to software. Others though may require mechanical fixes such as new injectors or catalyzers.

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Bankruptcy judge approves chemical spill company's plan in W.Va.

By Pam Ramsey

CHARLESTON, W.Va. (AP) — More than $2 million will be distributed to residents and businesses affected by a 2014 chemical spill in West Virginia under a liquidation plan approved by a bankruptcy judge.

Freedom Industries' plan also will provide $1.4 million to the West Virginia Department of Environmental Protection and environmental firms for continued cleanup work. Freedom's parent, Chemstream Holdings, is adding $1.1 million for the cleanup under an agreement with the agency.

A $350,000 initial cash payment will be distributed to unsecured claims, plus future payments from potential recovery sources.

"The plan is the result of extensive arm's-length discussions, debate and/or negotiations among the debtor and key stakeholders and is overwhelmingly supported by the creditors and other parties-in-interest in the case," U.S. Bankruptcy Judge Ronald Pearson wrote in a Tuesday order approving the plan.

More

Jury seated, arguments conclude in ex-Massey CEO's trial

By Jonathan Matisse

CHARLESTON, W.Va. (AP) — Opening statements concluded Wednesday in the federal trial of former Massey Energy CEO Don Blankenship in connection with a deadly mine explosion five years ago.

Jury selection began last Thursday and lasted four days. A jury was seated on Wednesday morning at the U.S. District Courthouse in Charleston.

Blankenship, 65, is charged with conspiring to break mine safety laws and lying to financial regulators about safety practices at the Upper Big Branch mine in southern West Virginia. The mine exploded in 2010, killing 29 miners.

Assistant U.S. Attorney Steven Ruby said a variety of witnesses, memos and phone recordings from a device secretly installed by Blankenship in his office will show the executive was intricately involved at Upper Big Branch, and consistently prioritized profits over safety at the mine.

More

Feds: Eels prized by fishermen aren't a threatened species

By Patrick Whittle

PORTLAND, Maine (AP) — American eels will not be listed under the Endangered Species Act, the U.S. Fish and Wildlife Service said Wednesday, a victory for fishermen who catch the increasingly valuable species.

The wildlife service rejected a petition from the California-based Center for Environmental Science, Accuracy & Reliability to list the eels — prized in Asian cuisine — as threatened.

The petitioners argued that the eels have lost more than 80 percent of their habitat and that the stock is jeopardized by commercial fishing. But the wildlife service issued a report Wednesday saying that "there have been large declines in abundance from historical times," but the species "currently appears to be stable."

Fishermen and fishing advocacy groups campaigned against additional protections for eels. Listing them under the Endangered Species Act would have severely limited the ability to harvest them as a commercial species, and they can be of high economic value because of their use in sushi.

More

Study: Mammals thrive in Chernobyl exclusion zone

By Katherine Jacobsen

MOSCOW (AP) — Nearly 30 years after a nuclear reactor caught fire and spewed a lethal cloud of radiation, some species of mammals are thriving in the zone around the Chernobyl nuclear power plant, a new study says.

The study, published in the journal Current Biology, found that elk, deer, wild boar and wolves are abundant in the 2,160-square-kilometer (835-square-mile) Polesie reserve in Belarus, which was established after the 1986 disaster. More than 20,000 people once lived in what is now the reserve.

"We're not saying radiation is good for animals, but we are saying that human interference can be more harmful to certain animal populations than radiation," said Jim Smith, an environmental scientist at Britain's University of Portsmouth who led the study.

To track the mammals, researchers used aerial surveys and examined animal tracks in the snow.

More

Freeport-McMoRan adds 2 board members from Carl Icahn's firm

By The Associated Press

NEW YORK (AP) — Shares of Freeport-McMoRan rose sharply Wednesday after the copper miner added two board members chosen by Carl Icahn.

The activist investor and firms that he controls own an 8.8 percent stake in Freeport-McMoRan. The board members, Andrew Langham and Courtney Mather, work at Icahn Capital LP.

"I hope and believe that we will work with Freeport's board to enhance value as we have done with so many others," Icahn said in a statement.

The additions come a day after Freeport-McMoRan slashed its board members to nine from 16, and said that it may split off its oil and gas operations.

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Monsanto posts 4Q loss, to eliminate 2,600 jobs to cut costs

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WASHINGTON (AP) — Monsanto Co. said Wednesday it will eliminate 2,600 jobs as part of a cost-saving plan designed to deal with falling sales of its biotech seeds and herbicides, which pushed its quarterly losses deeper into the red.

The job cuts will reduce the company's 22,500-employee workforce of by about 12 percent over the next two years.

The St. Louis-based agricultural giant predicts the move will generate between $275 million and $300 million in annual savings by the end of fiscal 2017. The cost of the reorganization — which will streamline sales, R&D and other departments — is estimated at $850 million to $900 million.

Monsanto's last round of layoffs came in June 2009, when the company slashed 900 jobs.

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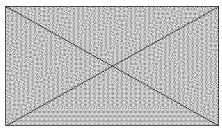

Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

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EPA: GHG up but methane down in oil and gas industry

EPA figures show that methane emissions in the oil and gas industry dropped to 73 million metric tons in 2013, the third straight year of decline, but carbon dioxide emissions are climbing, E&E reports.

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Maritime provision could sink exports bill

Language added to the House bill lifting the longstanding ban on U.S. crude exports—to send some federal money to the maritime shipping industry—is drawing criticism from Heritage Action for America, which is dismissing the provision as "corporate welfare" and an "earmark for labor unions," FuelFix reports.

More

Wind energy costs on a par with fossil fuels: Analysis

According to an analysis from Bloomberg New Energy Finance, the cost of onshore wind energy is reaching a par with gas-fired generation in the Americas, and going forward the cost of renewables is dropping, making them more competitive with fossil fuels, The Washington Post reports.

More

Lankford seeking to kill off wind PTC

Legislation introduced Wednesday by Sen. James Lankford, R-Okla., would end some specific renewable energy tax credits for good, including the wind industry's Production Tax Credit, The Hill reports.

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To: Grundler, Christopher[grundler.christopher@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]
From: Birgfeld, Erin
Sent: Wed 10/7/2015 9:32:01 PM
Subject: FW: VW withdrawal of application for certification of 2016 models--following up on vm

Ex. 5

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From: Conger, Nick
Sent: Wednesday, October 07, 2015 5:22 PM
To: Valentine, Julia
Cc: Birgfeld, Erin; Hengst, Benjamin; Sutton, Tia; Allen, Laura
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Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: Sean Reilly [mailto:sreilly@eenews.net]
Sent: Wednesday, October 07, 2015 3:13 PM
To: Conger, Nick
Subject: VW withdrawal of application for certification of 2016 models--following up on vm

Hi Nick:

In prepared testimony released today by the House Energy and Commerce Committee, Michael Horn says that VW has withdrawn its request for certification of its 2016 vehicles. I'm checking with the company, but do you have a date for when the application was withdrawn, as well as a list (or at least the total number) of models affected by the withdrawal? I'm on a very tight deadline, so would appreciate your letting me know as soon as possible.

Thanks.

Sean Reilly

Transportation Reporter

Greenwire/Environment & Energy Publishing

202-446-0433 (Direct)

202-316-4596 (Cell)

sreilly@eenews.net

To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Wed 10/7/2015 9:32:02 PM
Subject: GOP, oil industry decry veto threat on crude export bill

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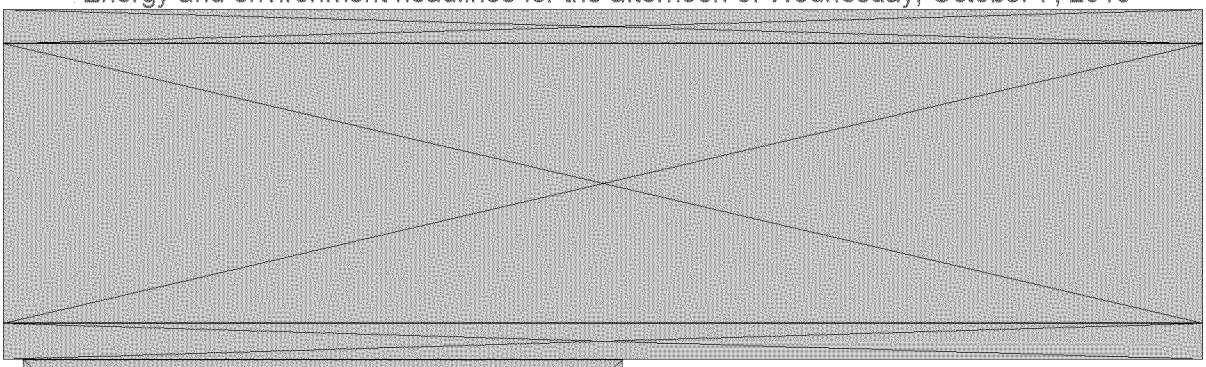
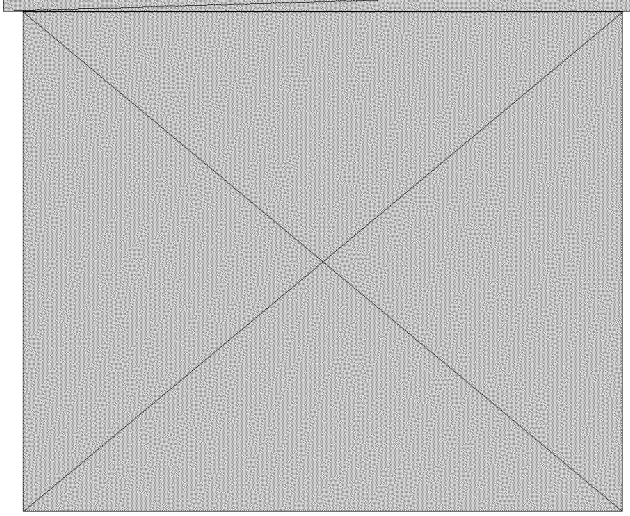
Energy and environment headlines for the afternoon of Wednesday, October 7, 2015





GOP, oil industry decry veto threat on crude export bill

By Kevin Rogers

The Obama administration on Wednesday threatened to veto a House bill that would lift the ban on crude oil exports, a position that Republicans and the oil industry said would benefit Iran and hurt American oil workers.

In an official Statement of Administration Policy released Wednesday, the Office of Management and Budget said it "strongly opposes" the legislation from Rep. Joe Barton, R-

Texas, that would end the 40-year-old ban. It instead urged Republicans to turn their focus to promoting cleaner energy sources.

"Congress should be focusing its efforts on supporting our transition to a low-carbon economy," OMB wrote. "It could do this through a variety of measures, including ending the billions of dollars a year in Federal subsidies provided to oil companies and instead investing in wind, solar, energy efficiency, and other clean technologies to meet America's energy needs."

While the White House has said that the power to lift or otherwise alter the ban lies with the Commerce Department, the veto threat made no mention of the department or its authorities.

The House is set to vote on the bill on Friday afternoon.

Bamon, speaking at a House Rules Committee meeting to set floor procedure for the bill, said he had hoped the White House would remain "neutral" on the bill.

"It is what it is, and we have to respect the president's decision," Bamon said.

Rep. Michael Burgess, R-Texas, slammed the announcement as "legislative irony," noting the bill's 137 co-sponsors.

"We have an administration that recently pushed a deal to lift sanctions on the country of Iran so they would be able to export their crude oil all over the world, but the United States of America can't export their oil," he said.

The veto threat was also panned by the oil industry.

"It's discouraging to see this White House negotiate a trans-pacific trade agreement and authorize Iran to export its oil, while America's energy producers are left tightening their belts and shutting down their rigs," Barry Russell, president of the Independent Petroleum Association of America, said in a statement. "The president should go to bat for American workers and businesses by directing the Department of Commerce to lift the ban on crude exports."

The White House on Wednesday also said it did not support a bill from Rep. Don Young, R-Alaska, that would relax energy regulations and environmental reviews for projects on Native American lands. While OMB stopped short on a veto threat, it said the bill in its current form would "undermine public participation and transparency of review."

Quick Links

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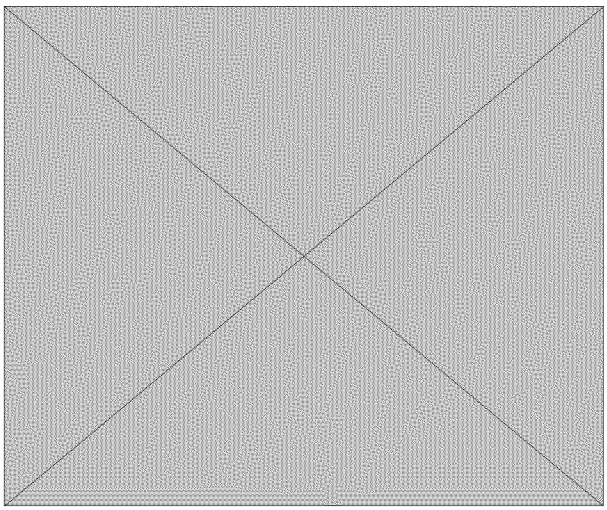

keep blocking it

By Kevin Rogers

The politics around the Land and Water Conservation Fund got more pointed Wednesday, with Democrats calling for a Senate vote on reauthorizing the lapsed program, and the chairman of the House Natural Resources Committee vowing to keep the fund moribund until the executive branch gives him detailed information on what lands the federal government has acquired under the program.

In a letter to Senate Majority Leader Sen. Mitch McConnell, R-Ky., a group led by Minority Leader Sen. Harry Reid, D-Nev., criticized Republicans for allowing the 50-year-old fund to expire on Sept. 30. "Every state benefits from LWC," they wrote. "Studies have consistently found that investing in land acquisition or improvements creates a significant return for taxpayers and local economies."

But Rep. Rob Bishop, R-Utah, who chairs the House committee with jurisdiction over the fund, wrote a letter of his own, asking Interior Secretary Sally Jewell and Agriculture Secretary Tom Vilsack to provide information on all lands acquired by the government under LWCF, including potential wildfire vulnerabilities, details on non-contiguous acres, how those acres are marked, and how much public access has been granted to land acquired under the program.

Bishop said he wanted the information submitted to the committee by Nov. 2. He said that he wouldn't entertain reauthorization without analyzing the information and making appropriate reforms.

"To simply reauthorize the law, without first examining its successes and addressing its failures, would be irresponsible," he wrote. "The Committee is concerned that land adjustment efforts, including conveyances and exchanges, are languishing while land management agencies are focusing almost solely on new acquisitions."

The program, established in 1965, was intended to use funds from offshore energy production to support state and federal conservation efforts. Though originally intended to receive $900 million each year, it has never been funded to its full level.

The Democratic senators accused Republicans of wasting time on ideological votes and standing in the way of reauthorization to cater to the oil industry.

“It is troubling that the Senate has spent weeks pursuing doomed votes on efforts to take away women's health care and lock in mindless cuts to critical priorities, all the while knowing that the LWCF was set to expire,” they wrote, in reference to a bill to defund Planned Parenthood and appropriations bills adhering to Budget Control Act caps, which President Barack Obama said he would veto.

“We are also deeply concerned that some outside special interests funded by big oil companies are trying to undermine the LWCF as part of their campaign to effectively decimate the National Park system and federal programs to support conservation and outdoor recreation,” they continued.

Reid was joined by Minority Whip Sen. Dick Durbin, D-Ill., Democratic Policy Committee Chair Sen. Chuck Schumer, D-N.Y., Democratic Caucus Secretary Sen. Patty Murray, D-Wash., and Senate Energy and Natural Resources Ranking Member Sen. Maria Cantwell, D-Wash.

Last month, a bipartisan group of 53 senators tried unsuccessfully to amend a government funding bill to reauthorize the program.

“We urge you to bring a permanent reauthorization bill to the Senate floor that would provide full funding for the LWCF program as soon as possible,” the Democrats wrote Wednesday.

Don Stewart, a spokesman for McConnell, said in an email said that any motion to proceed on the legislation would require unanimous consent to move to debate and cloture on the measure, not just McConnell's approval.

Sen. Kelly Ayotte, R-N.H., called for unanimous consent for a short-term reauthorization last week, but it was blocked by Sen. Mike Lee, R-Utah.

Lee's objections echoed Bishop's: The fund is too often used by the federal government to purchase new land, they contend, instead of maintaining existing property. They argue that the program shouldn't be reauthorized without significant reform to minimize federal land acquisition.

The Democrats pushed back on that concern.

“The outdoor recreation economy generates $646 billion in economic activity each year and

creates 6.1 million direct jobs," they wrote. "There is a huge backlog of outdoor projects that need investment throughout the country."

California aims to go half renewable under new climate law

By Michael R. Blood and Judy Lin

LOS ANGELES (AP) — California Gov. Jerry Brown signed an ambitious climate change bill on Wednesday, aiming to increase the state's use of renewable electricity to 50 percent and making existing buildings twice as energy-efficient by 2030.

"The goal is clear, and California is in the forefront," Brown said at a signing ceremony at the hilltop Griffith Observatory, where a hazy downtown Los Angeles provided the backdrop.

Brown tried for an even stronger measure that would have also directed state regulators to enforce a 50 percent drop in petroleum use in the next 15 years, but oil interests defeated that part of the package.

He characterized the loss as a short-term setback, and insisted that the world needs to wean itself off fossil fuels as quickly as possible.

More

Supporters of embattled Ex-Im Bank move to bypass GOP foes

By Andrew Taylor

WASHINGTON (AP) — The federal Export-Import Bank is showing some signs of life.

More than three months after it expired, House Democrats and Republican backers have united to revive the charter of the small federal agency that helps U.S. companies sell their products overseas, by underwriting financing to foreign customers. The coalition is teaming up to bypass opposition from the tea party and top GOP leaders, including Rep. Kevin McCarthy, the favorite to become the new Speaker.

In a rarely used congressional maneuver, supporters are gathering signatures on a so-called "discharge petition" that would allow them to force a House vote on legislation.

The bank's charter expired June 30, and it's been unable to approve new applications or fulfill its mission of helping overseas buyers purchase U.S. products like airplanes and heavy

equipment, which the bank says helps sustain tens of thousands of U.S. manufacturing jobs.

More

VW's top US executive learned of emissions issues in 2014

By Michael Biesecker and Tom Krisher

WASHINGTON (AP) — Volkswagen's top U.S.-based executive is expected to testify before Congress Thursday that he first learned in 2014 of emissions problems with the German automaker's four-cylinder diesel cars.

But in prepared remarks posted Wednesday, Volkswagen Group of America CEO Michael Horn doesn't directly address when he was first told his company had developed on-board computer software designed to deceive emissions tests.

Horn is scheduled to testify before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations, which was provided an advance copy of the executive's written testimony. It will be the first appearance on Capitol Hill by Horn, a German and veteran VW manager who took over the reins of the brand's American subsidiary last year.

After the written version of Horn's remarks became public, Volkswagen spokeswoman Jeannine Ginivan told The Associated Press that Horn would testify on Thursday that he only learned of the cheating software "over the past several weeks."

More

VW CEO: Emissions fixes could take until end of next year

By David McHugh and Geir Moulson

WOLFSBURG, Germany (AP) — Volkswagen said a recall of cars with software that can be used to evade emissions tests could start in Germany in January and last until the end of next year.

The recall does not yet include cars in the U.S., where the scandal engulfing the world's largest carmaker erupted. Any recall there will have to be approved by the Environmental Protection Agency, which disclosed the rigging last month, and the California Air Resources Board.

Confirmation of the planned launch date of the recall of 2.8 million cars in Germany came in

an interview with VW CEO Matthias Mueller published Wednesday in the daily Frankfurter Allgemeine Zeitung.

In it, he said many of the cars being recalled won't need much fixing, merely requiring an adjustment to software. Others though may require mechanical fixes such as new injectors or catalyzers.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

Bankruptcy judge approves chemical spill company's plan in W.Va.

By Pam Ramsey

CHARLESTON, W.Va. (AP) — More than $2 million will be distributed to residents and businesses affected by a 2014 chemical spill in West Virginia under a liquidation plan approved by a bankruptcy judge.

Freedom Industries' plan also will provide $1.4 million to the West Virginia Department of Environmental Protection and environmental firms for continued cleanup work. Freedom's parent, Chemstream Holdings, is adding $1.1 million for the cleanup under an agreement with the agency.

A $350,000 initial cash payment will be distributed to unsecured claims, plus future payments from potential recovery sources.

"The plan is the result of extensive arm's-length discussions, debate and/or negotiations among the debtor and key stakeholders and is overwhelmingly supported by the creditors and other parties-in-interest in the case," U.S. Bankruptcy Judge Ronald Pearson wrote in a Tuesday order approving the plan.

More

Jury seated, arguments conclude in ex-Massey CEO's trial

By Jonathan Matisse

CHARLESTON, W.Va. (AP) — Opening statements concluded Wednesday in the federal trial of former Massey Energy CEO Don Blankenship in connection with a deadly mine explosion five years ago.

Jury selection began last Thursday and lasted four days. A jury was seated on Wednesday morning at the U.S. District Courthouse in Charleston.

Blankenship, 65, is charged with conspiring to break mine safety laws and lying to financial regulators about safety practices at the Upper Big Branch mine in southern West Virginia. The mine exploded in 2010, killing 29 miners.

Assistant U.S. Attorney Steven Ruby said a variety of witnesses, memos and phone recordings from a device secretly installed by Blankenship in his office will show the executive was intricately involved at Upper Big Branch, and consistently prioritized profits over safety at the mine.

More

Feds: Eels prized by fishermen aren't a threatened species

By Patrick Whittle

PORTLAND, Maine (AP) — American eels will not be listed under the Endangered Species Act, the U.S. Fish and Wildlife Service said Wednesday, a victory for fishermen who catch the increasingly valuable species.

The wildlife service rejected a petition from the California-based Center for Environmental Science, Accuracy & Reliability to list the eels — prized in Asian cuisine — as threatened.

The petitioners argued that the eels have lost more than 80 percent of their habitat and that the stock is jeopardized by commercial fishing. But the wildlife service issued a report Wednesday saying that "there have been large declines in abundance from historical times," but the species "currently appears to be stable."

Fishermen and fishing advocacy groups campaigned against additional protections for eels. Listing them under the Endangered Species Act would have severely limited the ability to harvest them as a commercial species, and they can be of high economic value because of their use in sushi.

More

Study: Mammals thrive in Chernobyl exclusion zone

By Katherine Jacobsen

MOSCOW (AP) — Nearly 30 years after a nuclear reactor caught fire and spewed a lethal cloud of radiation, some species of mammals are thriving in the zone around the Chernobyl nuclear power plant, a new study says.

The study, published in the journal Current Biology, found that elk, deer, wild boar and wolves are abundant in the 2,160-square-kilometer (835-square-mile) Polesie reserve in Belarus, which was established after the 1986 disaster. More than 20,000 people once lived in what is now the reserve.

"We're not saying radiation is good for animals, but we are saying that human interference can be more harmful to certain animal populations than radiation," said Jim Smith, an environmental scientist at Britain's University of Portsmouth who led the study.

To track the mammals, researchers used aerial surveys and examined animal tracks in the snow.

More

Freeport-McMoRan adds 2 board members from Carl Icahn's firm

By The Associated Press

NEW YORK (AP) — Shares of Freeport-McMoRan rose sharply Wednesday after the copper miner added two board members chosen by Carl Icahn.

The activist investor and firms that he controls own an 8.8 percent stake in Freeport-McMoRan. The board members, Andrew Langham and Courtney Mather, work at Icahn Capital LP.

"I hope and believe that we will work with Freeport's board to enhance value as we have done with so many others," Icahn said in a statement.

The additions come a day after Freeport-McMoRan slashed its board members to nine from 16, and said that it may split off its oil and gas operations.

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Monsanto posts 4Q loss, to eliminate 2,600 jobs to cut costs

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WASHINGTON (AP) — Monsanto Co. said Wednesday it will eliminate 2,600 jobs as part of a cost-saving plan designed to deal with falling sales of its biotech seeds and herbicides, which pushed its quarterly losses deeper into the red.

The job cuts will reduce the company's 22,500-employee workforce of by about 12 percent over the next two years.

The St. Louis-based agricultural giant predicts the move will generate between $275 million and $300 million in annual savings by the end of fiscal 2017. The cost of the reorganization — which will streamline sales, R&D and other departments — is estimated at $850 million to $900 million.

Monsanto's last round of layoffs came in June 2009, when the company slashed 900 jobs.

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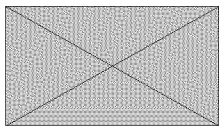

Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

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EPA: GHG up but methane down in oil and gas industry

EPA figures show that methane emissions in the oil and gas industry dropped to 73 million metric tons in 2013, the third straight year of decline, but carbon dioxide emissions are climbing, E&E reports.

More

Maritime provision could sink exports bill

Language added to the House bill lifting the longstanding ban on U.S. crude exports—to send some federal money to the maritime shipping industry—is drawing criticism from Heritage Action for America, which is dismissing the provision as "corporate welfare" and an "earmark for labor unions," FuelFix reports.

More

Wind energy costs on a par with fossil fuels: Analysis

According to an analysis from Bloomberg New Energy Finance, the cost of onshore wind energy is reaching a par with gas-fired generation in the Americas, and going forward the cost of renewables is dropping, making them more competitive with fossil fuels, The Washington Post reports.

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To: Bunker, Byron[bunker.byron@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]
From: Conger, Nick
Sent: Wed 10/7/2015 9:48:23 PM
Subject: RE: VW withdrawal of application for certification of 2016 models--following up on vm

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Sent from my Windows Phone

From: Bunker, Byron
Sent: 10/7/2015 5:45 PM
To: Birgfeld, Erin; Grundler, Christopher
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Byron Bunker

Director Compliance Division

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>
> Deputy Press Secretary
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> U.S. Environmental Protection Agency
>
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>
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In prepared testimony released today by the House Energy and Commerce Committee, Michael Horn says that VW has withdrawn its request for certification of its 2016 vehicles. I'm checking with the company, but do you have a date for when the application was withdrawn, as well as a list (or at least the total number) of models affected by the withdrawal? I'm on a very tight deadline, so would appreciate your letting me know as soon as possible.

Thanks.

Sean Reilly

Transportation Reporter

Greenwire/Environment & Energy Publishing

202-446-0433 (Direct)

202-316-4596 (Cell)

sreilly@eenews.net

To: Conger, Nick[Conger.Nick@epa.gov]
Cc: Bunker, Byron[bunker.byron@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]
From: Birgfeld, Erin
Sent: Wed 10/7/2015 9:49:05 PM
Subject: Re: VW withdrawal of application for certification of 2016 models--following up on vm

Thanks Byron.

Sent from my iPhone

On Oct 7, 2015, at 5:48 PM, Conger, Nick <Conger.Nick@epa.gov> wrote:

Ok we will pass this along to reporters.

Sent from my Windows Phone

From: Bunker, Byron
Sent: 10/7/2015 5:45 PM
To: Birgfeld, Erin; Grundler, Christopher
Cc: Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Valentine, Julia; Conger, Nick
Subject: RE: VW withdrawal of application for certification of 2016 models--following up on vm

Ex. 5

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

****

From: Birgfeld, Erin
Sent: Wednesday, October 07, 2015 5:32 PM
To: Grundler, Christopher; Bunker, Byron
Cc: Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Valentine, Julia; Conger, Nick
Subject: FW: VW withdrawal of application for certification of 2016 models--following up on vm

Ex. 5

Thanks,

erin

From: Conger, Nick
Sent: Wednesday, October 07, 2015 5:22 PM
To: Valentine, Julia
Cc: Birgfeld, Erin; Hengst, Benjamin; Sutton, Tia; Allen, Laura
Subject: RE: VW withdrawal of application for certification of 2016 models--following up on vm

Ex. 5

Sent from my Windows Phone

From: Valentine, Julia
Sent: 10/7/2015 3:36 PM
To: Conger, Nick
Cc: Birgfeld, Erin; Hengst, Benjamin; Sutton, Tia; Allen, Laura
Subject: Re: VW withdrawal of application for certification of 2016 models--following up on vm

I have the same q in from Reuters

Sent from USEPA iPhone

On Oct 7, 2015, at 3:19 PM, Conger, Nick <Conger.Nick@epa.gov> wrote:

> OTAQ - Do you guys have an answer to this question?
>
> Nick Conger
>
> Deputy Press Secretary
>
> Office of the Administrator
>
> U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: Sean Reilly [mailto:sreilly@eenews.net]
Sent: Wednesday, October 07, 2015 3:13 PM
To: Conger, Nick
Subject: VW withdrawal of application for certification of 2016 models--following up on vm

Hi Nick:

In prepared testimony released today by the House Energy and Commerce Committee, Michael Horn says that VW has withdrawn its request for certification of its 2016 vehicles. I'm checking with the company, but do you have a date for when the application was withdrawn, as well as a list (or at least the total number) of models affected by the withdrawal? I'm on a very tight deadline, so would appreciate your letting me know as soon as possible.

Thanks.

Sean Reilly

Transportation Reporter

Greenwire/Environment & Energy Publishing

202-446-0433 (Direct)

202-316-4596 (Cell)

sreilly@eenews.net

To: Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 10:07:15 PM
Subject: Re: VW withdrawal of application for certification of 2016 models--following up on vm

I'm good

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 5:49 PM, Bunker, Byron <bunker.byron@epa.gov> wrote:

> Please hold. I would like to check with Chris first!
>
> **********
>
> Byron Bunker
>
> Director Compliance Division
>
> Office of Transportation and Air Quality
>
> Environmental Protection Agency
>
> 2000 Traverwood Drive
>
> Ann Arbor, MI 48105
>
> Bunker.Byron@epa.gov
>
> Phone: (734) 214-4155
>
> Mobile: (734) 353-9623
>
> **********
>
> **From:** Conger, Nick
> **Sent:** Wednesday, October 07, 2015 5:48 PM

To: Bunker, Byron; Birgfeld, Erin; Grundler, Christopher
Cc: Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Valentine, Julia
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To: Birgfeld, Erin; Grundler, Christopher
Cc: Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Valentine, Julia; Conger, Nick
Subject: RE: VW withdrawal of application for certification of 2016 models--following up on vm

At this point, I think we should say that today Volkswagen withdrew their certification application for 2016 vehicle models that use the 2.0L diesel engine including the AUDI: A3 VOLKSWAGEN: BEETLE, BEETLE CONVERTIBLE, GOLF, GOLF SPORTWAGEN, JETTA, PASSAT models.

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

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Ann Arbor, MI 48105

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Phone: (734) 214-4155

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To: Grundler, Christopher; Bunker, Byron
Cc: Hengst, Benjamin; Cohen, Janet; Sutton, Tia; Valentine, Julia; Conger, Nick
Subject: FW: VW withdrawal of application for certification of 2016 models--following up on vm

Byron and Chris,

The press are asking for a list of vehicle models that VW has withdrawn from certification. I don't think we have this correct – because of the nuances of our cert program?

Here is a suggested response:

VW has not formally informed EPA which of their 2016 certificates they intend to pull from EPA review.

Copying Nick and Julia since this is a quick turn.

Thanks,

erin

From: Conger, Nick
Sent: Wednesday, October 07, 2015 5:22 PM
To: Valentine, Julia
Cc: Birgfeld, Erin; Hengst, Benjamin; Sutton, Tia; Allen, Laura
Subject: RE: VW withdrawal of application for certification of 2016 models--following up on vm

Chris says its OK to confirm. Do we know when and what models, per the reporters questions below?

Sent from my Windows Phone

From: Valentine, Julia
Sent: 10/7/2015 3:36 PM
To: Conger, Nick
Cc: Birgfeld, Erin; Hengst, Benjamin; Sutton, Tia; Allen, Laura
Subject: Re: VW withdrawal of application for certification of 2016 models--following up on vm

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Thanks.

Sean Reilly

Transportation Reporter

Greenwire/Environment & Energy Publishing

202-446-0433 (Direct)

202-316-4596 (Cell)

sreilly@eenews.net

To: OAR-OTAQ (AA) Everyone[OAROTAQ_AA_Everyone@epa.gov]
From: Spieth, John
Sent: Wed 10/7/2015 10:18:22 PM
Subject: Reminder: 2015 Vehicle Technology Showcase (this Tuesday, October 13th)

Dear Ann Arbor OTAQ,

To follow up from my note 2 weeks ago, our 2015 Vehicle Technology Showcase is **this Tuesday, October 13th.**

Non-Responsive

3) *** Reminder to not speak for EPA regarding VW or other issues. Refer VW questions to Erin Birgfeld who will be on site. ***

*** Media name badges will be marked with MEDIA in red to help identify them, but the same policy applies to similar questions from manufacturers or any others. ***

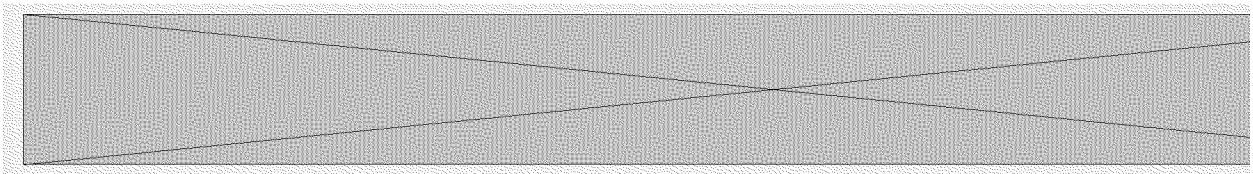
Non-Responsive

Non-Responsive

Non-Responsive

Non-Responsive

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: The Hill
Sent: Wed 10/7/2015 10:32:02 PM
Subject: Overnight Energy & Environment: Obama threatens to veto oil exports bill



OBAMA'S A NO ON EXPORT BILL: The Obama administration renewed its threat to veto a House bill lifting the ban on crude oil exports on Wednesday afternoon.

The bill, which would overturn the 40-year-old ban, "is not needed at this time," officials said in a statement of administration policy. Instead, the statement said, Congress should look to institute more environmentally-friendly policies.

White House press secretary Josh Earnest said in September that the administration opposed the House bill, arguing that the Commerce Department already has the power to approve crude oil exports under certain circumstances.

The White House's opposition comes a few days before the House considers a bill from Rep. Joe Barton (R-Texas) lifting the export ban. Support for the measure has swelled among Republicans, the oil industry and oil-state Democrats, who hope to pass the measure this year.

Some Democrats have hinted that they could support expanding oil exports, but they first want the chance to amend the bill.

"Help me to help you, help me to help the constituents of my district, to assist all job-seeking Americans by allowing amendments to be entertained on this bill," Rep. Bobby Rush (D-Ill.) said at a House Rules Committee meeting Wednesday.

Read more here.

TOMORROW IN THE HILL: Supporters of lifting the crude oil export ban are looking to craft a compromise on the issue -- though no one has found a package able to unite Republicans, Democrats and a reluctant president. Read it Thursday at The Hill.

ON TAP THURSDAY I: A House Energy and Commerce oversight subcommittee will probe the Volkswagen emissions scandal. VW's U.S. president, Michael Horn, and two Environmental Protection Agency officials are scheduled to testify.

The hearing will be Congress's first crack at VW since the EPA accused the car manufacturer

of working to evade federal emissions requirements. Our preview is here.

ON TAP THURSDAY II: The Senate Energy and Natural Resources Committee will hold a hearing on Western and Alaskan water bills. Michael Connor, the deputy secretary of the Department of the Interior, will testify.

Rest of Thursday's agenda ...

A Senate Energy and Natural Resources subcommittee will meet to discuss 10 other bills.

AROUND THE WEB:

General Electric Co. is spinning off its energy technology business into a new Boston-based company called Current, the Cleveland Plain Dealer reports.

Japanese Prime Minister Shinzo Abe has appointed Tamayo Marukawa, a former television broadcaster and health and welfare minister, to oversee the country's environmental policies, Bloomberg Business reports.

Executives of the world's biggest oil companies will meet next week on climate change policy strategies, Reuters reports.

Oral arguments began Wednesday in the federal trial against Don Blankenship, a former coal executive accused of various crimes related to the Upper Big Branch mine disaster that killed 38 in 2010, the Register-Herald reports.

IN CASE YOU MISSED IT:

Check out Wednesday's stories ...

-White House threatens veto on crude oil exports bill
-EPA probing VW's profit from emissions cheating
-California governor signs major climate law
-GOP chairman seeks 'fiscal discipline' at nuclear regulator
-Senate Finance enters Volkswagen fray
-GOP senator looks to end wind power subsidy
-Heritage blasts 'union buyoff' in oil export bill

Please send tips and comments to Timothy Cama, tcama@thehill.com; and Devin Henry, dhenry@thehill.com. Follow us on Twitter: @Timothy_Cama, @dhenry, @thehill

Forward email

This email was sent to grundler.christopher@epa.gov by newsletters@thehill.com |
Update Profile/Email Address | Rapid removal with SafeUnsubscribe™ | About our service provider.

The Hill | 1625 K Street NW | Suite 900 | Washington | DC | 20006

Statement of
Christopher Grundler, Director
Office of Transportation and Air Quality
Office of Air and Radiation
and
Phillip Brooks, Director
Office of Civil Enforcement—Air Enforcement Division,
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Subcommittee on Oversight and Investigations
Committee on Energy and Commerce
U.S. House of Representatives

October 8, 2015

Chairman Murphy, Ranking Member DeGette and other members of the Subcommittee, we appreciate the opportunity to testify on the matter of the Environmental Protection Agency's Notice of Violation issued to Volkswagen.

I am Chris Grundler, and I direct EPA's Office of Transportation and Air Quality, which is responsible for EPA's air pollution compliance program for all mobile vehicles, engines and equipment, including cars and trucks. I am joined today by my colleague Phil Brooks, Director of the Office of Civil Enforcement's Air Enforcement Division. EPA's Civil Enforcement program develops and prosecutes civil administrative and judicial cases.

On September 18, 2015, EPA sent a Notice of Violation (NOV) of the Clean Air Act to Volkswagen (Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc.) alleging that four-cylinder Volkswagen and Audi diesel cars sold in the U.S. from model years 2009 to 2015 include software that

VW FOIA, EPA 06/20/2017 2017-FFP_029826

circumvents EPA emissions standards. Volkswagen manufactured and installed software in the electronic control module of these vehicles that sensed when the vehicle was being tested for compliance with EPA emission standards. Put simply, these cars contain software that turns off or significantly reduces the effectiveness of emissions controls when driving normally, and turns them on when the car is undergoing an emission test.

Known as a "defeat device," this design feature results in the cars emitting up to 40 times the emissions that are allowed to ensure public health is protected. These devices contain a "switch" that senses whether the vehicle is being tested or not based on various inputs, including the position of the steering wheel, vehicle speed, the duration of the engine's operation, and barometric pressure. The NOV that EPA issued covers roughly 482,000 diesel cars.

All new cars sold in the United States must have an EPA-issued "certificate of conformity" demonstrating that the car meets applicable federal emission standards to control air pollution. By making and selling vehicles with defeat devices that allowed for higher levels of air emissions than were certified to EPA, VW violated multiple important Clean Air Act provisions. These violations are very serious. Not only because the illegal defeat device results in excess emissions many times the allowable standard, but also because after the high emissions were discovered, VW concealed the facts from EPA, the State of California, and from consumers.

These vehicles are emitting more nitrogen oxides, or "NOx," than regulations allow. NOx pollution contributes to ground-level ozone and

VW FOIA, EPA 06/20/2017 2017-FFP_029827

particulate matter. Exposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

* * *

EPA is in the midst of the ongoing investigation into VW's actions. We will be working closely with the U.S. Department of Justice throughout this investigation, and determinations regarding potential penalties and other remedies will be assessed as part of the investigation. However, at this point we are unable to provide further details of the investigation because the release of such information could jeopardize this ongoing enforcement investigation.

EPA will continue to work closely with the California Air Resources Board during the investigation. CARB led and contributed much of the effort to get us to this point – our agencies work closely together on the implementation and oversight of the vehicle emissions programs.

As part of the investigation, we intend to assess the scope of VW's liability under the Clean Air Act, and whether there are additional vehicles with defeat devices. We intend to assess the economic benefit to VW of noncompliance and pursue appropriate penalties, as well as assess the excess pollution from VW's violations and appropriate ways to mitigate that harm.

While our enforcement authority concerns air pollution, we are acutely aware of the impact of these Clean Air Act violations on consumers, and we

VW FOIA, EPA 06/20/2017 2017-FFP_029828

have provided frequently asked questions for consumers on our website, such as whether the cars are safe to drive and whether EPA is officially recalling the vehicles at this point.

* * *

On September 25th, my office sent a letter to all auto manufacturers notifying them that we are stepping up our testing activities in response to VW's alleged violations. Over the 40-plus year history of our program, we have continuously updated and adapted our approaches to compliance oversight as technologies and situations changed. We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations. It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for.

Again, we thank you for the opportunity to appear as witnesses at this hearing for the Subcommittee, and we welcome your questions.

VW FOIA, EPA 06/20/2017 2017-FFP_029829

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

October 6, 2015

TO: Members, Subcommittee on Oversight and Investigations

FROM: Committee Majority Staff

RE: Hearing on "Volkswagen's Emissions Cheating Allegations: Initial Questions"

I. INTRODUCTION

On Thursday, October 8, 2015, at 10:00 a.m. in 2123 Rayburn House Office Building, the Subcommittee on Oversight and Investigations will hold a hearing entitled "Volkswagen's Emissions Cheating Allegations: Initial Questions." This hearing will examine the available facts and the initial compliance and consumer issues stemming from Volkswagen AG's reported use of engine software that would reduce the effectiveness of emissions control systems in certain make and model year diesel passenger vehicles in the United States, in apparent violation of the Clean Air Act and its implementing regulations.

II. WITNESSES

There will be two witness panels:

Panel 1:

- Michael Horn, President and Chief Executive Officer, Volkswagen Group of America

Panel 2:

- Christopher Grundler, Director, Office of Transportation and Air Quality, Office of Air and Radiation; and

- Phillip Brooks, Director , Air Enforcement Division, Office of Enforcement and Compliance Assurance, U.S. Environmental Protection Agency

III. SUMMARY

On September 18, 2015, the Environmental Protection Agency (EPA) issued a Notice of Violation (NOV) to Volkswagen AG, Audi AG, and Volkswagen Group of America (collectively, VW) based on a determination "that VW manufactured and installed defeat

devices" in certain model year Volkswagen and Audi diesel passenger cars.[1] The agency alleged that VW installed engine software that "sensed" when the vehicles were undergoing emissions testing and ensured emissions control systems were operating to pass the tests. During normal vehicle use, according to the agency, the software would "switch" to a different mode that produced emissions of nitrogen oxides (NOx) up to 10 to 40 times above current EPA standards. The California Air Resource Board (CARB), which investigated the matter with EPA, issued its own "In-Use Compliance Letter" to VW at the same time.[2]

The installation and use of a component — in this case engine software — to "bypass, defeat, or render inoperative elements of the vehicles' emission control system," would violate the Clean Air Act (CAA) and EPA regulations.[3] The alleged violations involve MY2009 to MY2015 VW and Audi vehicles equipped with 2.0 liter diesel engines, a vehicle population of approximately 480,000 in the United States.[4] Press reports in the wake of EPA's announcement suggest the violations could affect approximately 11 million vehicles worldwide.[5]

EPA and CARB have initiated enforcement investigations, which are ongoing. No fines or recalls to bring the vehicles into compliance have been announced to date. EPA also is expanding its review of other vehicles. The agency notified automakers on September 25, 2015, that it would add to its regimen of "confirmatory testing additional evaluations to look for additional defeat devices."[6] Multiple agencies and foreign governments also have launched their own investigations into VW's conduct.

VW has publically admitted and apologized for violating EPA's regulations and currently is conducting its own investigation and examining solutions to fix the software. The company also has announced significant changes to its leadership and corporate structure. On September 23, 2015, the company's CEO, Dr. Martin Winterkorn, resigned.[7] He was replaced by Matthias Muller, who most recently led the company's Porsche division. In addition, on September 25, 2015, the company has suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit. The company has set aside more than $7 billion to address this alleged violation.

---

[1] Notice of Violation, EPA to Volkswagen AG, Audi AG and Volkswagen Group of America (September 18, 2015) *available at* http://www3.epa.gov/otaq/cert/documents/vw-nov-caa-09-18-15.pdf, at 1 (hereinafter, NOV).
[2] Letter from Cal. Air Resources Board to VW (September 18, 2015) *available at* http://www.arb.ca.gov/newsrel/in_use_compliance_letter.htm, at 1 (Hereinafter, CARB Letter)
[3] NOV, at 1-2.
[4] Affected U.S. diesel models, according to EPA: MY2009 VW Jetta, Jetta Sportwagen; MY2010 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2011 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2012 to MY2015 VW Beetle, Beetle Convertible, Golf, Jetta, Jetta Sportwagen, Passat, and Audi A3.
[5] Mark Thompson and Ivana Kottasova, CNN Money, *Volkswagen scandal widens* (September 22, 2015) *available at,* http://money.cnn.com/2015/09/22/news/vw-recall-diesel/.
[6] EPA Update on Recent Volkswagen Announcement (September 25, 2015) *available at* http://yosemite.epa.gov/opa/admpress.nsf/Press%20Releases%20from%20Headquarters?OpenView
[7] Jack Ewing, N.Y. Times, *Volkswagen C.E.O. Martin Winterkorn Resigns Amid Emissions Scandal* (Sept. 23, 2015) *available at* http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html?_r=0

IV. BACKGROUND

A. Clean Air Act and EPA Regulations

The Clean Air Act and its implementing regulations are intended to protect human health and the environment by limiting pollution caused by emissions from various sources. Title II of the CAA grants EPA the authority to establish and regulate emissions standards for mobile sources, including automobiles. Among the pollutants regulated under Title II, significant attention is placed on NOx.[8] In combination with volatile organic compounds (VOCs), NOx contributes to the production of ground-level ozone.

Current emissions requirements for new motor vehicles, known as "Tier 2" standards, were promulgated in 2000 and phased in beginning in MY2004 vehicles, with full compliance required by MY2009.[9] The Tier 2 standards required manufacturers to reduce NOx emissions by 88% to 95%, depending on vehicle type, though compliance is based on fleet-wide emissions, rather than certification of each individual vehicle.[10] In 2014, new Tier 3 standards went into effect and will generally be phased in between MY2017 and MY2025.[11]

Compliance with EPA's motor vehicle emissions standards is governed by section 203 of the CAA. Prior to introducing a vehicle for sale in the United States, manufacturers must demonstrate that the vehicle meets emissions standards and obtain a certificate of conformity (COC) from the EPA. In the COC application submitted to the EPA, the manufacturer must list all auxiliary emission control devices (AECDs) installed on the vehicle.[12] An AECD is defined as "any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system."[13] The manufacturer must also justify each AECD and explain why it is not a "defeat device."[14] An AECD is considered a "defeat device" if it:

> . . . reduces the effectiveness of the emission control system under conditi ons which may reasonably be expected to be encountered in normal vehicle operation and use, unless: (1) Such conditions are substantially included in the Federal emission test procedure; (2) The need for the AECD is justified in terms of protecting the veh icle against damage or accident; (3) The AECD does not go beyond the requirements of engine starting; or (4) The AECD applies only to emergency vehicles . . . .[15]

It is a violation of the CAA to manufacture or sell any part or component if it will:

---

[8] The EPA estimates that on-road vehicles account for 38% of NOx emissions.
[9] CRS Report R43497, *Tier 3 Motor Vehicle Standards* (April 28, 2014) at 1-2.
[10] *Id.*, at 2.
[11] *Id.,* at 3-4.
[12] NOV, at 2.
[13] 40 C.F.R. § 86.1803-01
[14] 40 C.F.R. § 86.1844-01(d)(11).
[15] 40 C.F.R. § 86.1803-01.

> . . . bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use.[16]

It is also a violation to sell, market, or import any new motor vehicle if it is not covered by a valid EPA-issued COC.[17] Violations of these provisions are subject to civil penalties of up to $3,750 and $37,500, respectively, for any vehicle sold, marketed, or imported on or after January 13, 2009.[18]

EPA's Office of Transportation and Air Quality (OTAQ) oversees a broad set of compliance activities to ensure that vehicles manufacturers satisfy regulatory requirements. These include the review of COC applications and a variety of testing and other requirements that occur over the life a vehicle. In addition to review of manufacturer supplied testing data, EPA's own testing may include so-called "confirmatory testing," both random and targeted, and in use compliance testing. In addition, OTAQ conducts defect reporting programs and recall programs. According to available historical data, emissions recalls affect about three million vehicles annually.[19]

B. Timeline

Set forth below is a timeline of key events related to the VW emissions allegations. Note that the Committee's investigation is ongoing, the Committee will be receiving documents and collecting information in coming weeks that will illuminate the facts and circumstances of these events.[20] The information in this timeline is largely drawn from public sources and is presented to assist Committee Members during the hearing before the Subcommittee.

- May 2014: A study conducted by independent researchers at West Virginia University (WVU) on behalf of the International Council for Clean Transportation (ICCT) identified significantly higher on-road NOx emissions from two VW vehicles – a 2012 Jetta and a 2013 Passat.[21] The results of this study were brought to the attention of the EPA, CARB, and VW.

- May 2014 to December 2014: CARB and EPA launched investigations into the higher emissions in VW vehicles. VW initiated testing to replicate the ICCT/WVU research and

[16] CAA Section 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B).
[17] CAA Section 203(a)(1), 42 U.S.C. § 7522(a)(1).
[18] NOV, at 5.
[19] *See* Vehicle & Engine Compliance Activities: 2009-2011 Compliance Report, *EPA, December 2013, available at http://www3.epa.gov/otaq/documents/cert/420r13006.pdf*.
[20] See Committee letters to VW and EPA, available at http://energycommerce.house.gov/letter/letters-volkswagen-and-epa-regarding-volkswagen-emissions-issues.
[21] NOV, at 4.

identify technical causes for the higher on-road emissions observed by the researchers.[22] VW asserted to EPA and CARB that "increased emissions from these vehicles could be attributed to various technical issues and unexpected in-use conditions."[23]

- December 2, 2014: VW shared testing results with EPA and CARB and proposed a "recalibration fix for the Gen1 (Lean NOx Trap technology) and Gen2 (Selective Catalytic Reduction (SCR) Technology) . . ."[24]

- December 2014: VW initiated a voluntary recall of approximately 500,000 vehicles in the United States. The recall included MY2009 to MY2014 diesel vehicles equipped with Gen1 and Gen2 technology.[25]

- May 6, 2015: CARB commenced testing to confirm that VW's recall solution addressed the higher on-road emissions.[26]

- May 6, 2015 to July 2015: CARB conducted laboratory and on-road testing to confirm the efficacy of the recall.[27] The testing showed limited improvement, prompting CARB to expand its investigation.[28]

- July 8, 2015: CARB shared test results with VW and the EPA, prompting a series of technical meetings. According to CARB, in the course of those meetings, "VW disclosed that Gen1, Gen2, and the 2015 model-year improved SCR vehicle (known as Gen3) had a second calibration intended to run only during confirmatory testing."[29]

- August 2015: EPA and CARB informed VW that they would not issue certificates of conformity for 2016 vehicles until VW could explain the higher emissions and provide assurance that they would not occur in 2016 vehicles.[30,31]

- September 3, 2015: VW admitted to EPA and CARB that it had designed and installed what was effectively a defeat device into these vehicles.

- September 18, 2015: EPA sent VW a Notice of Violation. CARB sent VW an in-use compliance letter.

- September 21, 2015: VW CEO, Dr. Martin Winterkorn, issued a public apology.

---

[22] CARB Letter.
[23] NOV, at 4.
[24] CARB Letter, at 2.
[25] *Id.*
[26] *Id.*
[27] NOV, at 4.
[28] *Id.*
[29] CARB, at 2.
[30] NOV, at 4.
[31] EPA has not certified MY2016 vehicles and will not do so until it understands this issue.

- September 23, 2015: Dr. Winterkorn resigned from VW.

- September 25, 2015: EPA announced it is adding additional confirmatory testing of passenger vehicles intended as an effort to identify any additional defeat devices.

- September 25, 2015: VW suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit.

V. Questions and Issues:

The following issues may be addressed at the hearing:

- What has been Volkswagen's response to the EPA allegations?
- What are the available facts concerning VW's violations?
- What is EPA's role in any measures to bring affected VW's into compliance?
- What can VW consumers expect going forward?

VI. Staff Contacts

If you have any questions regarding this hearing, please contact Peter Spencer or John Ohly of the majority Committee staff at (202) 225-2927.

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029836

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029837

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029838

To: Allen, Laura[Allen.Laura@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 10:35:03 PM
Subject: RE: Sounds like you're going to do well tomorrow...

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From: Allen, Laura
Sent: Wednesday, October 07, 2015 6:34 PM
To: Grundler, Christopher
Cc: Birgfeld, Erin
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EPA's Rigorous Auto Oversight Will Get Even Stronger

By Christopher Grundler, Director, Office of Transportation and Air Quality

Last month, Volkswagen admitted to EPA and the California Air Resources Board that the company employed a sophisticated device to cheat U.S. emissions standards in certain diesel cars, including the Audi A3, Beetle, Golf, Jetta, and Passat. We take this matter very seriously. It's not only a violation of the Clean Air Act, it threatens public health and the credibility of the industry.

Our goal is to complete a comprehensive investigation and to take the appropriate steps to ensure that this never happens again. We are now testing for defeat devices and other compliance issues for model year 2015 and 2016 light-duty diesel vehicles from all manufacturers. On September 25, we notified all auto manufacturers that our testing will include additional evaluations designed to detect potential defeat devices.

We employ a rigorous, multi-layer process to test and certify new vehicle models before they can be sold, and for testing vehicles that are in production and on the road. But technologies evolve and circumstances change, and we're constantly looking at ways to improve our compliance and oversight programs. Over the past 45 years, our oversight and testing program has developed new tools and new techniques to adapt to technology advances so we can deliver on the agency's mission.

In the late 1990's, the heavy-duty industry deployed defeat devices in a large number of trucks, resulting in a settlement valued at over $1 billion. We've done extensive on-road testing audits for compliance with the newly implemented greenhouse gas emissions standards. This effort resulted in an enforcement action and ultimately a record-setting settlement with Hyundai/Kia, and significant fuel economy adjustments by Ford and other vehicle manufacturers.

Our testing and oversight includes both in-lab testing using dynamometers and on-road testing in real-world conditions. Both are necessary as part of an active robust program. This provides a multi-layered oversight approach focused on:

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- Laboratory audits ensuring that manufacturer, contract, and other agency test labs conform to testing protocols and data quality standards, so that the data EPA gets from these sources (including the data manufacturers provide to EPA) meet standards and that results can be compared among labs; and

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Laura Allen

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Office of the Administrator
U.S. Environmental Protection Agency

Email: Allen.Laura@epa.gov

Office: 202-564-1175

Mobile: 202-731-3005

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To: Allen, Laura[Allen.Laura@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 10:36:01 PM
Subject: RE: Sounds like you're going to do well tomorrow...

Comforting news about the room….

From: Allen, Laura
Sent: Wednesday, October 07, 2015 6:34 PM
To: Grundler, Christopher
Cc: Birgfeld, Erin
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Email: Allen.Laura@epa.gov

Office: 202-564-1175

Mobile: 202-731-3005

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To: Allen, Laura[Allen.Laura@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 10:36:35 PM
Subject: RE: Sounds like you're going to do well tomorrow...

Speaking of the Big House, I hope you worked out your gear dilemma

From: Allen, Laura
Sent: Wednesday, October 07, 2015 6:34 PM
To: Grundler, Christopher
Cc: Birgfeld, Erin
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Mobile: 202-731-3005

Please consider the environment before printing this email.

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Bunker, Byron
Sent: Wed 10/7/2015 10:56:30 PM
Subject: RE: should i stick around for the revised timeline?
Intergrated Chronology.docx

Attached is an updated timeline.

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

****

From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 6:55 PM
To: Bunker, Byron
Subject: should i stick around for the revised timeline?

To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Allen, Laura
Sent: Wed 10/7/2015 11:31:47 PM
Subject: RE: Sounds like you're going to do well tomorrow...

Ok, last email. Flagging this financial times story on timeline of knowledge of issue.

VW's US chief knew of emissions issue for 18 months

Robert Wright in New York

Mr Horn, whose position has been reaffirmed by VW's supervisory board in the wake of the scandal, is expected to present his written testimony on Thursday morning to the House committee on energy and commerce's subcommittee on oversight and investigations.

It will mark his first public appearance to give evidence on VW's deception, first revealed on September 18 by the US Environmental Protection Agency.

In his evidence, he describes the company's hiding of its emissions levels as "deeply troubling", offers the latest of a series of apologies from senior executives for the events and says he is testifying to prove VW's co-operation.

However, he also lays out a timeline of his actions on the issue that suggests he waited up to 18 months before alerting regulators to what was happening.

"In the spring of 2014 . . . I was told that there was a possible emissions non-compliance that could be remedied," he will tell the committee.

He was informed at the time that the EPA could perform tests to detect "defeat devices" intended to fool emissions testers and that there were penalties for not complying with the rules, he will say.

"Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process," he will add.

Mr Horn's account is the first by a senior VW executive to give details of when top figures learned about the deception, which had been under way since at least 2008. The company's board of directors insisted when Martin Winterkorn resigned as chief executive on September 23 that he had not known about it.

The EPA announced on September 18 that VW had told it on September 3 that 482,000 diesel-powered vehicles sold in the US between 2008 and this year contained "defeat device" software to disguise their emissions levels. The software detects when the vehicle is undergoing an emissions test and removes most nitrogen oxide emissions during the test — but it largely disables the controls at all other times.

VW has since said that up to 11m diesel vehicles worldwide feature the defeat device.

VW stressed in a statement on Wednesday that Mr Horn was initially unaware the problem resulted from a defeat device. He had learned that only "over the past several weeks", the company said.

Mr Horn's testimony gives no reason why he apparently failed to disclose the issues to the EPA for so long. The testimony goes straight from the information he was given later in 2014 to describing the company's admission to the EPA this September.

"On September 3, 2015, Volkswagen disclosed . . . that emissions software in four-cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' . . . that could recognise whether a vehicle was being operated in a test laboratory or on the road," he will tell the committee.

His testimony also reveals that VW has formally withdrawn its application for its 2016 diesel models for the US market — vehicles that would have gone on sale this year. It was discussions

over certification for the latest vehicles that led the EPA to query VW's emissions record and eventually prompted VW to admit the long-running deception.

Mr Horn is expected to be subjected to tough questioning by the committee, which will also hear from EPA officials involved in the case and the current investigation into VW's wrongdoing.

From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 6:35 PM
To: Allen, Laura
Cc: Birgfeld, Erin
Subject: RE: Sounds like you're going to do well tomorrow...

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Email: Allen.Laura@epa.gov

Office: 202-564-1175

Mobile: 202-731-3005

Please consider the environment before printing this email.

To: Ex. 7

Ex. 7

Cc: Wehrly, Linc[wehrly.linc@epa.gov]; Snyder, Jim[Snyder.Jim@epa.gov]
From: Bunker, Byron
Sent: Wed 10/7/2015 11:32:20 PM
Subject: Horn Testimony - 2016 Certification withdrawn
2015-10-08 Horn Testimony.pdf

Hi Ex. 7

Attached is the written testimony that Michael Horn provided to the HEC Subcommittee today in advance of his appearance at tomorrow's hearing.

It includes a statement that VW has withdrawn its 2016 application for certification. We had not previously understood that to be VW's request. I called David Geanacopoulos to confirm that the statement reflected VW's intent. He confirmed that it did. As of that phone call, I consider VW's 2016 certification application to be withdrawn.

We have also confirmed that fact in response to press inquiries today.

Thanks,

Byron

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

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Subcommittee on Oversight and Investigations
October 8, 2015

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On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029856

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029857

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029858

To: Allen, Laura[Allen.Laura@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/7/2015 11:50:53 PM
Subject: Re: Sounds like you're going to do well tomorrow...

This will not go well for him

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 7, 2015, at 7:31 PM, Allen, Laura <Allen.Laura@epa.gov> wrote:

Ok, last email. Flagging this financial times story on timeline of knowledge of issue.

VW's US chief knew of emissions issue for 18 months

Robert Wright in New York

Mr Horn, whose position has been reaffirmed by VW's supervisory board in the wake of the scandal, is expected to present his written testimony on Thursday morning to the House committee on energy and commerce's subcommittee on oversight and investigations.

It will mark his first public appearance to give evidence on VW's deception, first revealed on September 18 by the US Environmental Protection Agency.

In his evidence, he describes the company's hiding of its emissions levels as "deeply troubling", offers the latest of a series of apologies from senior executives for the events and says he is testifying to prove VW's co-operation.

However, he also lays out a timeline of his actions on the issue that suggests he waited up to 18 months before alerting regulators to what was happening.

"In the spring of 2014 . . . I was told that there was a possible emissions non-compliance that could be remedied," he will tell the committee.

He was informed at the time that the EPA could perform tests to detect "defeat devices" intended to fool emissions testers and that there were penalties for not complying with the rules, he will say.

"Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process," he will add.

Mr Horn's account is the first by a senior VW executive to give details of when top figures learned about the deception, which had been under way since at least 2008. The company's board of directors insisted when Martin Winterkorn resigned as chief executive on September 23 that he had not known about it.

The EPA announced on September 18 that VW had told it on September 3 that 482,000 diesel-powered vehicles sold in the US between 2008 and this year contained "defeat device" software to disguise their emissions levels. The software detects when the vehicle is undergoing an emissions test and removes most nitrogen oxide emissions during the test — but it largely disables the controls at all other times.

VW has since said that up to 11m diesel vehicles worldwide feature the defeat device.

VW stressed in a statement on Wednesday that Mr Horn was initially unaware the problem resulted from a defeat device. He had learned that only "over the past several weeks", the company said.

Mr Horn's testimony gives no reason why he apparently failed to disclose the issues to the EPA for so long. The testimony goes straight from the information he was given later in 2014 to describing the company's admission to the EPA this September.

"On September 3, 2015, Volkswagen disclosed . . . that emissions software in four-cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' . . . that could recognise whether a vehicle was being operated in a test laboratory or on the road," he will tell the committee.

His testimony also reveals that VW has formally withdrawn its application for its 2016 diesel models for the US market — vehicles that would have gone on sale this year. It was discussions over certification for the latest vehicles that led the EPA to query VW's emissions record and eventually prompted VW to admit the long-running deception.

Mr Horn is expected to be subjected to tough questioning by the committee, which will also hear from EPA officials involved in the case and the current investigation into VW's wrongdoing.

From: Grundler, Christopher
Sent: Wednesday, October 07, 2015 6:35 PM
To: Allen, Laura
Cc: Birgfeld, Erin
Subject: RE: Sounds like you're going to do well tomorrow...

Thanks. this is helpful. It was difficult to print from web

From: Allen, Laura
Sent: Wednesday, October 07, 2015 6:34 PM
To: Grundler, Christopher
Cc: Birgfeld, Erin
Subject: Sounds like you're going to do well tomorrow...

Also sending this blog again because it puts a lot of the topics (esp our testing) in easy-to-use paragraphs. So hopefully it's helpful to you.

Also, the E&C hold room happens to have a GIANT photo of the big house (thanks Rep. Upton—it's actually called "the Michigan room"), so that should be a good omen.

EPA's Rigorous Auto Oversight Will Get Even Stronger

By Christopher Grundler, Director, Office of Transportation and Air Quality

Last month, Volkswagen admitted to EPA and the California Air Resources Board that the company employed a sophisticated device to cheat U.S. emissions standards in certain diesel cars, including the Audi A3, Beetle, Golf, Jetta, and Passat. We take this matter very seriously. It's not only a violation of the Clean Air Act, it threatens public health and the credibility of the industry.

Our goal is to complete a comprehensive investigation and to take the appropriate steps to ensure that this never happens again. We are now testing for defeat devices and other compliance issues for model year 2015 and 2016 light-duty diesel vehicles from all manufacturers. On September 25, we notified all auto manufacturers that our testing will include additional evaluations designed to detect potential defeat devices.

We employ a rigorous, multi-layer process to test and certify new vehicle models before they can be sold, and for testing vehicles that are in production and on the road. But technologies evolve and circumstances change, and we're constantly looking at ways to improve our compliance and oversight programs. Over the past 45 years, our oversight and testing program has developed new tools and new techniques to adapt to technology advances so we can deliver on the agency's mission.

In the late 1990's, the heavy-duty industry deployed defeat devices in a large number of trucks, resulting in a settlement valued at over $1 billion. We've done extensive on-road testing audits for compliance with the newly implemented greenhouse gas emissions standards. This effort resulted in an enforcement action and ultimately a record-setting settlement with Hyundai/Kia, and significant fuel economy adjustments by Ford and other vehicle manufacturers.

Our testing and oversight includes both in-lab testing using dynamometers and on-road testing in real-world conditions. Both are necessary as part of an active robust program. This provides a multi-layered oversight approach focused on:

- Testing both pre-production prototypes and production vehicles on the dynamometer, which provides accurate, reliable and repeatable measurements that can be used to compare against the standard, and across vehicle types;

- On-road testing using portable emissions monitors (PEMs) that measure emissions during real world driving situations. In recent years, on-road PEMs testing has been focused on heavy duty diesel vehicles, which account for roughly 40 percent of the NOx pollution from on-road sources. (By comparison light duty diesel cars account for about 0.1 percent of NOx pollution from on-road sources.)

- Laboratory audits ensuring that manufacturer, contract, and other agency test labs conform to testing protocols and data quality standards, so that the data EPA gets from these sources (including the data manufacturers provide to EPA) meet standards and that results can be compared among labs; and

- Holding manufacturers accountable for their actions through rigorous enforcement of the Clean Air Act, which provides a strong deterrence against cheating and helps maintain a level playing field for the vast majority of automakers that play by the rules.

Air quality monitors across the country tell a clear and compelling story: U.S. air quality has dramatically improved as a result of implementing our programs as vehicle miles and the economy have grown significantly. Since EPA's founding, we've cut our nation's air pollution 70% all while the economy has tripled. A strong oversight and compliance program is critical to ensure that the clean air standards that EPA sets for vehicles to protect public health actually deliver the emissions promised to the American people. We will learn from this Volkswagen case, and will adapt and improve --as we have before-- to ensure we deliver on the Agency's mission.

More information for owners of affected vehicles may be found here: http://www3.epa.gov/otaq/cert/violations.htm

Laura Allen

Deputy Press Secretary

Office of the Administrator
U.S. Environmental Protection Agency

Email: Allen.Laura@epa.gov

Office: 202-564-1175

Mobile: 202-731-3005

Please consider the environment before printing this email.

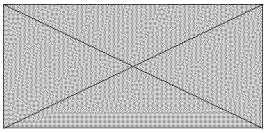
To: Kaul, Meetu[Kaul.Meetu@epa.gov]; Volkswagen Customer Resolution and Retention[VWcustomerresolutionretention@vw.com]; VWoA Customer CARE[VWCustomerCARE@vw.com]
From: Ann Ex. 6
Sent: Thur 10/8/2015 2:50:22 AM
Subject: Trade-in for a 2015 GOLF

Hello:
I drove my car and I don't like polluting. I try to be conscienious and I really want a car that reflects my values. My 2012 VW Jetta Sportwagen Diesel Ex. 6 does not meet my standards. I don 't want to drive it anymore. You are considering this matter. I have received e-mails from you. I am writing again, because new 2015 inventory does not last forever. My goal is to get a 2015 Golf Sportwagen Diesel, same package as mine. TDI SEL. Same colors. As long as there is availability, this is what I want to do. Trade my car in for this new and EPA certified car.

I bought the car at Winn VW in Newark CA. I live in Sebastopol, CA nearest to Hansel VW in Santa Rosa. The whole bay area is within an approximate 3 hour drive, with several dealers.
I am certain at this point, a dealer has the 2015 Golf that I want. In a month or 3 or 6 months, there may not be availability, I love my car, but I don't like to drive it anymore.
Thank you again for your time and consideration.
What can I do to expedite this?

Ann
Ex. 6

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Environmental Law360
Sent: Thur 10/8/2015 7:31:41 AM
Subject: Marathon Not Liable In Oilfield Nuisance Suit, Court Affirms



ENVIRONMENTAL

Thursday, October 8, 2015

TOP NEWS

Marathon Not Liable In Oilfield Nuisance Suit, Court Affirms

A Texas appeals court affirmed Wednesday that homeowners who accused Marathon Oil and a production company of damaging their health and property by negligently operating nearby oilfields, allowing noxious odors to migrate onto their land and damaging their home's foundation, hadn't backed their claims with sufficient evidence.

VW Hit With First German Lawsuit On Emissions Testing

German law firm Jordan Fuhr Meyer GbR said Wednesday that it had filed the first customer lawsuit in Germany against Volkswagen for deliberately masking the real emissions output of some of its vehicles in a scandal that has encompassed some 11 million diesel cars worldwide.

Arctic Drilling Will Hardly Impact Walrus, 9th Circ. Told

The federal government asked the Ninth Circuit to toss a challenge to the authorization to harm Pacific walruses during Arctic oil and gas explorations, saying Tuesday such activity will result in "negligible" impacts to the species.

14 States Demand Info From EPA On Power Plant Rule Delay

Fourteen states on Tuesday asked the U.S. Environmental Protection Agency to explain why its new plan to reduce greenhouse gas emissions from existing power plants has not yet been published in the Federal Register, which is needed before legal challenges can be brought against it.

Calif. Gov. Signs Landmark Renewable Energy Bill

Calif. Gov. Jerry Brown signed into law on Wednesday a bill referred to as the nation's most far-reaching climate change legislation, requiring the state's utilities to obtain at least half of their electricity from renewable energy sources within 15 years.

POLICY & REGULATION

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Davis Cedillo

Dewey & LeBoeuf

Dykema

Earthjus

Gray Reed

Senate Committee Probes VW Over Fuel-Economy Tax Credits

The Senate Finance Committee pressed Volkswagen on Tuesday for documents and information on potentially misleading statements it made to the IRS in order to certify several of its vehicles for a fuel economy tax credit in the wake of revelations that the company installed "defeat devices" to evade emissions standards.

$1B NJ Pipeline Proposal Shores Up Support From Unions

The proposal for an estimated $1 billion pipeline that would carry Bakken Shale oil though New Jersey and New York has shored up support from a coalition of unions and business groups, tempering the largely critical reception the plan has drawn so far.

ENFORCEMENT

Volkswagen Must Tighten Belt For Coming Recall, CEO Says

Volkswagen must scrimp and save a "massive" amount to fix around 11 million diesel cars worldwide that don't live up to emissions standards, the company's new CEO has said, while the company confirmed on Wednesday it would work to recall affected non-U.S. cars within 2016.

Ex-Massey Energy CEO Loses Bid To Transfer Criminal Case

A West Virginia federal judge on Wednesday refused an attempt by former Massey Energy CEO Don Blankenship to transfer the federal government's criminal case accusing him of driving safety violations before an explosion killed 29 people at a mine.

LITIGATION

Citgo Can't Drop Oil Spill Payouts, La. Appeals Court Says

A Louisiana appeals court rejected Citgo's bid to reduce judgments in favor of 15 workers who were sickened by a 2006 oil spill at the company's Calcasieu Parish refinery, finding the evidence supported the amount of each worker's award on Wednesday.

Enviros Pushes DC Circ. To Hear Diablo Canyon Permit Suit

Environmentalists have asked the D.C. Circuit to reactivate their suit challenging purported operating license changes for Pacific Gas & Electric Co.'s Diablo Canyon Nuclear Power Plant in California, saying that, despite a pending administrative process, the court can still hear the case.

Business Owners To Appeal Oil Refinery Suit To 6th Circ.

A group of Detroit business owners on Wednesday told a Michigan federal court that they would be appealing the court's decision to dismiss their case accusing Marathon Petroleum Co. of maliciously interfering with their business operations and increasing air pollution to

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Gray Reed

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the Sixth Circuit.

3rd Circ. Bars Flood Inaction Claims Against Pa. Borough

The Third Circuit has upheld a Pennsylvania district court's dismissal of a suit for flooding damages filed by residents of Duryea Borough following Hurricane Irene, ruling that the property owners failed to identify specific actions the town's officials may have taken to cause their alleged injuries.

Fifth Third Urges Sanctions For Whistleblower With 'Vendetta'

Fifth Third Bancorp. pushed Wednesday for a Michigan federal judge to sanction the attorney and his client in a False Claims Act suit against the company and PNC Financial Services Group Inc. alleging they did not disclose environmental contamination liability when applying for Troubled Asset Relief Program funds.

DuPont Hit With $1.6M Verdict In First Trial Of Pollution MDL

DuPont Co. owes a woman $1.6 million for negligence and emotional distress, the Ohio federal jury hearing the first trial in multidistrict litigation alleging the company contaminated drinking water found in a verdict posted Wednesday.

EXPERT ANALYSIS

Migratory Birds Of A Feather Don't Always Flock Together

The scope of the Migratory Bird Treaty Act's take prohibition has become a key issue in the energy industry, both in the criminal and civil context, and the Fifth Circuit's ruling in United States v. Citgo Petroleum Co. that the MBTA's take prohibition is limited to only intentional take of migratory birds further widens a circuit split and perpetuates regulatory uncertainty, say attorneys at Perkins Coie LLP.

Fall Of Fracking Rule: When Agencies Don't Consult Tribes

A Wyoming federal judge's recent decision enjoining, on a nationwide basis, the Bureau of Land Management from enforcing its final rule related to hydraulic fracturing on federal and Indian lands marks a milestone in using lack of tribal consultation as a sword in litigation, says Troy Eid, a shareholder at Greenberg Traurig LLP and former U.S. attorney for the District of Colorado.

LEGAL INDUSTRY

Most Feared Plaintiffs Firm: Motley Rice

After getting a verdict against Arab Bank for providing services to a terrorist group, taking on the manufacturers of transvaginal mesh, and inking wrongful death and personal injury settlements between smokers and three major tobacco companies, Motley Rice LLC has again earned a spot among Law360's Most Feared Plaintiffs Firms.

The 6 Phrases That Should Be Banned From Legal Writing

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Ifrah Law

Jones Day

Next time you're about to turn in a brief full of technical jargon and age-old stock phrases, remember that judges hate stuffy writing just as much as ordinary readers do. Here are six overused phrases that experts would like to banish from legal writing.

Dewey Execs Beat Some Charges, Jury Stuck On Others

A New York state jury on Wednesday acquitted three former Dewey & LeBoeuf LLP executives of falsifying business records and deadlocked on grand larceny, fraud and other counts in the closely watched criminal trial over the firm's collapse.

Dewey Execs Face A Tougher Path To Victory With The SEC

While the legal world has been focused on the criminal trial of the former leaders of Dewey & LeBoeuf LLP, the U.S. Securities and Exchange Commission has been waiting in the wings with an enforcement action expected to be a lot harder for the executives to beat, raising the likelihood of settlement.

Dewey Prosecution May Be Tripped Up By Charge-Heavy Trial

Jurors in the trial of the former executive leadership of Dewey & LeBoeuf LLP on Wednesday acquitted the defendants of 49 counts of falsifying business records but deadlocked on the remaining counts, an indication prosecutors may have overcharged this multifaceted case, some experts say.

Dewey Defense Places Trust In Jury With Extra Deliberations

The defense team for former Dewey & LeBoeuf LLP leaders asked a deadlocked jury Wednesday to continue to deliberate — a rare and risky move for most criminal defendants and a clear sign of confidence that the jury is on their side, experts said.

Dallas DA Sets Ethical Example With Depression Treatment

When Dallas County's district attorney took a leave of absence to treat serious depression — a problem that affects attorneys in disproportionate numbers to the general population — she faced calls for resignation, but experts say getting treatment and ensuring that any clients are taken care of is the ethical thing to do.

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GOVER AGENCI

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Departm of Energy

Departm of the Interior

Environr Protectic Agency

Fish and Wildlife Service

Internal

Revenue Service

New Jersey Board of Public Utilities

Nuclear Regulat Commis

Office of Manage and Budget

Securitie and Exchang Commis

Southern Ute Indian Tribe

U.S. Army

U.S. Departm of Justice

U.S. Sentenc Commis

U.S. Supreme Court

Ute Indian Tribe

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Dykema

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Gray Reed

Hill Peterson

Ifrah Law

Kreis Enderle

Levin Papantonio

Lieff Cabraser

Marshall Dennehey

Mayer Brown

Miller Canfield

Morvillo Abramowitz

Motley Rice

Perkins Coie

Podhurst Orseck

Reed Smith

Sayles Werbner

Scofield Gerard

Squire Patton Boggs

Stoel Rives

Taft Stettinius

Taylor English

Zuckerman Spaeder

COMPANIES
Volkswagen

CITGO Petroleum Corp.

Sierra Club

Alpha Natural Resources, Inc.

Altria Group Inc.

American Bar Association

American Medical Systems Holdings, Inc.

Babcock & Wilcox Co.

Boston Scientific Corporation

California Independent System Operator

Center for Biological Diversity Inc.

E. I. du Pont de Nemours and Company (DuPont)

Environmental Law Institute

Fifth Third Bancorp

Institutional Shareholder Services Inc.

International Brotherhood of Teamsters

Marathon Oil Corporation

Marathon Petroleum Corp.

National Mining Association

Natural Resources Defense Council

PG&E Corporation

Philip Morris International Inc.

Plains Exploration & Production Company

Pnc Financial Services Group,The

Porsche

R.J. Reynolds Tobacco Co.

Royal Dutch Shell PLC

State Bar of Texas

GOVERNMENT AGENCIES
Environmental Protection Agency

U.S. Department of Justice

U.S. Supreme Court

Department of the Interior

Fish and Wildlife Service

Army Corps of Engineers

Bureau of Land Management

Centers for Disease Control and Prevention

Department of Energy

Internal Revenue Service

New Jersey Board of Public Utilities

Nuclear Regulatory Commission

Office of Management and Budget

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Southern Ute Indian Tribe

U.S. Army

U.S. Sentencing Commission

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To: Brooks, Phillip[Brooks.Phillip@epa.gov]
Cc: Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Shinkman, Susan[Shinkman.Susan@epa.gov]; Kelley, Rosemarie[Kelley.Rosemarie@epa.gov]
From: Grundler, Christopher
Sent: Thur 10/8/2015 10:08:48 AM
Subject: Re: VE

Got it. Thx

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 8, 2015, at 6:03 AM, Brooks, Phillip <Brooks.Phillip@epa.gov> wrote:

> Fyi. Company numbers on crashes and Fidelity's being questioned. Does not appear in anyway related to our issue, but could come up for someone today.
> http://www.bloomberg.com/news/articles/2015-10-07/for-volkswagen-new-questions-arise-on-u-s-injury-reporting
>
> Sent from my iPhone

To: Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Shinkman, Susan[Shinkman.Susan@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Belser, Evan[Belser.Evan@epa.gov]
From: Brooks, Phillip
Sent: Thur 10/8/2015 10:33:37 AM
Subject: Possible source of new questions re economic benefit today

http://www.bloomberg.com/news/articles/2015-10-07/vw-s-gains-from-cheating-to-be-considered-in-u-s-penalties

Sent from my iPhone

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: McCabe, Janet
Sent: Thur 10/8/2015 11:05:36 AM
Subject: Re: VW's Cheating Gains Will Be a Factor in U.S. Penalties - Bloomberg Business

Yep.

Sent from my iPhone

> On Oct 8, 2015, at 5:46 AM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:
>
> Note comment from Cong From Texas in committee
>
> http://www.bloomberg.com/news/articles/2015-10-07/vw-s-gains-from-cheating-to-be-considered-in-u-s-penalties
>
>
> Christopher Grundler, Director
> Office of Transportation and Air Quality
> U.S. EPA
> 202-564-1682 (DC)
> 734-214-4207 (Ann Arbor)

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Simon, Karl
Sent: Thur 10/8/2015 11:14:25 AM
Subject: Re: VW

Wow

Driving Innovation in Clean Transportation

On Oct 8, 2015, at 6:08 AM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

Begin forwarded message:

From: "Brooks, Phillip" <Brooks.Phillip@epa.gov>
Date: October 8, 2015 at 6:03:51 AM EDT
To: "Giles-AA, Cynthia" <Giles-AA.Cynthia@epa.gov>, "Starfield, Lawrence" <Starfield.Lawrence@epa.gov>, "Shinkman, Susan" <Shinkman.Susan@epa.gov>, "Kelley, Rosemarie" <Kelley.Rosemarie@epa.gov>, "Grundler, Christopher" <grundler.christopher@epa.gov>
Subject: VE

Fyi. Company numbers on crashes and Fidelity's being questioned. Does not appear in anyway related to our issue, but could come up for someone today.
http://www.bloomberg.com/news/articles/2015-10-07/for-volkswagen-new-questions-arise-on-u-s-injury-reporting

Sent from my iPhone

To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Thur 10/8/2015 11:27:44 AM
Subject: Amendment fights over crude export bill include new studies, maritime spending

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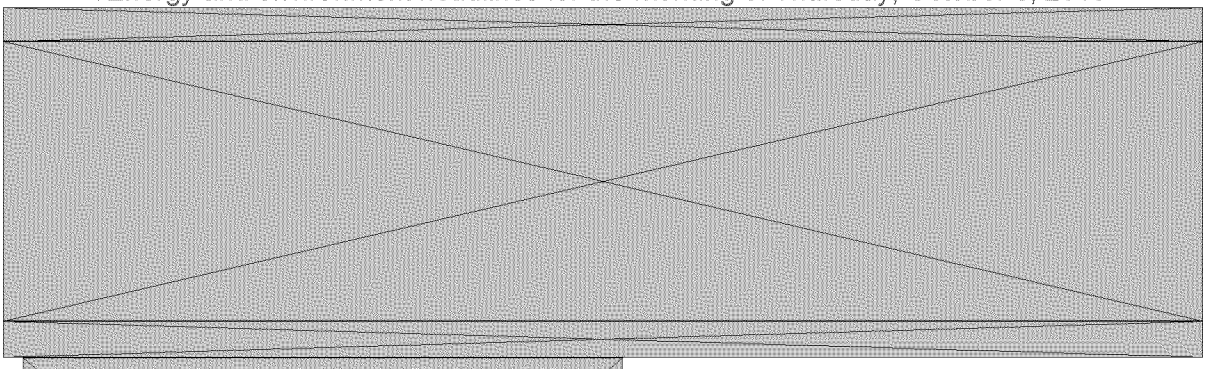
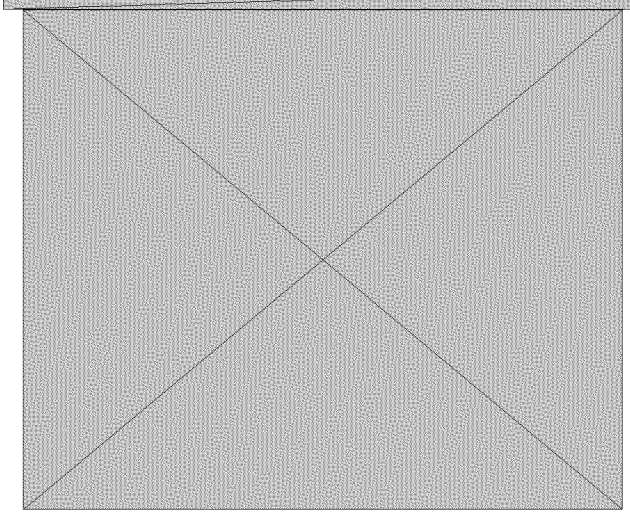
Energy and environment headlines for the morning of Thursday, October 8, 2015





Amendment fights over crude export bill include new studies, maritime spending

By Kevin Rogers

As the House moves toward a Friday vote to lift the U.S. ban on crude oil exports, lawmakers will consider 10 amendments that include requiring new federal studies on greenhouse gas emissions, setting an economic trigger to restrict exports and scrapping a controversial maritime funding provision.

The House Rules Committee on Wednesday ordered that the bill would follow a structured

rule, with one hour of equally divided debate and pre-selected amendments, countering Democratic Rep. Bobby Rush's request for an open debate and amendment process.

Rush, D-Ill., had said that given the Obama administration's veto threat, the bill, authored by Texas Republican Rep. Joe Barton, would need an open process to make it more palatable to Democrats.

"I doubt there are any members here today under any false illusion that this bill will ever become law as currently drafted in this Congress while President Obama is in office," he said. "It would appear to me that the most logical way to approve this bill and help its chances of actually becoming law would be to allow minority amendments, so we may have a fair deal, a transparent deal and some open debate."

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The full House will consider a bill from Rep. Henry Cuellar, D-Texas, that would encourage the Energy Department to develop oil and gas development training partnerships with minority serving institutions. Rush, however, dismissed the amendment as a "diluted version" of his proposal.

Lawmakers will consider some Democratic priorities as amendments, including a proposal from Rep. Jared Huffman, D-Calif., that would order the Energy Department to conduct a study into the greenhouse gas impacts of lifting the ban.

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Another amendment up for a vote from Rep. John Garamendi, D-Calif., would allow the president, in consultation with the Energy and Commerce secretaries, to reduce exports of crude oil if supply shortages and price increases pose a "sustained" threat to U.S. refining capacity and employment.

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"We cannot afford to put California's coastal economy at risk by drilling offshore," Sen. Barbara Boxer of California said in a statement. "More than half a million California jobs and more than $34 billion in annual economic activity depend on a pristine coastline and we owe it to current and future generations to protect our coast."

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VW's US CEO to face tough questions in congressional hearing

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House GOP to vote for new speaker, but won't be last word

By Erica Werner

WASHINGTON (AP) — Divided House Republicans are meeting to vote on a new speaker as the front-runner, Majority Leader Kevin McCarthy of California, faces a fresh challenge from the hard-line conservatives who forced outgoing Speaker John Boehner to resign.

Thursday's closed-door, secret-ballot election will produce a GOP nominee for speaker, but it will not be the final word. That won't come until Oct. 29, when the full House votes in open session for speaker.

Many of the conservatives who oppose Boehner are eager to deny McCarthy, the outgoing speaker's ally and deputy, the chance to advance. Members of the hard-right House Freedom Caucus announced Wednesday they would be backing a different candidate, GOP Rep. Daniel Webster of Florida, a little-known longshot who ran against Boehner at the beginning

of this year but got only 12 votes.

Webster, who served as speaker of the House in Florida, is unlikely to deny McCarthy a majority vote in Thursday's session. But if the several-dozen Freedom Caucus members stick together on the House floor later this month, they could prevent McCarthy from getting the 218 votes he'd need to prevail. That would send the House into uncertain territory — and perhaps increase the Freedom Caucus' leverage to exact concessions as members demand confrontations with President Barack Obama and Senate Democrats on issues of spending and debt.

More

California wants renewable energy for half its power by 2030

By Michael R. Blood and Judy Lin

LOS ANGELES (AP) — Gov. Jerry Brown dramatically increased California's climate-change goals, committing the state to use renewable energy for half its electricity and make existing buildings twice as energy-efficient in just 15 years.

Brown tried for an even stronger measure that also would have enforced a 50 percent drop in petroleum use by 2030, but was defeated by oil interests. He called that a short-term setback, and insisted that the world needs to wean itself off fossil fuels as quickly as possible.

"What has been the source of our prosperity now becomes the source of our ultimate destruction, if we don't get off it. And that is so difficult," Brown said at a signing ceremony Wednesday at the hilltop Griffith Observatory, overlooking the haze of downtown Los Angeles.

California already has some of the world's toughest air quality standards, and set a mandate in 2006 to derive a third of its electricity from renewable sources such as solar, wind and geothermal by 2020. State regulators say they already hit 25 percent last year, as huge solar farms sprouted in the desert and towering windmills went up along mountain passes.

More

California grooms utility giants to compete against Big Oil

By Judy Lin

SACRAMENTO, Calif. (AP) — California wants more drivers to dump the pump and plug in.

Climate change legislation signed Wednesday day by Gov. Jerry Brown calls for major utilities to compete as an alternative transportation fuel source by installing thousands of charging stations where people live, work and play.

The provision was contained in a broader climate control measure requiring the state to boost renewable electricity use to 50 percent and double the energy efficiency of existing buildings by 2030.

The bill's author, Senate President Pro Tem Kevin de Leon, a Los Angeles Democrat, was forced to drop a key aspect of his proposal that would have pushed the state to cut oil use by half.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

IMF Chief: We're cooked if we fail on climate change

By Frank Bajak

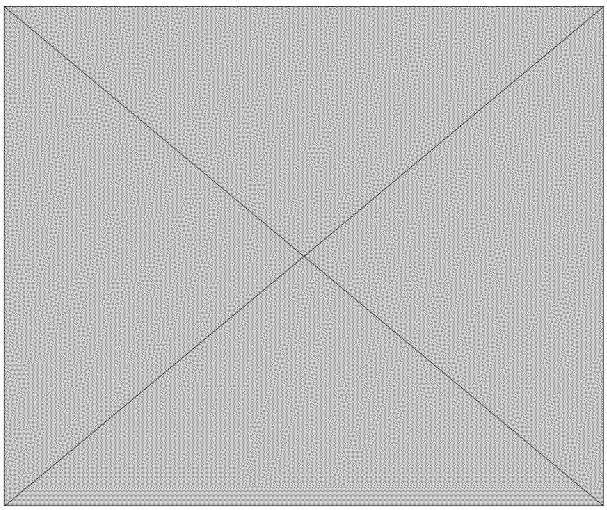
LIMA, Peru (AP) — International Monetary Fund chief Christine Lagarde said Wednesday that failure to take urgent action on global warming will condemn humanity to the same fate as the Peruvian poultry that so many delegates to the group's annual meeting are enjoying this week in a country famed for its cuisine.

"If we collectively chicken out of this we'll all turn into chickens and we'll all be fried, grilled, toasted and roasted," said Lagarde.

Her comments came in a panel discussion involving World Bank President Jim Yong Kim, U.N. climate talks executive secretary Christiana Figueres and economist and climate expert Nicholas Stern.

Lagarde and Kim argued strongly for removing subsidies on fossil fuels that are worth more than $5 trillion a year and on the immediate need for carbon taxes so that the burning of fossil fuels can fund clean energy replacements.

More



S.C. flooding: Columbia officials trying to save water supply

By Adam Beam and Meg Kinnard

COLUMBIA, S.C. (AP) — City of Columbia officials said they're moving forward with a backup plan to protect the city's main water source after a portion of the Columbia canal collapsed following record rainfall, forcing workers to stop building a dam meant to plug an earlier breach.

The city said late Wednesday that it would begin installing pumps that move water directly from the canal and the nearby Broad River to the reservoir that feeds the water plant. Mayor Steve Benjamin said the pumps were already in place and expressed confidence officials will work hard to make sure the city doesn't run out of water.

The Columbia Canal was built in the early 1800s and provides 35 million gallons a day to the city's water plant, serving 375,000 customers. A breach in the canal downstream from the water plant had brought the canal's water level dangerously low.

Gov. Nikki Haley paid a visit to South Carolina's coast earlier Wednesday, which she said would still be in danger for another 24-48 hours. "We're holding our breath and saying a prayer," she added.

U.S. Senator Lindsey Graham, meanwhile, warned the flooding disaster in the storm-battered state could "break the bank" of federal emergency funds, possibly topping more than $1 billion.

More

Woman awarded $1.6 million over DuPont chemical

in water

By Andrew Welsh-Huggins

COLUMBUS, Ohio (AP) — An Ohio woman was awarded $1.6 million Wednesday in the trial of a lawsuit that alleged a chemical from a DuPont Co. plant contaminated drinking water and contributed to her contracting kidney cancer.

A jury awarded the damages to 59-year-old Carla Bartlett of Guysville in one of two cases that could influence thousands of similar lawsuits over the chemical giant's discharge of perfluorooctanoic acid, also known as C8. The chemical is used to make Teflon.

Some 3,500 people say they became ill after the company dumped C8 into the Ohio River and their drinking water from its Washington Works plant near Parkersburg, West Virginia.

The trial, which lasted about three weeks, was the latest development in a yearslong battle between DuPont and residents of the Mid-Ohio Valley in the heart of Appalachia. Bartlett once lived closer to the river. Her lawyer said she was thrilled by the verdict.

More

Lumber Liquidators paying $10M in wood importation probe

By The Associated Press

NEW YORK (AP) — Lumber Liquidators says it will pay $10 million and plead guilty to five violations of environmental law, including one felony charge, to end a federal investigation into its importation of illegally sourced wood products.

The Justice Department says the wood came from Russia and Myanmar, and that illegal logging in Eastern Russia threatens the habitat of wild Siberian tigers. The DOJ said Lumber Liquidators should have known that the wood was illegally sourced.

The Toano, Virginia, company says the settlement is unrelated to the controversy over some of its laminate flooring from China, which CBS' "60 Minutes" has reported contains high levels of the carcinogen formaldehyde.

The $10 million payment will include a fine, a forfeiture of profits, and contributions to two conservation charities.

Researcher: Children's cancer linked to Fukushima radiation

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TOKYO (AP) — A new study says children living near the Fukushima nuclear meltdowns have been diagnosed with thyroid cancer at a rate 20 to 50 times that of children elsewhere, a difference the authors contend undermines the government's position that more cases have been discovered in the area only because of stringent monitoring.

Most of the 370,000 children in Fukushima prefecture (state) have been given ultrasound checkups since the March 2011 meltdowns at the tsunami-ravaged Fukushima Dai-ichi nuclear plant. The most recent statistics, released in August, show that thyroid cancer is suspected or confirmed in 137 of those children, a number that rose by 25 from a year earlier. Elsewhere, the disease occurs in only about one or two of every million children per year by some estimates.

"This is more than expected and emerging faster than expected," lead author Toshihide Tsuda told The Associated Press during a visit to Tokyo. "This is 20 times to 50 times what would be normally expected."

The study was released online this week and is being published in the November issue of Epidemiology, produced by the Herndon, Virginia-based International Society for Environmental Epidemiology. The data comes from tests overseen by Fukushima Medical University.

More

Governor of major China province in corruption investigation

By The Associated Press

BEIJING (AP) — The governor of China's economically vital eastern province of Fujian has been placed under investigation amid President Xi Jinping's ongoing attack on corruption at all levels of government.

Su Shulin is suspected of "serious violations of discipline," according to a one-sentence statement issued late Wednesday by the ruling Communist Party's corruption watchdog body, the Central Commission for Discipline Inspection.

No details were given, although the term usually applies to accusations of corruption and abuse of power.

Su took over as Fujian governor in 2011 after a lengthy career in the oil industry, which has been a major target of anti-corruption investigators.

More

Oil-starved Nepal seeks suppliers to bring fuel by air

By Binaj

KATHMANDU, Nepal (AP) — Struggling with a fuel shortage after Indian shipments went on hold, Nepal is asking suppliers to bring gasoline and kerosene by airplane before the Himalayan country begins celebrating its biggest festival of the year, and for the first time is looking to import fuel from China.

The state-run Nepal Oil Corp. said Thursday it also needs aviation fuel and diesel, after supplies were cut off two weeks ago. Since then, the country has had to halt all fuel sales for private vehicles, and was rationing what was left among hospitals, government offices and police.

India, which supplies all of Nepal's fuel, has said there is no official blockade, but that its truck drivers are simply reluctant to cross the border to make deliveries because of ongoing protests by an ethnic group against the country's newly adopted constitution.

Some schools have closed because there is no gasoline for the school buses. Meanwhile, the halt in truck shipments has hurt Nepal's stocks of medicine and food.

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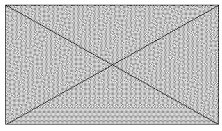

Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

Click here to read the brief

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Shell, Exxon chiefs share contrasting climate visions

Exxon Mobil CEO Rex Tillerson told a London oil conference this week that innovation and competition in a free market offered the best solutions for tackling climate change, while Ben van Beurden, head of Royal Dutch Shell said government action also is needed, The Wall Street Journal reports.

More

New G.E. company to handle lighting, energy

General Electric announced Wednesday it has formed a new company called Current to handle LED lighting, electric vehicles, solar and energy storage that will be based in Boston and headed by Maryrose Sylvester, The Plain Dealer reports.

More

Greens press NC to force Duke Energy to shutter coal plants

A coalition of environment and advocacy groups is pressing North Carolina Attorney General Roy Cooper to act on an "emergency complaint" to force Duke Energy to address climate change by shutting down its coal-fired plants within five years, a move the utility is dismissing as a "stunt," the Charlotte Business Journal reports.

More

Missouri energy plan calls for incremental changes

The Missouri Division of Energy's policy director says the state's comprehensive energy plan unveiled Wednesday -- which calls for gains in efficiency and renewable energy use -- isn't "revolutionary" and seeks incremental changes, the St. Louis Post-Dispatch reports.

More

Oil higher on weaker dollar

A drop in the dollar outweighed rising U.S. crude inventories on Thursday to keep oil prices on track for a sizeable weekly gain. U.S. benchmark crude gained 42 cents to $48.23 a barrel in electronic trading on the Nymex, while in London Brent rose 56 cents to $51.89, Reuters reports.

More

Canadian Oil Sands says no to Suncor, turns to poison pill

Adopting a poison pill plan to thwart hostile takeover attempts, Canadian Oil Sands has turned its back on a takeover offer from Suncor Energy that was valued around $5 billion, The New York Times reports.

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Michigan governor to announce action on Flint water problems

Michigan Gov. Rick Snyder is due to make an announcement Thursday about the ongoing problems with drinking water in Flint, The New York Times reports.

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Marukawa named Japan's new environment minister

Former television announcer Tamayo Marukawa has been named Japan's new environment minister in Prime Minister Shinzo Abe's cabinet reshuffle, weeks ahead of the global climate talks in Paris, Bloomberg reports.

More

Japan pushing refinery consolidation

Japan would be better off if some of the country's eight refinery operators joined forces, Economy Minister Motoo Hayashi said the day after taking his post in a cabinet reshuffle, Reuters reports.

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Upcoming Events

- Oct. 8, Washington: The Senate Energy and Natural Resources Subcommittee on Public Lands, Forests and Mining to hold a legislative hearing on 10 bills. National Forest System Associate Deputy Chief Glenn Casamassa and Bureau of Land Management Deputy Director of Operations Steve Ellis to testify. 2:30 pm , 366 Dirksen.
- Oct. 8, Washington: The House Natural Resources Committee to continue its markup on eight bills. 10:00 am , 1324 Longworth.
- Oct. 8, Washington: The House Energy and Commerce Subcommittee on Oversight and Investigations to hold a hearing into allegations that Volkswagen evaded Clean Air Act emissions testing. Volkswagen Group of America President and CEO Michael Horn, Environmental Protection Agency Director of Transportation and Air Quality Christopher Grundler, and EPA Air Enforcement Director Phillip Brooks to testify. 10:00 am , 2123 Rayburn.
- Oct. 8, Washington: The Senate Energy and Natural Resources Committee to hold a legislative hearing on six bills dealing with water issues. Interior Deputy Secretary Michael Connor to testify. 9:30 am , Dirksen 366.

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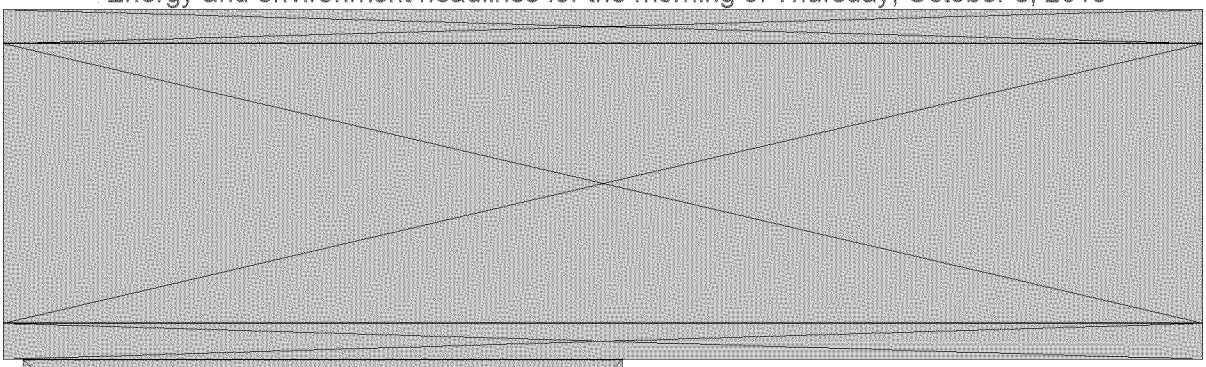

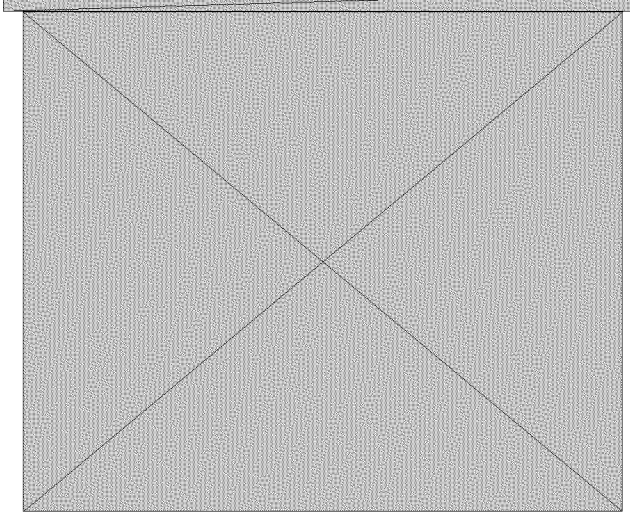

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House GOP to vote for new speaker, but won't be last word

By Erica Werner

WASHINGTON (AP) — Divided House Republicans are meeting to vote on a new speaker as the front-runner, Majority Leader Kevin McCarthy of California, faces a fresh challenge from the hard-line conservatives who forced outgoing Speaker John Boehner to resign.

Thursday's closed-door, secret-ballot election will produce a GOP nominee for speaker, but it will not be the final word. That won't come until Oct. 29, when the full House votes in open session for speaker.

Many of the conservatives who oppose Boehner are eager to deny McCarthy, the outgoing speaker's ally and deputy, the chance to advance. Members of the hard-right House Freedom Caucus announced Wednesday they would be backing a different candidate, GOP Rep. Daniel Webster of Florida, a little-known longshot who ran against Boehner at the beginning

of this year but got only 12 votes.

Webster, who served as speaker of the House in Florida, is unlikely to deny McCarthy a majority vote in Thursday's session. But if the several-dozen Freedom Caucus members stick together on the House floor later this month, they could prevent McCarthy from getting the 218 votes he'd need to prevail. That would send the House into uncertain territory — and perhaps increase the Freedom Caucus' leverage to exact concessions as members demand confrontations with President Barack Obama and Senate Democrats on issues of spending and debt.

More

California wants renewable energy for half its power by 2030

By Michael R. Blood and Judy Lin

LOS ANGELES (AP) — Gov. Jerry Brown dramatically increased California's climate-change goals, committing the state to use renewable energy for half its electricity and make existing buildings twice as energy-efficient in just 15 years.

Brown tried for an even stronger measure that also would have enforced a 50 percent drop in petroleum use by 2030, but was defeated by oil interests. He called that a short-term setback, and insisted that the world needs to wean itself off fossil fuels as quickly as possible.

"What has been the source of our prosperity now becomes the source of our ultimate destruction, if we don't get off it. And that is so difficult," Brown said at a signing ceremony Wednesday at the hilltop Griffith Observatory, overlooking the haze of downtown Los Angeles.

California already has some of the world's toughest air quality standards, and set a mandate in 2006 to derive a third of its electricity from renewable sources such as solar, wind and geothermal by 2020. State regulators say they already hit 25 percent last year, as huge solar farms sprouted in the desert and towering windmills went up along mountain passes.

More

California grooms utility giants to compete against Big Oil

By Judy Lin

SACRAMENTO, Calif. (AP) — California wants more drivers to dump the pump and plug in.

Climate change legislation signed Wednesday day by Gov. Jerry Brown calls for major utilities to compete as an alternative transportation fuel source by installing thousands of charging stations where people live, work and play.

The provision was contained in a broader climate control measure requiring the state to boost renewable electricity use to 50 percent and double the energy efficiency of existing buildings by 2030.

The bill's author, Senate President Pro Tem Kevin de Leon, a Los Angeles Democrat, was forced to drop a key aspect of his proposal that would have pushed the state to cut oil use by half.

More

A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

IMF Chief: We're cooked if we fail on climate change

By Frank Bajak

LIMA, Peru (AP) — International Monetary Fund chief Christine Lagarde said Wednesday that failure to take urgent action on global warming will condemn humanity to the same fate as the Peruvian poultry that so many delegates to the group's annual meeting are enjoying this week in a country famed for its cuisine.

"If we collectively chicken out of this we'll all turn into chickens and we'll all be fried, grilled, toasted and roasted," said Lagarde.

Her comments came in a panel discussion involving World Bank President Jim Yong Kim, U.N. climate talks executive secretary Christiana Figueres and economist and climate expert Nicholas Stern.

Lagarde and Kim argued strongly for removing subsidies on fossil fuels that are worth more than $5 trillion a year and on the immediate need for carbon taxes so that the burning of fossil fuels can fund clean energy replacements.

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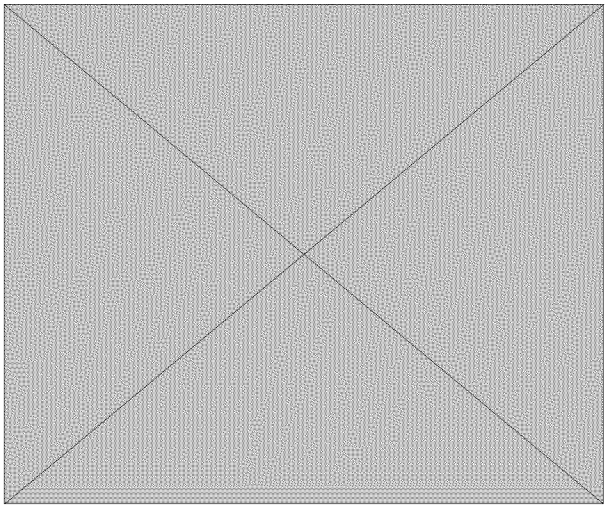

S.C. flooding: Columbia officials trying to save water supply

By Adam Beam and Meg Kinnard

COLUMBIA, S.C. (AP) — City of Columbia officials said they're moving forward with a backup plan to protect the city's main water source after a portion of the Columbia canal collapsed following record rainfall, forcing workers to stop building a dam meant to plug an earlier breach.

The city said late Wednesday that it would begin installing pumps that move water directly from the canal and the nearby Broad River to the reservoir that feeds the water plant. Mayor Steve Benjamin said the pumps were already in place and expressed confidence officials will work hard to make sure the city doesn't run out of water.

The Columbia Canal was built in the early 1800s and provides 35 million gallons a day to the city's water plant, serving 375,000 customers. A breach in the canal downstream from the water plant had brought the canal's water level dangerously low.

Gov. Nikki Haley paid a visit to South Carolina's coast earlier Wednesday, which she said would still be in danger for another 24-48 hours. "We're holding our breath and saying a prayer," she added.

U.S. Senator Lindsey Graham, meanwhile, warned the flooding disaster in the storm-battered state could "break the bank" of federal emergency funds, possibly topping more than $1 billion.

More

Woman awarded $1.6 million over DuPont chemical

in water

By Andrew Welsh-Huggins

COLUMBUS, Ohio (AP) — An Ohio woman was awarded $1.6 million Wednesday in the trial of a lawsuit that alleged a chemical from a DuPont Co. plant contaminated drinking water and contributed to her contracting kidney cancer.

A jury awarded the damages to 59-year-old Carla Bartlett of Guysville in one of two cases that could influence thousands of similar lawsuits over the chemical giant's discharge of perfluorooctanoic acid, also known as C8. The chemical is used to make Teflon.

Some 3,500 people say they became ill after the company dumped C8 into the Ohio River and their drinking water from its Washington Works plant near Parkersburg, West Virginia.

The trial, which lasted about three weeks, was the latest development in a yearslong battle between DuPont and residents of the Mid-Ohio Valley in the heart of Appalachia. Bartlett once lived closer to the river. Her lawyer said she was thrilled by the verdict.

More

Lumber Liquidators paying $10M in wood importation probe

By The Associated Press

NEW YORK (AP) — Lumber Liquidators says it will pay $10 million and plead guilty to five violations of environmental law, including one felony charge, to end a federal investigation into its importation of illegally sourced wood products.

The Justice Department says the wood came from Russia and Myanmar, and that illegal logging in Eastern Russia threatens the habitat of wild Siberian tigers. The DOJ said Lumber Liquidators should have known that the wood was illegally sourced.

The Toano, Virginia, company says the settlement is unrelated to the controversy over some of its laminate flooring from China, which CBS' "60 Minutes" has reported contains high levels of the carcinogen formaldehyde.

The $10 million payment will include a fine, a forfeiture of profits, and contributions to two conservation charities.

Researcher: Children's cancer linked to Fukushima radiation

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TOKYO (AP) — A new study says children living near the Fukushima nuclear meltdowns have been diagnosed with thyroid cancer at a rate 20 to 50 times that of children elsewhere, a difference the authors contend undermines the government's position that more cases have been discovered in the area only because of stringent monitoring.

Most of the 370,000 children in Fukushima prefecture (state) have been given ultrasound checkups since the March 2011 meltdowns at the tsunami-ravaged Fukushima Dai-ichi nuclear plant. The most recent statistics, released in August, show that thyroid cancer is suspected or confirmed in 137 of those children, a number that rose by 25 from a year earlier. Elsewhere, the disease occurs in only about one or two of every million children per year by some estimates.

"This is more than expected and emerging faster than expected," lead author Toshihide Tsuda told The Associated Press during a visit to Tokyo. "This is 20 times to 50 times what would be normally expected."

The study was released online this week and is being published in the November issue of Epidemiology, produced by the Herndon, Virginia-based International Society for Environmental Epidemiology. The data comes from tests overseen by Fukushima Medical University.

More

Governor of major China province in corruption investigation

By The Associated Press

BEIJING (AP) — The governor of China's economically vital eastern province of Fujian has been placed under investigation amid President Xi Jinping's ongoing attack on corruption at all levels of government.

Su Shulin is suspected of "serious violations of discipline," according to a one-sentence statement issued late Wednesday by the ruling Communist Party's corruption watchdog body, the Central Commission for Discipline Inspection.

No details were given, although the term usually applies to accusations of corruption and abuse of power.

Su took over as Fujian governor in 2011 after a lengthy career in the oil industry, which has been a major target of anti-corruption investigators.

More

Oil-starved Nepal seeks suppliers to bring fuel by air

By Binaj

KATHMANDU, Nepal (AP) — Struggling with a fuel shortage after Indian shipments went on hold, Nepal is asking suppliers to bring gasoline and kerosene by airplane before the Himalayan country begins celebrating its biggest festival of the year, and for the first time is looking to import fuel from China.

The state-run Nepal Oil Corp. said Thursday it also needs aviation fuel and diesel, after supplies were cut off two weeks ago. Since then, the country has had to halt all fuel sales for private vehicles, and was rationing what was left among hospitals, government offices and police.

India, which supplies all of Nepal's fuel, has said there is no official blockade, but that its truck drivers are simply reluctant to cross the border to make deliveries because of ongoing protests by an ethnic group against the country's newly adopted constitution.

Some schools have closed because there is no gasoline for the school buses. Meanwhile, the halt in truck shipments has hurt Nepal's stocks of medicine and food.

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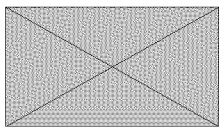

Week in Review – End to Biofuel Mandates Sought

EPA Sets Tighter Ozone Standards.

Click here to read the brief

More

Shell, Exxon chiefs share contrasting climate visions

Exxon Mobil CEO Rex Tillerson told a London oil conference this week that innovation and competition in a free market offered the best solutions for tackling climate change, while Ben van Beurden, head of Royal Dutch Shell said government action also is needed, The Wall Street Journal reports.

More

New G.E. company to handle lighting, energy

General Electric announced Wednesday it has formed a new company called Current to handle LED lighting, electric vehicles, solar and energy storage that will be based in Boston and headed by Maryrose Sylvester, The Plain Dealer reports.

More

Greens press NC to force Duke Energy to shutter coal plants

A coalition of environment and advocacy groups is pressing North Carolina Attorney General Roy Cooper to act on an "emergency complaint" to force Duke Energy to address climate change by shutting down its coal-fired plants within five years, a move the utility is dismissing as a "stunt," the Charlotte Business Journal reports.

More

Missouri energy plan calls for incremental changes

The Missouri Division of Energy's policy director says the state's comprehensive energy plan unveiled Wednesday -- which calls for gains in efficiency and renewable energy use -- isn't "revolutionary" and seeks incremental changes, the St. Louis Post-Dispatch reports.

More

Oil higher on weaker dollar

A drop in the dollar outweighed rising U.S. crude inventories on Thursday to keep oil prices on track for a sizeable weekly gain. U.S. benchmark crude gained 42 cents to $48.23 a barrel in electronic trading on the Nymex, while in London Brent rose 56 cents to $51.89, Reuters reports.

More

Canadian Oil Sands says no to Suncor, turns to poison pill

Adopting a poison pill plan to thwart hostile takeover attempts, Canadian Oil Sands has turned its back on a takeover offer from Suncor Energy that was valued around $5 billion, The New York Times reports.

More

Michigan governor to announce action on Flint water problems

Michigan Gov. Rick Snyder is due to make an announcement Thursday about the ongoing problems with drinking water in Flint, The New York Times reports.

More

Marukawa named Japan's new environment minister

Former television announcer Tamayo Marukawa has been named Japan's new environment minister in Prime Minister Shinzo Abe's cabinet reshuffle, weeks ahead of the global climate talks in Paris, Bloomberg reports.

More

Japan pushing refinery consolidation

Japan would be better off if some of the country's eight refinery operators joined forces, Economy Minister Motoo Hayashi said the day after taking his post in a cabinet reshuffle, Reuters reports.

More

Upcoming Events

- Oct. 8, Washington: The Senate Energy and Natural Resources Subcommittee on Public Lands, Forests and Mining to hold a legislative hearing on 10 bills. National Forest System Associate Deputy Chief Glenn Casamassa and Bureau of Land Management Deputy Director of Operations Steve Ellis to testify. 2:30 pm , 366 Dirksen.
- Oct. 8, Washington: The House Natural Resources Committee to continue its markup on eight bills. 10:00 am , 1324 Longworth.
- Oct. 8, Washington: The House Energy and Commerce Subcommittee on Oversight and Investigations to hold a hearing into allegations that Volkswagen evaded Clean Air Act emissions testing. Volkswagen Group of America President and CEO Michael Horn, Environmental Protection Agency Director of Transportation and Air Quality Christopher Grundler, and EPA Air Enforcement Director Phillip Brooks to testify. 10:00 am , 2123 Rayburn.
- Oct. 8, Washington: The Senate Energy and Natural Resources Committee to hold a legislative hearing on six bills dealing with water issues. Interior Deputy Secretary Michael Connor to testify. 9:30 am , Dirksen 366.

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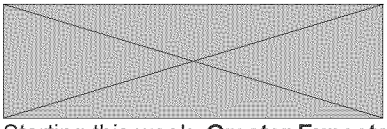

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E&E DAILY — Thu., October 8, 2015

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Senate Dems to block energy bill as budget talks limp along

Senate Democrats today are expected to filibuster the popular Energy and Water Development appropriations bill, as they continue to prod Republicans toward an end-of-the-year budget deal.

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Key Senate Republicans warn Obama admin ahead of Paris talks

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House export bill moves forward despite White House veto threat

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McGinty raises $1M for Pa. Senate bid

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Drought fixes shouldn't ignore fish and wildlife, groups argue

7.OFFSHORE DRILLING:
West Coast senators propose Pacific moratorium

8.AIR POLLUTION:
Sen. Wyden asks Treasury to recapture VW's tax credits

9.PUBLIC LANDS:
Dems boycott Natural Resources markup in effort to renew LWCF

10.REGULATIONS:
Senate panel passes 4 bills to revamp rulemaking

IN THE HOUSE

11.ENERGY:
Rules panel denies thorny amendments to tribal energy bill

12.WATER POLLUTION:
Bill takes aim at EPA spill response

13.LAKE TAHOE:
Calif. Dem offers House companion to Senate restoration bill

UPCOMING HEARINGS AND MARKUPS

14.CALENDAR:

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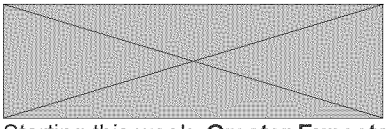

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Subject: Morning Consult Energy: White House Issues Veto Threat for Crude Oil Export Bill; Volkswagen Withdraws U.S. Certification Request for New Diesel Vehicles

By Deirdra O'Regan

Today's Washington Brief

- The White House issued a veto threat for a House bill that would lift a 40-year-old ban on U.S. crude oil exports, saying the legislation was "not needed at this time." The Obama administration urged Congress to instead focus on diverting oil subsidies to renewable energy. (Reuters)

- Heritage Action for America criticized House Republicans for a provision in the crude oil export bill that would increase payments to certain unionized maritime shipping companies. Bill sponsor Rep. Joe Barton (R-Texas) said he still expects the House to pass the measure on Friday. (The Hill)

- California Governor Jerry Brown (D) signed into law legislation that sets one of the country's most ambitious clean-energy targets: 50 percent of California's electricity will come from wind, solar and other renewable sources by the end of 2030. (San Francisco Chronicle)

Today's Business Brief

- Volkswagen AG withdrew a request for U.S. regulators to certify new diesel vehicles, conceding that it will not be able to sell such models in the United States for some time. The chief executive officer of the company's U.S. arm will testify today before the House Energy and Commerce Subcommittee on Oversight and Investigations. (The Wall Street Journal)

- General Electric is creating a company to house its developing energy businesses. The $1 billion spinoff, called Current, will focus on providing products and services in energy efficiency, renewable generation and storage to large customers like hospitals, universities, retail stores and cities. (The New York Times)

- U.S. and European oil companies are split over their response to emissions ahead of this year's United Nations climate-change summit. ExxonMobil Corp. favors free markets and competition to curb emissions, while Royal Dutch Shell PLC said governments need to step in. (The Wall Street Journal)

Today's Chart Review

Better Plants' Potential Cumulative Cost Savings
U.S. Department of Energy

Mark Your Calendars (All Times Eastern)

Thursday
Society of Environmental Journalists annual conference @ 5:30 a.m.
FERC environmental review & compliance for natural gas facilities seminar @ 8 a.m.
NRC Advisory Committee on Reactor Safeguards meeting @ 8:30 a.m.
Congressional Hispanic Caucus Institute annual Public Policy Conference @ 9 a.m.
USEA annual energy supply forum @ 9 a.m.
American Gas Association Winter Outlook @ 9:30 a.m.
Sen. Energy & Nat. Resources hearing on six bills @ 9:30 a.m.
House E&C Oversight and Investigations Subcommittee hearing on Volkswagen's emissions scandal @ 10 a.m.
House Small Business Investigations, Oversight and Regulations Subcommittee hearing on DOL's overtime rule @ 10 a.m.
Clean Energy States Alliance webinar on fuel cells for educational facilities @ 1 p.m.
Sen. Energy & Nat. Resources Public Lands, Forests and Mining Subcommittee legislative hearing @ 2:30 p.m.
EESI webinar on energy efficiency in Iowa @ 2:30 p.m.

Friday
NRC Advisory Committee on Reactor Safeguards meeting @ 8:30 a.m.
Society of Environmental Journalists annual conference @ 9 a.m.
CATO talk on regressive regulation to boost U.S. economic growth @ 12 p.m.

General

Volkswagen Withdraws Request to Certify 2016 Diesel Models
Mike Spector and William Boston, The Wall Street Journal

Volkswagen AG conceded it won't be able sell diesel-powered vehicles in the U.S. for a prolonged period, withdrawing a request for regulators to certify new models in the wake of an emissions-cheating scandal. Volkswagen's 2016 model-year diesel-powered vehicles include emissions-control software that requires regulatory approval in the U.S.

EPA probing VW's profit from emissions cheating

Timothy Cama, The Hill

The Environmental Protection Agency (EPA) is investigating the extent to which Volkswagen profited from cheating on diesel car emissions tests. Christopher Grundler, who heads the EPA's Transportation and Air Quality Office, will provide some details about the agency's ongoing investigation to lawmakers Thursday.

One of EPA's toughest critics is running for speaker
Kevin Bogardus, E&E

Jason Chaffetz vows that he wouldn't let his daughters work at U.S. EPA. That's not what an agency wants to hear from a lawmaker who could become speaker of the House. But since taking the reins of the Oversight and Government Reform Committee earlier this year, the Utah Republican has become one of EPA's fiercest critics.

Methane emissions fall for 3rd consecutive year — EPA
Pamela King, E&E

Greenhouse gas emissions from the oil and gas sector are on the rise, but methane leakage continues to fall, according to new U.S. EPA data. Methane emissions ticked down from 77 million metric tons CO2e in 2013 to 73 million metric tons CO2e last year, marking the third consecutive year that measurement has declined.

Futures Drop After S&P 500 Erases Half of August Rout; EMC Soars
Alex Longley, Bloomberg News

U.S. stock-index futures dropped, after the Standard & Poor's 500 Index's sixth advance in seven days helped claw back some of the declines from an equity rout that started in August. S&P 500 E-mini contracts expiring in December fell 0.4 percent to 1,980 at 7:22 a.m. in New York. Dow Jones Industrial Average contracts lost 58 points, or 0.3 percent, to 16,756 today, while those on the Nasdaq 100 Index dropped 0.4 percent.

Oil & Natural Gas

Oil Rises After Biggest Loss in a Week on View Surplus Will Fade
Grant Smith, Bloomberg News

Oil advanced in New York after its biggest loss in a week on speculation that lower prices will eventually curb global oversupply and re-balance world markets. West Texas Intermediate futures were higher after declining 1.5 percent on Wednesday.

White House issues veto threat for House oil export bill
Roberta Rampton and Timothy Gardner, Reuters

The White House issued a veto threat on Wednesday for a U.S. House of Representatives bill that would lift a four-decade-old ban on crude oil exports, saying the legislation was "not needed at this time." Congress should instead end "the billions of dollars a year in federal subsidies provided to oil companies" and invest in wind, solar and other renewable energy projects, the White House said in a statement about the bill, which is expected to face a vote in the full House on Friday.

Heritage blasts 'union buyoff' in oil export bill
Timothy Cama, The Hill

A major conservative lobbying group is blasting House Republicans for inserting into a crude oil export bill a provision to increase payments to certain unionized maritime shipping companies. Heritage Action for America, the lobbying arm of the Heritage Foundation, said the bill's funding increase to the Maritime Security Program (MSP) "has entangled good policy in corporate welfare and a $500 million labor union buyoff."

Oil CEOs Differ on Carbon Strategy, Highlighting Industry Divide
Sarah Kent and Amy Harder, The Wall Street Journal

The chief executives of Royal Dutch Shell PLC and ExxonMobil Corp. laid out contrasting visions this week for reducing fossil-fuel emissions, illustrating a divide between American and European energy companies ahead of a United Nations climate-change summit. Rex Tillerson, CEO of U.S.-based Exxon, said Wednesday that innovation, free markets and competition were the best tools for curbing emissions.

Western Mass. town proposes local gas tax
Andy Metzger, The Lowell Sun

Finding state dollars lacking, one western Massachusetts town wants to go it alone on transportation funding and its state senator hopes to make that option available to all 351 Massachusetts municipalities. Proposing a 3-cent-per-gallon tax hike on gasoline sold in town along Interstate 90, Nason estimated a local gas tax could boost available roadwork dollars to $850,000, up from $550,000.

Canadian Oil Sands Adopts Poison Pill in Wake of Hostile Suncor Bid
Judy McKinnon, The Wall Street Journal

Canadian Oil Sands Ltd. on Wednesday adopted a so-called poison pill antitakeover measure with a 20% trigger, two days after Suncor Energy Inc. launched a hostile bid for the oil-sands company. Calgary, Alberta-based Canadian Oil Sands said the shareholder rights plan is meant to give its shareholders and board adequate time to evaluate Suncor's 4.3 billion Canadian dollar ($3.3 billion) all-stock offer and any other unsolicited bid or strategic options.

Utilities & Infrastructure

Utility group bows to the inevitable, gets wish on ozone rule
Amanda Reilly, E&E

In late September, the trade group representing investor-owned utilities attended two meetings with top White House and U.S. EPA officials. Its request: Set a new ozone standard at 70 parts per billion. Six days later, the Obama administration unveiled its final new national ambient air quality standard at that level.

Renewables

Brown signs climate law mandating 50% renewable power by 2030
David R. Baker, San Francisco Chronicle

By the end of 2030, half of California's electricity will come from the wind, the sun and other renewable sources under a new law that sets one of the country's most ambitious clean-energy targets. The law, signed Wednesday by Gov. Jerry Brown, accelerates California's shift away from fossil fuels as its dominant source of energy and marks another milestone in the state's fight against climate change.

G.E. to Spin Off New Energy Technologies in One Company
Diane Cardwell, The New York Times

General Electric, which has been moving to shed a number of divisions and return to its roots as an industrial behemoth, is creating a company to house developing energy businesses, executives said Wednesday. The company, to be called Current, will focus on providing products and services in energy efficiency, renewable generation and storage to large customers like hospitals, universities, retail stores and cities.

SunEdison, Shares Fizzling, Promises a New Strategy
Cassandra Sweet, The Wall Street Journal

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Subject: Morning Consult Energy: White House Issues Veto Threat for Crude Oil Export Bill; Volkswagen Withdraws U.S. Certification Request for New Diesel Vehicles

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Lender Group Lambasts Patriot Coal Bankruptcy Plan
Jacqueline Palank, The Wall Street Journal

An unhappy group of Patriot Coal Corp.'s lenders on Wednesday urged a bankruptcy judge to deny the coal miner's sale and debt-payment plan, arguing that its chapter 11 case was unfairly run for the benefit of key creditor Knighthead Capital Management LLC. Knighthead helped fund Patriot's exit from bankruptcy in 2013 and is among the lenders financing the miner's current chapter 11 case.

CEO charged in W. Virginia coal mine blast hid violations -prosecutor
Kara Van Pelt, Reuters

The former Massey Energy Co chief executive being tried over a 2010 coal mine explosion that killed 29 people was a hands-on boss who covered up widespread safety violations, a U.S. prosecutor said on Wednesday in the trial's opening arguments. But a defense lawyer for the executive, Don Blankenship, described him as a scapegoat who was unfairly blamed for the blast at West Virginia's Upper Big Branch Mine.

Nuclear

GOP chairman seeks 'fiscal discipline' at nuclear regulator
Timothy Cama, The Hill

The top senator overseeing the Nuclear Regulatory Commission (NRC) is working on legislation to reform the way the agency spends money. Sen. James Inhofe (R-Okla.), chairman of the Senate Environment and Public Works Committee, did not go so far as to say he wants to cut the NRC's budget.

Climate

Climate Scientist Faces Backlash for Urging Investigation of Fossil Fuel Companies
Katherine Bagley, InsideClimate News

A climate scientists who was the lead signatory on a letter urging President Obama to launch a federal investigation into whether fossil fuel companies "knowingly deceived the American people about the risks of climate change" is now facing an investigation by Congress because of his part in the letter. Jagadish Shukla, a climate scientist at George Mason University in Virginia, received notice Oct. 1 that the non-profit research organization he runs, the Institute of Global Environment and Society (IGES), will soon be investigated by the House Committee on Science, Space and Technology for suspected misuse of federal funding.

New Climate Rewrite May Herald Success At COP21 In Paris
Sandy Dechert, Clean Technica

Only five official negotiating days remain before the Paris conference begins. These take place the week of October 19 in Bonn. The climate rewrite marks a critical step toward worldwide consensus on combatting, mitigating, and adapting to climate change by cutting greenhouse gas emissions for 2020 onward, after the current agreement runs out.

The pending Paris accord: not your father's climate agreement
Lisa Friedman, E&E

When leaders from 194 countries meet in Paris, they will find a starkly different landscape than the one under which the 1997 Kyoto Protocol was crafted, or even the messy and incomplete Copenhagen Accord of 2009. In interviews with dozens of ministers, negotiators and longtime U.N. Framework Convention on Climate Change (UNFCCC) observers over the past year, most agreed that the once neatly divided world of rich and poor countries is gone.

Opinions, Editorials & Perspectives

For EPA's ozone standard, no cost is too high, no risk too low
Kathleen Hartnett White, The Hill

The Environmental Protection Agency's (EPA) expanding regulatory dominion apparently knows no bounds. The science behind the EPA's current crusade, however, is a statistical house of cards. Although less stringent than anticipated, the new national ambient air quality standard (NAAQS) for ozone, set at 70 parts per billion (ppb), may be the straw that breaks the back of our struggling economy.

Let's Modernize Our Environmental Laws
Gregg Easterbrook, The New York Times

Our major environmental laws are a generation or more out of date — written for conditions of the past, not the present. Protection of nature and of public health are data-driven sciences — yet environmental laws are grounded in obsolete information.

Joint design of emission tax and trading systems
Bernard Caillaud and Gabrielle Demange, The Center for Economic and Policy Research

The standard economic argument in favour of a uniform carbon price is efficiency – all agents face the same marginal cost of pollution. Such a price can be achieved either by an emissions trading (cap-and-trade) system or by imposing a tax. This column argues that whether a uniform policy or a mixture of both is optimal depends on a few factors, and most importantly on the nature of stochastic shocks affecting the economy.

How technology could help utilities manage economic and regulatory change
Chloe Green, Information Age

Electricity no longer flows solely from large central plants fired by fossil fuels. Alongside coal and gas; wind farms, hydroelectric dams and other renewable energy sources increasingly provide electricity to homes and businesses.

Federal sage grouse plans abandon scientific integrity
Erik Molvar, The Hill

Last week, Interior Secretary Sally Jewell announced new federal sage grouse plans as a justification to withhold Endangered Species Act protections for this charismatic bird. But the plans unveiled this September abandon scientific integrity. Instead, a collection of special political favors for the oil and gas industry and other industries actually block sage grouse habitat protections from addressing the most important threats — and most powerful industries — in each state.

Nationwide, Electricity Generation from Coal Falls While Natural Gas Rises
Chris Cassar, The Energy Collective

The monthly natural gas share of total U.S. electricity generation surpassed the coal share in July for the second time ever, with natural gas fueling 35.0% of total generation to coal's 34.9% share. Compared to the previous July, coal-fired generation fell in every region of the country, while natural gas-fired generation rose in every region.

Research Reports, Issue Briefs & Case Studies

2015 Utility Industry Survey Results: NERC CIP Survey Results Summary
Bridge Energy Group

Bridge Energy Group, today announced results from the company's 4th annual Utility Industry Survey on the North American Electric Reliability Corporation, Critical

Infrastructure Protection (NERC CIP). As of mid-2015 over 20,000 utility executives, managers and engineers polled showed 68 percent of them believed that their organization is not "well prepared" for NERC CIP v5 compliance.

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Morning Consult, P.O. Box 27068
Washington District of Columbia 20038
United States

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Thur 10/8/2015 12:43:55 PM
Subject: A.M. NEWSCAST: UAW avoids FCA strike, touts 'real gains' in latest deal | VW diesels delayed | GM family spiff | Mitsu EV concept | Chevy Traverse's world of comedy | A merry Mustang

October 8, 2015

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To: Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
From: Simon, Karl
Sent: Thur 10/8/2015 12:48:14 PM
Subject: Sen Wyden, tax credits - may come up today

Sen. Wyden asks Treasury to recapture VW's tax credits

Sean Reilly, E&E reporter

Published: Thursday, October 8, 2015

The Treasury Department should regain the value of any "clean energy" tax credits improperly claimed by Volkswagen during the time it was evading air pollution control requirements, Senate Finance Committee ranking member Ron Wyden (D-Ore.) said yesterday.

From 2009 through 2015, the German automaker benefited from two such programs: the Alternative Motor Vehicle Credit, available to individuals, and the Advanced Energy Manufacturing Tax Credit for businesses, Wyden wrote in a letter to Treasury Secretary Jack Lew.

"To the extent that Volkswagen Group misled the Treasury Department and the Internal Revenue Service about the performance of its vehicles, the value of these tax incentives should be recaptured," Wyden wrote.

"I urge you to work with the EPA and the Department of Justice as they weigh levying fines and enforcement actions against Volkswagen and take the full value of these tax benefits into account," he continued.

Wyden added, however, that the IRS should not go after VW car buyers who were "duped by Volkswagen and claimed the credits in good faith."

On Tuesday, Wyden and Finance Chairman Orrin Hatch (R-Utah) asked Volkswagen for an array of records related to its eligibility certifications for the advanced lean-burn technology motor vehicle credit under the alternative motor vehicle program. Hatch did not sign yesterday's letter to Lew.

Volkswagen has admitted to outfitting almost a half-million diesel-powered cars sold in the United States for model years 2009 through 2015 with software intended to skirt emissions control requirements. Michael Horn, the head of the company's American subsidiary, is scheduled to testify this morning at a hearing of the House Energy and Commerce Subcommittee on Oversight and Investigations.

Driving Innovation in Clean Transportation

To: Grundler, Christopher[grundler.christopher@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Charmley, William[charmley.william@epa.gov]
From: Nims, Kirk
Sent: Thur 10/8/2015 1:03:35 PM
Subject: FW: ALERT: VW withdraws EPA application for 2016 diesels
VW withdraws.pdf
VW Horn Testimony 1082012.pdf

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Kirk Nims, Librarian Ma.L.Sc. (Contractor)

U.S. Environmental Protection Agency

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From: Automotive News [mailto:autonews@CrainAlerts.com]
Sent: Wednesday, October 07, 2015 3:56 PM
To: Nims, Kirk
Subject: ALERT: VW withdraws EPA application for 2016 diesels

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October 7, 2015

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VW withdraws EPA application for 2016 diesels

Ryan Beene

Volkswagen has withdrawn its application for EPA certification that its 2016 model year diesel vehicles comply with U.S. emissions standards. Without EPA certification, the cars can't be sold, which means there could be a longer wait for the diesel models.

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Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029945

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029946

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029947

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Sutton, Tia
Sent: Thur 10/8/2015 1:11:21 PM
Subject: RE: Missing a health impacts Q and A. I think we had one in the larger batch

Will do.

Will also have her print the NUMBERS from Byron so you can have for the binder.

From: Grundler, Christopher
Sent: Thursday, October 08, 2015 9:10 AM
To: Sutton, Tia
Subject: Re: Missing a health impacts Q and A. I think we had one in the larger batch

Tia pls ask Pat to print out the full set for backup and put in my book. Thx

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. EPA

202-564-1682 (DC)

734-214-4207 (Ann Arbor)

On Oct 8, 2015, at 8:59 AM, Sutton, Tia <sutton.tia@epa.gov> wrote:

We do- copied below, and I will have Pat print out.

Q12: An AP analysis claims that VW's emissions-evading likely killed between five and 20 people in the U.S annually -- pollution to cause somewhere between 16 and 94 deaths over seven years -- at a total cost of over $100 million. Can EPA comment on this, and have you done any similar health analyses?

A: EPA conducts its own analyses of how emissions affect air quality, and how air quality

impacts health. We know that exposure to ozone and PM contributes to premature mortality, as well as a number of other adverse health effects. However, as the experts that the reporters talked to appropriately note, that type of analysis is very complex and requires detailed information about a number of factors. EPA has not performed an analysis of the health effects associated with the VW situation, nor have we reviewed the analyses described in the articles.

Background: There were two high-profile articles in the U.S. that estimated the mortality impacts, both with numbers in the same order of magnitude:

AP article: primary estimate of 16-94 deaths since 2008; also provides a range of 12-69

(Assumed 46,000 tons of NOx emissions)

New York Times: 106 deaths since 2008; or ~40 deaths since 2008

(Assumed 15,600-89,700 tons of NOx emissions)

The range of estimated mortality impacts appear to be reasonable back-of-the-envelope estimates of health risk based on their emissions assumptions.

-----Original Message-----
From: Grundler, Christopher
Sent: Thursday, October 08, 2015 8:54 AM
To: Sutton, Tia
Subject: Missing a health impacts Q and A. I think we had one in the larger batch

Christopher Grundler, Director

Office of Transportation and Air Quality U.S. EPA

202-564-1682 (DC)

734-214-4207 (Ann Arbor)

To: Argyropoulos, Paul[Argyropoulos.Paul@epa.gov]; Berrier, Judi[Berrier.Judi@epa.gov]; Blubaugh, Jim[Blubaugh.Jim@epa.gov]; Bradish, Tracey[bradish.tracey@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Caldwell, Amy[caldwell.amy@epa.gov]; Cook, Leila[cook.leila@epa.gov]; Cooper, Nanette[cooper.nanette@epa.gov]; Curtis, Rhonda[Curtis.Rhonda@epa.gov]; Derksen, Kimberly[derksen.kimberly@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Fearnside, Judy[Fearnside.Judy@epa.gov]; Gonzalez, Gail[Gonzalez.Gail@epa.gov]; Galano, Fidel[Galano.Fidel@epa.gov]; Greuel, Justin[Greuel.Justin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Haley, Mike[Haley.Mike@epa.gov]; Haugen, David[haugen.david@epa.gov]; Iffland, JoNell[Iffland.JoNell@epa.gov]; Jackson, Cleophas[jackson.cleophas@epa.gov]; Johnson, Francene[Johnson.Francene@epa.gov]; Jones, Jacqueline[Jones.Jacqueline@epa.gov]; Kolowich, Bruce[kolowich.bruce@epa.gov]; Larson, Robert[larson.robert@epa.gov]; Le, Madison[Le.Madison@epa.gov]; McQueen, Lyndia[mcqueen.lyndia@epa.gov]; Meekins, Tanya[Meekins.Tanya@epa.gov]; Miller, Debra L.[Miller.DebraL@epa.gov]; Mylan, Christopher[Mylan.Christopher@epa.gov]; Nelson, Suzanne[nelson.suzanne@epa.gov]; Paff, Patricia[paff.patricia@epa.gov]; Patterson, Susan[Patterson.Susan@epa.gov]; Peralta, Maria[Peralta.Maria@epa.gov]; Sabourin, Michael[sabourin.michael@epa.gov]; Sargeant, Kathryn[sargeant.kathryn@epa.gov]; Shaffer, Patricia[Shaffer.Patricia@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Soth, Judith[Soth.Judith@epa.gov]; Stewart, Gwen[Stewart.Gwen@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Moore, Theresa[Moore.Theresa@epa.gov]; Vawters, Katie[Vawters.Katie@epa.gov]; Waite, Sherry[waite.sherry@epa.gov]; Wasenko, Barbara[Wasenko.Barbara@epa.gov]; Watkins, Erica[Watkins.Erica@epa.gov]; Wehrly, Linc[wehrly.linc@epa.gov]; Weihrauch, John[Weihrauch.John@epa.gov]; White, SharonB[White.SharonB@epa.gov]; Zaremski, Sara[zaremski.sara@epa.gov]
From: Shaffer, Patricia
Sent: Thur 10/8/2015 1:26:23 PM
Subject: Grundler, Christopher Calendar
Grundler Christopher Calendar.ics

CHRISTOPHER GRUNDLER

CALENDAR
THURSDAY, OCTOBER 8, 2015

DC OFFICE

9:00 AM – 6:00 PMVW HEARING

HOUSE ENERGY AND COMMERCE COMMITTEE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

2123 RAYBURN BUILDING

To: Bill Rodgers (william.Rodgers@vw.com)[william.Rodgers@vw.com]
Cc: Snyder, Jim[Snyder.Jim@epa.gov]
From: Mazaitis, Vincent
Sent: Thur 10/8/2015 1:35:35 PM
Subject: 1VWAV7A38GC002110_10-7-15
Ex. 6

Please find enclosed, the Subject information. If you have any questions or concerns, please contact me.

Thank you,

Vince Mazaitis

(734)214-4864

Cert

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-001 | Vehicle ID: **Ex. 6**

Test Information

Test Date:	10/7/2015	MFR Name:	Volkswagen Group of
Key Start / Hot Soak:	08 01:05 / 09:33	MFR Codes:	VGA 10015
Fuel Container ID / FTAG:	F00023 / 24688	Config #:	00
Fuel Type:	19 Cert Diesel 7-15 ppm Sulfur	Transmission:	Auto
Test Procedure:	2 CVS 75 and later (w/o can. load)	Shift Schedule:	A0EPA0005
FE Calculation Method:	Diesel	Beginning Odometer:	002529.0 MI
Pretest Remarks:		Drive Schedule:	ftp3bag
Drive Axle:	FWD	Soak Period:	16.3 hours

Bag Data	N2O (ppm)	THC / IntTHC (ppmC)	CO (ppm)	NOx (ppm)	CO2 (%)	CH4 (ppm)	NMHC (ppmC)
Phase 1							
Sample	0.761	4.044 / 4.135	7.674	2.802	0.687	2.968	
Ambient	0.332	2.617	0.150	0.026	0.049	2.325	
Net Concentration	0.446	1.561 / 1.652	7.532	2.777	0.640	0.763	0.832
Remarks							
Phase 2							
Sample	0.548	3.135 / 3.142	0.489	0.072	0.443	2.729	
Ambient	0.332	2.591	0.100	0.016	0.049	2.312	
Net Concentration	0.227	0.629 / 0.636	0.393	0.057	0.395	0.493	0.106
Remarks							
Phase 3							
Sample	0.661	3.008 / 3.018	0.601	1.234	0.612	2.515	
Ambient	0.331	2.694	0.076	0.019	0.049	2.278	
Net Concentration	0.345	0.437 / 0.447	0.529	1.215	0.566	0.341	0.081
Remarks							
Phase 4							
Sample							
Ambient							
Net Concentration							

Remarks: This test has particulate results.

Results	N2O (gpm)	THC / IntTHC (gpm)	CO (gpm)	NOx (gpm)	CO2 (gpm)	CH4 (gpm)	NMHC / NMOG (gpm)	Vol MPG (mpg)
Phase 1	0.019	- / 0.022	0.200	0.110	266.7	0.012	0.011	38.091
Phase 2	0.015	- / 0.013	0.017	0.004	263.9	0.012	0.002	38.532
Phase 3	0.014	- / 0.006	0.014	0.048	234.1	0.005	0.001	43.453
Weighted	0.01564	0.01302	0.05398	0.03794	256.255	0.01002	NMOG-NMHC 0.00371	

Fuel Economy	Diesel MPG
Phase 1	38.10
Phase 2	38.54
Phase 3	43.47
Weighted	39.73

Dyno Settings	
Aug Brake	Y
	FWD
Dyno #:	D329 - FWD
Inertia:	3875
EPA Set Co A:	7.00
EPA Set Co B:	0.0611
EPA Set Co C:	0.01783
Emiss-Bench:	Mexa 7200de

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-001 Vehicle ID: Ex. 6

Results	N2O (grams)	THC / IntTHC (grams)	CO (grams)	NOx (grams)	CO2 (grams)	CH4 (grams)	NMHC (grams)	Meth Response
Phase 1	0.067	- / 0.078	0.715	0.394	955.3	0.042	0.039	1.075
Phase 2	0.058	- / 0.051	0.064	0.014	1009.5	0.046	0.009	
Phase 3	0.051	- / 0.021	0.050	0.172	841.1	0.018	0.004	

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.17	29.17	29.17	
Avg Cell Temp (degF)	74.07	73.97	73.69	
Dew Point (degF)	50.23	49.49	48.70	
Specific Humidity (grains/lbm)	55.44	53.89	52.31	
NOx Corr Factor	0.9158	0.9097	0.9036	
CO2 Dilution Factor	19.484	30.252	21.871	
CFV Vmix (scf @68F)	2832.59	4843.05	2819.77	
Total CVS Vmix (scf@68F)	2880.78	4927.13	2868.67	
CVS Flow Rate Avg (scfm)	335.35	334.35	334.76	
Fan Placement: One Small Fan - Up - Front				
Phase Time (secs)	506.80	869.10	505.40	
Distance (miles)	3.582	3.825	3.593	
Bag Analysis Time (secs)	926.1	132.0	57.6	

	FTP B1	FTP B2	FTP B3	FTP-W	MFR
IWR % diff	-2.251	-0.058	-0.211	-0.545	99.990
ASCR % diff	-1.260	0.783	0.103	0.308	99.990
EER	-1.069	-0.240	-0.328	-0.422	99.990

MFR Test Results for Procedure 2 CVS 75 and later (w/o can. load)

MFR Number	HC	CO	NOx	CO2	NMOG	NonMeth HC	CH4
10038730	0.0124	0.021	0.0405	251	0	0.0043	0.0094

Odometer	MPG	PM
2283 M	40.5	0.001

MPG is 1.94 % higher than EPA MPG

MFR Lab: Volkswagen Test Center Oxnard

Dyno: 4

Fuel: 19 Federal Cert Diesel 7-15 PPM Sulfur

NVFEL Laboratory Test Data

PARTICULATE

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-001 Vehicle ID: Ex. 6

Test Information

Test Date: 10/7/2015
Key Start: 08:01:05 / 09:33
Fuel Container ID: F00023 / 24688
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 2 CVS 75 and later (w/o can load)
Calculation Method: Diesel
Pretest Remarks:

MFR Name: Volkswagen Group of
MFR Codes: VGA 10015
Config #: 00
Transmission: Auto
Shift Schedule: A0EPA0005
Beginning Odometer: 002529.0 MI
Drive Schedule: ftp3bag
Soak Period: 16.3 hours

All filter weights are corrected for buoyancy

Particulate	Filter Sampler	Filter No	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Total Mass mg	Total Mass mg / mi	Filter comment
Phase 1	A	220214956	367.6533	367.6545	0.00117	0.219	0.061	
	B	220214957	370.6242	370.6264	0.00217	0.382	0.107	
	C	220214958	366.9162	366.9162	0.00000	0.000	0.000	
Remarks:								
Phase 2	A	220214959	370.4241	370.4275	0.00338	0.592	0.155	
	B	220214960	357.7333	357.7377	0.00438	0.768	0.201	
	C	220214961	365.5284	365.5320	0.00358	0.631	0.165	
Remarks:								
Phase 3	A	220214962	365.2214	365.2215	0.00017	0.031	0.009	
	B	220214963	360.9625	360.9693	0.00678	1.190	0.331	
	C	220214964	360.9046	360.9081	0.00348	0.615	0.171	
Remarks:								
Phase 4								
Remarks:	This test has particulate results.							

Average Results	Net Wt mg	Total Mass mg	Total Mass mg / mi
Phase 1	0.00112	0.300	0.084
Phase 2	0.00378	0.664	0.174
Phase 3	0.00348	0.612	0.170

All filter weights are corrected for buoyancy

Weighted All Filters: 0.15397

Reference Filter Stability Check	No	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Stability Check	
2% of Avg Net or 0.01 mg					PASS/FAIL	Dyno #: D329 - FWD
0.01	1	367.79118	367.79115	-0.00003	PASS	Inertia: 3875
	2	364.69616	364.69604	-0.00013	PASS	EPA Set Co A: 7.00
						EPA Set Co B: 0.0611
PM Media						EPA Set Co C: 0.01783
MTL PTFE_PFA						
						Emissions Benc Mexa 7200dje

v150811 - d329 EPAVDAEm151007074805 Page 1 of 2 Print Time 08-Oct-2015 09:14

VW FOIA, EPA 06/20/2017 2017-FFP_029956

NVFEL Laboratory Test Data

PARTICULATE

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-001 Vehicle ID: Ex. 6

WEIGHING CHAMBER	Timestamp	Buoyancy Factor	Operator (id)	Chamber Temp (°F)	Dew Point (°F)	Barometer ("Hg)	Last Change in Status Status @ timestamp
Pre-test	10/6/15 14:37	1.0003924	322990	71.2	49.6	29.15	NORM @ 10/02/15 17:22:30
Post-test	10/7/15 10:14	1.0003924	322990	71.7	49.6	29.17	NORM @ 10/07/15 06:39:12

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.17	29.17	29.17	
Avg Cell Temp (degF)	74.07	73.97	73.69	
Dew Point (degF)	50.23	49.49	48.70	
Specific Humidity (grains/lbm)	55.44	53.89	52.31	
NOx Corr Factor	0.9158	0.9097	0.9036	
Dilution Factor	19.48	30.25	21.87	
CFV Vmix (scf @68F)	2832.59	4843.05	2819.77	
Sample Volume A (scf @68F)	15.474	28.091	16.327	
Sample Volume B (scf @68F)	16.405	28.061	16.344	
Sample Volume C (scf @68F)	16.311	27.925	16.227	
Sample Volume D (scf @68F)				
Sample Volume Average (scf @68F)	16.064	28.026	16.299	
Total PM Vmix (scf @68F)	2880.78	4927.13	2868.67	
Phase Time (sec)	506.80	869.10	505.40	
Distance (miles)	3.582	3.825	3.593	
PSU Probe A (degC)				
PSU Probe B (degC)				
PSU Probe C (degC)				
PSU Dil Air A (degC)	46.3	46.3	46.3	
PSU Dil Air B (degC)	45.5	45.6	45.6	
PSU Dil Air C (degC)	43.6	43.9	44.1	
PSU Filter A (degC)	44.6	44.7	46.3	
PSU Filter B (degC)	49.2	50.2	50.0	
PSU Filter C (degC)	46.7	47.6	47.1	
PSU Dil Flow A (lpm)	0.0	0.0	0.0	
PSU Dil Flow B (lpm)	0.0	0.0	0.0	
PSU Dil Flow C (lpm)	0.0	0.0	0.0	
PSU A Proportionality				
PSU B Proportionality				
PSU C Proportionality				

Cert

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-002 Vehicle ID: Ex. 6

Test Information

Test Date:	10/7/2015	MFR Name:	Volkswagen Group of
Key Start:	09:28:01	MFR Codes:	VGA 10015
Fuel Container ID / FTAG:	F00023 / 24688	Config #:	00
Fuel Type:	19 Cert Diesel 7-15 ppm Sulfur	Transmission:	Auto
Test Procedure:	3 HWFET (hwfetprep_hwfet)	Shift Schedule:	A0EPA0011
FE Calculation Method:	Diesel	Beginning Odometer:	002541.0 MI
Pretest Remarks:		Drive Schedule:	hwfetwarmup_hwfet
Drive Axle:	FWD		

Bag Data	N2O (ppm)	THC / IntTHC (ppmC)	CO (ppm)	NOx (ppm)	CO2 (%)	CH4 (ppm)	NMHC (ppmC)
Phase 1							
Sample	0.563	3.088 / 3.094	0.655	0.023	0.815	2.769	
Ambient	0.327	2.449	0.030	0.012	0.047	2.205	
Net Concentration	0.256	0.768 / 0.794	0.627	0.011	0.772	0.698	0.043
Remarks:							
Phase 2							
Sample							
Ambient							
Net Concentration							
Remarks:							
Phase 3							
Sample							
Ambient							
Net Concentration							
Remarks:							
Phase 4							
Sample							
Ambient							
Net Concentration							
Remarks:							

Results	N2O (gpm)	THC / IntTHC (gpm)	CO (gpm)	NOx (gpm)	CO2 (gpm)	CH4 (gpm)	NMHC / NMOG (gpm)	Vol MPG (mpg)
Phase 1	0.005	- / 0.005	0.009	0.000	155.4	0.005	0.000	61.494
							NMOG=NMHC	

Fuel Economy

	Diesel MPG
Phase 1	61.51

Dyno Settings			
Aug Brake		Dyno #:	D329 - FWD
Y		Inertia:	3875
		EPA Set Co A:	7.00
		EPA Set Co B:	0.0611
		EPA Set Co C:	0.01783
FWD		Emiss-Bench:	Mexa 7200dle

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-002 Vehicle ID: Ex. 6

Results	N2O (grams)	THC / IntTHC (grams)	CO (grams)	NOx (grams)	CO2 (grams)	CH4 (grams)	NMHC (grams)	Meth Response
Phase 1	0.056	- / 0.055	0.088	0.002	1693.5	0.056	0.003	1.075

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.18			
Avg Cell Temp (degF)	74.15			
Dew Point (degF)	48.99			
Specific Humidity (grains/lbm)	52.86			
NOx Corr Factor	0.9057			
CO2 Dilution Factor	16.428			
CFV Vmix (scf @68F)	4236.70			
CVS Flow Rate Avg (scfm)	332.29			
Fan Placement	One Small Fan - Up - Front			
Phase Time (secs)	765.00			
Distance (miles)	10.239			
Bag Analysis Time (secs)	57.6			

	HWY	MFR
IWR % diff	0.858	-
ASCR % diff	0.713	-
EER	-0.873	-

Cert

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-003 Vehicle ID: Ex. 6

Test Information

Test Date: 10/7/2015
Key Start: 10:29:56
Fuel Container ID / FTAG: F00023 / 24688
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 89 us062bag (us06warmup_2bagus06)
FE Calculation Method: Diesel
Pretest Remarks:
Drive Axle: FWD

MFR Name: Volkswagen Group of
MFR Codes: VGA 10015
Config #: 00
Transmission: Auto
Shift Schedule: A0EPA0041
Beginning Odometer: 002562.0 MI
Drive Schedule: us06warmup_2bagus06

Bag Data	N2O	THC / IntTHC	CO	NOx	CO2	CH4	NMHC
Phase 1	(ppm)	(ppmC)	(ppm)	(ppm)	(%)	(ppm)	(ppmC)
Sample	0.859	2.484 / 2.474	0.732	0.843	0.558	2.072	
Ambient	0.326	2.528	0.191	0.013	0.045	2.117	
Net Concentration	0.547	0.061 / 0.052	0.549	0.831	0.514	0.044	0.005

Remarks:

Phase 2							
Sample	0.649	2.630 / 2.652	0.799	0.170	0.679	2.239	
Ambient	0.326	2.528	0.205	0.011	0.046	2.120	
Net Concentration	0.339	0.230 / 0.252	0.604	0.159	0.635	0.227	0.008

Remarks:

Phase 3							
Sample							
Ambient							
Net Concentration							

Remarks:

Phase 4							
Sample							
Ambient							
Net Concentration							

Remarks: This test has particulate results.

Results	N2O	THC / IntTHC	CO	NOx	CO2	CH4	NMHC / NMOG	Vol MPG
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(mpg)
Phase 1	0.044	- / 0.001	0.028	0.063	412.7	0.001	0.000	24.649
Phase 2	0.012	- / 0.003	0.014	0.005	223.3	0.003	0.000	45.556
Composite	0.01899	0.00246	0.01672	0.01801	265.168	0.00255	NMOG+NMHC 0.00010	

Fuel Economy

	Diesel MPG
Phase 1	24.66
Phase 2	45.57
Composite	38.39

Dyno Settings
Aug Brake: Y
FWD

Dyno #: D329 - FWD
Inertia: 3875
EPA Set Co A: 7.00
EPA Set Co B: 0.0611
EPA Set Co C: 0.01783
Emiss-Bench: Mexa 7200dle

NVFEL Laboratory Test Data

CVS

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-003 Vehicle ID: Ex. 6

Results	N2O (grams)	THC / IntTHC (grams)	CO (grams)	NOx (grams)	CO2 (grams)	CH4 (grams)	NMHC (grams)	Meth Response
Phase 1	0.078	- / 0.002	0.050	0.111	730.7	0.002	0.000	1.075
Phase 2	0.074	- / 0.017	0.084	0.033	1391.6	0.018	0.001	

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.19	29.19		
Avg Cell Temp (degF)	73.95	73.96		
Dew Point (degF)	48.47	48.64		
Specific Humidity (grains/lbm)	51.82	52.16		
NOx Corr Factor	0.9018	0.9031		
CO2 Dilution Factor	24.000	19.728		
CFV Vmix (scf @68F)	2718.59	4191.50		
Total CVS Vmix (scf@68F)	2741.60	4226.64		
CVS Flow Rate Avg (scfm)	689.71	689.01		
Fan Placement	One Large Fan - Down - Front (US06 Only)			
Phase Time (secs)	130.00	365.00	106.50	
Distance (miles)	1.771	6.233		
Bag Analysis Time (secs)	79.7	260.2		

	US06-C	US06-H	US06-T	MFR
IWR % diff	-0.198	-11.493	-5.694	-
ASCR % diff	0.450	-8.669	-2.439	-
EER	-0.623	-2.866	-2.143	-

NVFEL Laboratory Test Data

PARTICULATE

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-003

Vehicle ID: Ex. 6

Test Information

Test Date: 10/7/2015
Key Start: 10.29.56
Fuel Container ID: F00023 / 24688
Fuel Type: 19 Cert Diesel 7-15 ppm Sulfur
Test Procedure: 89 us062bag (us06warmup_2bagus06)
Calculation Method: Diesel
Pretest Remarks:

MFR Name: Volkswagen Group of
MFR Codes: VGA 10015
Config #: 00
Transmission: Auto
Shift Schedule: A0EPA0041
Beginning Odometer: 002562.0 MI
Drive Schedule: us06warmup_2bagus06

All filter weights are corrected for buoyancy

Particulate	Filter Sampler		Filter No.	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Total Mass mg	Total Mass mg / mi	Filter comment
Phase 1		A	220214965	368.3512	368.3542	0.00296	1.066	0.133	
		B	220214966	368.2210	0.0000	0.00000	0.000	0.000	VOID
		C	220214967	361.6504	361.6496	0.00000	0.000	0.000	

Remarks:

Phase 2

Remarks:

Phase 3

Remarks:

Phase 4

Remarks: This test has particulate results.

Average Results

	Net Wt mg	Total Mass mg	Total Mass mg / mi
Phase 1	0.00099	1.066	0.133

All filter weights are corrected for buoyancy

Reference Filter Stability Check

2% of Avg Net or 0.01 mg: 0.01

PM Media: MTL PTFE_PFA

No.	Tare (Pre Wt)	Gross (Post Wt)	Net Wt mg	Stability Check PASS/FAIL
1	367.79042	367.79098	0.00056	PASS
2	364.69531	364.69576	0.00046	PASS

Dyno #: D329 - FWD
Inertia: 3875
EPA Set Co A: 7.00
EPA Set Co B: 0.0611
EPA Set Co C: 0.01783

Emissions Benc: Mexa 7200dle

VW FOIA, EPA 06/20/2017 2017-FFP_029962

NVFEL Laboratory Test Data

PARTICULATE

Final Laboratory Test Results- Refer to VERIFY Reports for Official Data

Test Number: 2015-0371-003 Vehicle ID: Ex. 6

WEIGHING CHAMBER	Timestamp	Buoyancy Factor	Operator (id)	Chamber Temp (°F)	Dew Point (°F)	Barometer ("Hg)	Last Change in Status Status @ timestamp
Pre-test	10/6/15 15:38	1.0003920	322990	71.5	49.5	29.13	NORM @ 10/02/15 17:22:30
Post-test	10/7/15 12:08	1.0003927	322990	71.2	49.6	29.17	NORM @ 10/07/15 06:39:12

Test Conditions	Phase 1	Phase 2	Phase 3	Phase 4
Barometer (inHg)	29.19	29.19		
Avg Cell Temp (degF)	73.95	73.96		
Dew Point (degF)	48.47	48.64		
Specific Humidity (grains/lbm)	51.82	52.16		
NOx Corr Factor	0.9018	0.9031		
Dilution Factor	24.00	19.73		
CFV Vmix (scf @68F)	2718.59	4191.50		
Sample Volume A (scf @68F)	19.339	11.723		
Sample Volume B (scf @68F)	19.490	11.712		
Sample Volume C (scf @68F)	19.321	11.706		
Sample Volume D (scf @68F)				
Sample Volume Average (scf @68F)	19.383	11.714		
Total PM Vmix (scf @68F)	2741.60	4226.64		
Phase Time (sec)	130.00	365.00	106.50	
Distance (miles)	1.771	6.233		
PSU Probe A (degC)				
PSU Probe B (degC)				
PSU Probe C (degC)				
PSU Dil Air A (degC)	46.4	46.4		
PSU Dil Air B (degC)	45.6	45.6		
PSU Dil Air C (degC)	44.1	44.2		
PSU Filter A (degC)	46.3	46.0		
PSU Filter B (degC)	50.2	50.4		
PSU Filter C (degC)	48.2	48.4		
PSU Dil Flow A (lpm)	0.0	0.0		
PSU Dil Flow B (lpm)	0.0	0.0		
PSU Dil Flow C (lpm)	0.0	0.0		
PSU A Proportionality				
PSU B Proportionality				
PSU C Proportionality				

VW FOIA, EPA 06/20/2017 2017-FFP_029963

To: Fernandez, Antonio[fernandez.antonio@epa.gov]
From: Wright, DavidA
Sent: Thur 10/8/2015 1:41:43 PM
Subject: FW: House E&C Testimony and Questions
HHRG-114-IF02-Wstate-HornM-20151008.pdf
HHRG-114-IF02-20151008-SD002.pdf

FYI

From: Wright, DavidA
Sent: Wednesday, October 07, 2015 5:05 PM
To: Anderson, Tom; Ball, Joel; Dalton, Joel; Good, David; Ott, William; Pidgeon, Bill; Snyder, Jim; Sohacki, Lynn; Wehrly, Linc
Subject: House E&C Testimony and Questions

Looks like we can live stream the hearing from the House Energy and Commerce Committee tomorrow morning. I will see if we can get that up and running in N95. Attached is VWs initial testimony along with the Energy and Commerce Committee's Initial Questions.

Regards,

David

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029965

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029966

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029967

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

October 6, 2015

TO: Members, Subcommittee on Oversight and Investigations

FROM: Committee Majority Staff

RE: Hearing on "Volkswagen's Emissions Cheating Allegations: Initial Questions"

I. INTRODUCTION

On Thursday, October 8, 2015, at 10:00 a.m. in 2123 Rayburn House Office Building, the Subcommittee on Oversight and Investigations will hold a hearing entitled "Volkswagen's Emissions Cheating Allegations: Initial Questions." This hearing will examine the available facts and the initial compliance and consumer issues stemming from Volkswagen AG's reported use of engine software that would reduce the effectiveness of emissions control systems in certain make and model year diesel passenger vehicles in the United States, in apparent violation of the Clean Air Act and its implementing regulations.

II. WITNESSES

There will be two witness panels:

Panel 1:

- Michael Horn, President and Chief Executive Officer, Volkswagen Group of America

Panel 2:

- Christopher Grundler, Director, Office of Transportation and Air Quality, Office of Air and Radiation; and

- Phillip Brooks, Director , Air Enforcement Division, Office of Enforcement and Compliance Assurance, U.S. Environmental Protection Agency

III. SUMMARY

On September 18, 2015, the Environmental Protection Agency (EPA) issued a Notice of Violation (NOV) to Volkswagen AG, Audi AG, and Volkswagen Group of America (collectively, VW) based on a determination "that VW manufactured and installed defeat

devices" in certain model year Volkswagen and Audi diesel passenger cars.[1] The agency alleged that VW installed engine software that "sensed" when the vehicles were undergoing emissions testing and ensured emissions control systems were operating to pass the tests. During normal vehicle use, according to the agency, the software would "switch" to a different mode that produced emissions of nitrogen oxides (NOx) up to 10 to 40 times above current EPA standards. The California Air Resource Board (CARB), which investigated the matter with EPA, issued its own "In-Use Compliance Letter" to VW at the same time.[2]

The installation and use of a component — in this case engine software — to "bypass, defeat, or render inoperative elements of the vehicles' emission control system," would violate the Clean Air Act (CAA) and EPA regulations.[3] The alleged violations involve MY2009 to MY2015 VW and Audi vehicles equipped with 2.0 liter diesel engines, a vehicle population of approximately 480,000 in the United States.[4] Press reports in the wake of EPA's announcement suggest the violations could affect approximately 11 million vehicles worldwide.[5]

EPA and CARB have initiated enforcement investigations, which are ongoing. No fines or recalls to bring the vehicles into compliance have been announced to date. EPA also is expanding its review of other vehicles. The agency notified automakers on September 25, 2015, that it would add to its regimen of "confirmatory testing additional evaluations to look for additional defeat devices."[6] Multiple agencies and foreign governments also have launched their own investigations into VW's conduct.

VW has publically admitted and apologized for violating EPA's regulations and currently is conducting its own investigation and examining solutions to fix the software. The company also has announced significant changes to its leadership and corporate structure. On September 23, 2015, the company's CEO, Dr. Martin Winterkorn, resigned.[7] He was replaced by Matthias Muller, who most recently led the company's Porsche division. In addition, on September 25, 2015, the company has suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit. The company has set aside more than $7 billion to address this alleged violation.

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[1] Notice of Violation, EPA to Volkswagen AG, Audi AG and Volkswagen Group of America (September 18, 2015) *available at* http://www3.epa.gov/otaq/cert/documents/vw-nov-caa-09-18-15.pdf, at 1 (hereinafter, NOV).
[2] Letter from Cal. Air Resources Board to VW (September 18, 2015) *available at* http://www.arb.ca.gov/newsrel/in_use_compliance_letter.htm, at 1 (Hereinafter, CARB Letter)
[3] NOV, at 1-2.
[4] Affected U.S. diesel models, according to EPA: MY2009 VW Jetta, Jetta Sportwagen; MY2010 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2011 VW Golf, Jetta, Jetta Sportwagen, Audi A3; MY2012 to MY2015 VW Beetle, Beetle Convertible, Golf, Jetta, Jetta Sportwagen, Passat, and Audi A3.
[5] Mark Thompson and Ivana Kottasova, CNN Money, *Volkswagen scandal widens* (September 22, 2015) *available at,* http://money.cnn.com/2015/09/22/news/vw-recall-diesel/.
[6] EPA Update on Recent Volkswagen Announcement (September 25, 2015) *available at* http://yosemite.epa.gov/opa/admpress.nsf/Press%20Releases%20from%20Headquarters?OpenView
[7] Jack Ewing, N.Y. Times, *Volkswagen C.E.O. Martin Winterkorn Resigns Amid Emissions Scandal* (Sept. 23, 2015) *available at* http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html?_r=0

IV. BACKGROUND

A. Clean Air Act and EPA Regulations

The Clean Air Act and its implementing regulations are intended to protect human health and the environment by limiting pollution caused by emissions from various sources. Title II of the CAA grants EPA the authority to establish and regulate emissions standards for mobile sources, including automobiles. Among the pollutants regulated under Title II, significant attention is placed on NOx.[8] In combination with volatile organic compounds (VOCs), NOx contributes to the production of ground-level ozone.

Current emissions requirements for new motor vehicles, known as "Tier 2" standards, were promulgated in 2000 and phased in beginning in MY2004 vehicles, with full compliance required by MY2009.[9] The Tier 2 standards required manufacturers to reduce NOx emissions by 88% to 95%, depending on vehicle type, though compliance is based on fleet-wide emissions, rather than certification of each individual vehicle.[10] In 2014, new Tier 3 standards went into effect and will generally be phased in between MY2017 and MY2025.[11]

Compliance with EPA's motor vehicle emissions standards is governed by section 203 of the CAA. Prior to introducing a vehicle for sale in the United States, manufacturers must demonstrate that the vehicle meets emissions standards and obtain a certificate of conformity (COC) from the EPA. In the COC application submitted to the EPA, the manufacturer must list all auxiliary emission control devices (AECDs) installed on the vehicle.[12] An AECD is defined as "any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system."[13] The manufacturer must also justify each AECD and explain why it is not a "defeat device."[14] An AECD is considered a "defeat device" if it:

> . . . reduces the effectiveness of the emission control system under conditi ons which may reasonably be expected to be encountered in normal vehicle operation and use, unless: (1) Such conditions are substantially included in the Federal emission test procedure; (2) The need for the AECD is justified in terms of protecting the veh icle against damage or accident; (3) The AECD does not go beyond the requirements of engine starting; or (4) The AECD applies only to emergency vehicles . . . .[15]

It is a violation of the CAA to manufacture or sell any part or component if it will:

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[8] The EPA estimates that on-road vehicles account for 38% of NOx emissions.
[9] CRS Report R43497, *Tier 3 Motor Vehicle Standards* (April 28, 2014) at 1-2.
[10] *Id.*, at 2.
[11] *Id.,* at 3-4.
[12] NOV, at 2.
[13] 40 C.F.R. § 86.1803-01
[14] 40 C.F.R. § 86.1844-01(d)(11).
[15] 40 C.F.R. § 86.1803-01.

> . . . bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use.[16]

It is also a violation to sell, market, or import any new motor vehicle if it is not covered by a valid EPA-issued COC.[17] Violations of these provisions are subject to civil penalties of up to $3,750 and $37,500, respectively, for any vehicle sold, marketed, or imported on or after January 13, 2009.[18]

EPA's Office of Transportation and Air Quality (OTAQ) oversees a broad set of compliance activities to ensure that vehicles manufacturers satisfy regulatory requirements. These include the review of COC applications and a variety of testing and other requirements that occur over the life a vehicle. In addition to review of manufacturer supplied testing data, EPA's own testing may include so-called "confirmatory testing," both random and targeted, and in use compliance testing. In addition, OTAQ conducts defect reporting programs and recall programs. According to available historical data, emissions recalls affect about three million vehicles annually.[19]

B. Timeline

Set forth below is a timeline of key events related to the VW emissions allegations. Note that the Committee's investigation is ongoing, the Committee will be receiving documents and collecting information in coming weeks that will illuminate the facts and circumstances of these events.[20] The information in this timeline is largely drawn from public sources and is presented to assist Committee Members during the hearing before the Subcommittee.

- May 2014: A study conducted by independent researchers at West Virginia University (WVU) on behalf of the International Council for Clean Transportation (ICCT) identified significantly higher on-road NOx emissions from two VW vehicles – a 2012 Jetta and a 2013 Passat.[21] The results of this study were brought to the attention of the EPA, CARB, and VW.

- May 2014 to December 2014: CARB and EPA launched investigations into the higher emissions in VW vehicles. VW initiated testing to replicate the ICCT/WVU research and

[16] CAA Section 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B).
[17] CAA Section 203(a)(1), 42 U.S.C. § 7522(a)(1).
[18] NOV, at 5.
[19] *See* Vehicle & Engine Compliance Activities: 2009-2011 Compliance Report, *EPA, December 2013, available at http://www3.epa.gov/otaq/documents/cert/420r13006.pdf*.
[20] See Committee letters to VW and EPA, available at http://energycommerce.house.gov/letter/letters-volkswagen-and-epa-regarding-volkswagen-emissions-issues.
[21] NOV, at 4.

identify technical causes for the higher on-road emissions observed by the researchers.[22] VW asserted to EPA and CARB that "increased emissions from these vehicles could be attributed to various technical issues and unexpected in-use conditions."[23]

- December 2, 2014: VW shared testing results with EPA and CARB and proposed a "recalibration fix for the Gen1 (Lean NOx Trap technology) and Gen2 (Selective Catalytic Reduction (SCR) Technology) . . ."[24]

- December 2014: VW initiated a voluntary recall of approximately 500,000 vehicles in the United States. The recall included MY2009 to MY2014 diesel vehicles equipped with Gen1 and Gen2 technology.[25]

- May 6, 2015: CARB commenced testing to confirm that VW's recall solution addressed the higher on-road emissions.[26]

- May 6, 2015 to July 2015: CARB conducted laboratory and on-road testing to confirm the efficacy of the recall.[27] The testing showed limited improvement, prompting CARB to expand its investigation.[28]

- July 8, 2015: CARB shared test results with VW and the EPA, prompting a series of technical meetings. According to CARB, in the course of those meetings, "VW disclosed that Gen1, Gen2, and the 2015 model-year improved SCR vehicle (known as Gen3) had a second calibration intended to run only during confirmatory testing."[29]

- August 2015: EPA and CARB informed VW that they would not issue certificates of conformity for 2016 vehicles until VW could explain the higher emissions and provide assurance that they would not occur in 2016 vehicles.[30,31]

- September 3, 2015: VW admitted to EPA and CARB that it had designed and installed what was effectively a defeat device into these vehicles.

- September 18, 2015: EPA sent VW a Notice of Violation. CARB sent VW an in-use compliance letter.

- September 21, 2015: VW CEO, Dr. Martin Winterkorn, issued a public apology.

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[22] CARB Letter.
[23] NOV, at 4.
[24] CARB Letter, at 2.
[25] *Id.*
[26] *Id.*
[27] NOV, at 4.
[28] *Id.*
[29] CARB, at 2.
[30] NOV, at 4.
[31] EPA has not certified MY2016 vehicles and will not do so until it understands this issue.

- September 23, 2015: Dr. Winterkorn resigned from VW.

- September 25, 2015: EPA announced it is adding additional confirmatory testing of passenger vehicles intended as an effort to identify any additional defeat devices.

- September 25, 2015: VW suspended the leaders of the VW, Audi, and Porsche research and development divisions and announced a restructuring of its North American business unit.

V. Questions and Issues:

The following issues may be addressed at the hearing:

- What has been Volkswagen's response to the EPA allegations?
- What are the available facts concerning VW's violations?
- What is EPA's role in any measures to bring affected VW's into compliance?
- What can VW consumers expect going forward?

VI. Staff Contacts

If you have any questions regarding this hearing, please contact Peter Spencer or John Ohly of the majority Committee staff at (202) 225-2927.

To: Valentine, Julia[Valentine.Julia@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]
Cc: Grundler, Christopher[grundler.christopher@epa.gov]; 'grundler.chris@epa.gov'[grundler.chris@epa.gov]
From: Jonathan Reiskin
Sent: Thur 10/8/2015 2:01:12 PM
Subject: RE: GHG comments

While disappointing, I understand that EPA is very much in the news now and the demands on your time must be quite substantial. That said, send me what you can when you can and I'll take it. No guarantee that it gets in immediately, but this story will keep my busy for a while. If your response isn't used now, it will be later.

2) Most of what I asked for is rather a primer on regulations, or Regs 101. I'm hoping it wouldn't be too hard to scrape together a response, but you know your obligations better than I do.

3) For the not-too-distant future, your colleague Christopher Grundler will be speaking to American Trucking Associations in Philadelphia on Mon., Oct. 19, starting around 2:30 p.m. His remarks are closed to the press, much to my chagrin. If possible, though, I would like to speak to him either immediately before or after his remarks. Actually, I'll talk to him any time at all, but I'm guessing that immediately before or after would work best for him. The point being, I'm formally requesting an interview with Mr. Grundler in Philadelphia. The subject is, obviously, your Phase 2 GHG proposal.

Thanks, -- Jonathan

Jonathan Reiskin, Associate News Editor, Transport Topics (www.ttnews.com)

(703) 838-1909 in Arlington, Va., or jreiskin@ttnews.com

From: Valentine, Julia [mailto:Valentine.Julia@epa.gov]
Sent: Thursday, October 08, 2015 9:43 AM
To: Jonathan Reiskin
Cc: StClair, Christie
Subject: RE: GHG comments

Hi Jonathan,

I am so sorry but your inquiry got buried under a pile of VW inquiries.

Christie is back on the office this morning and I am transferring this back to her to handle. I apologize profusely for probably not being able to make your deadline today. End of the day is more reasonable since we have the VW congressional hearing this morning.

Sorry again,

Julia P. Valentine

Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

From: Jonathan Reiskin [mailto:JReiskin@ttnews.com]
Sent: Tuesday, October 06, 2015 2:57 PM
To: Valentine, Julia
Subject: RE: GHG comments

11:00 a.m. EDT on Thursday the 8th.

From: Valentine, Julia [mailto:Valentine.Julia@epa.gov]
Sent: Tuesday, October 06, 2015 2:56 PM
To: Jonathan Reiskin
Subject: RE: GHG comments

Hi again, Jonathan,

Please let me know your hard deadline.

Best,

Julia P. Valentine

Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

From: Jonathan Reiskin [mailto:JReiskin@ttnews.com]
Sent: Tuesday, October 06, 2015 2:50 PM
To: Valentine, Julia; Press
Subject: FW: GHG comments

Christy is out of town, so I'm trying another approach.

From: Jonathan Reiskin
Sent: Tuesday, October 06, 2015 2:47 PM
To: stclair.christie@epa.gov
Subject: GHG comments

Hi Christie, I'm writing about the comments submitted regarding EPA-NHTSA Phase 2 of Greenhouse Gas Emissions for H-D and M-D Trucks. Several questions, please.

1) Regulations.gov says 140,449 comments were received, but only 480 are posted on the website. Why the fairly substantial discrepancy between 140.4K received and 480 posted?

2) Who reads these? Surely it's not Gina McCarthy herself. Is there just one person who reads them all? Or is it a team of people? (If so, how many?) Are they in the Washington HQ, the Ann Arbor lab, or elsewhere?

3) Please put this into context for my readers. You've got this very big rule, and a trainload full of comments. If so, then what? Is this just a formality in that since EPA & NHTSA proposed a rule they have to collect comments? Or is it the case that comments often lead to changes in proposals that are reflected in the final rule. Is the final rule still on track for June 30, 2016?

If there's anything else you or EPA & NHTSA would like to add, I'm happy to listen. Thanks, -- Jonathan

Jonathan Reiskin, Associate News Editor, Transport Topics (www.ttnews.com)

(703) 838-1909 in Arlington, Va., or jreiskin@ttnews.com

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If you have received this message in error, please notify the sender by replying to this message and delete
it from your computer.

To: [Ex. 7 @vw.com]
From: Snyder, Jim
Sent: Thur 10/8/2015 2:08:03 PM
Subject: FW: 2014 Touraeg PIDs

This is what I sent [Ex. 7]

Also, Can you guys confirm the Cal ID that is in the Touareg if I sent it?

From: Snyder, Jim
Sent: Thursday, October 08, 2015 10:02 AM
To: 'Glas, Tobias'
Cc: [Ex. 7]
Subject: 2014 Touraeg PIDs

Tobias, I got a PID List thru Len last week but its mainly the public SAE PIDs. I'm looking for the "Enhanced" Or Manufacturer PIDs for some key parameters. Mainly %Dosing amount and Nox sensor. The public PID for Nox didn't seem to work reliably. I noticed on your Diagra software you had access to all the addresses. Can you look up the parameters in question and get me their addresses?

Alternatively, [Ex. 7] can you get me a scan tool that will access the enhanced PIDs? I believe that's what CARB did for at least some of their testing.

This is important, I need an answer to this today.

Jim Snyder
Light-Duty Vehicle Group
Compliance Division
United States Environmental Protection Agency
(734) 214-4946
snyder.jim@epa.gov

To: Grundler, Christopher[grundler.christopher@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]
Cc: Conger, Nick[Conger.Nick@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Senn, John[Senn.John@epa.gov]
From: Allen, Laura
Sent: Thur 10/8/2015 2:12:14 PM
Subject: VW media clips, R9 announcement

Good morning- sending along clips that posted last night and this morning (so far). See below.

We also wanted to make sure you both are aware of this announcement happening today at 1:30pm: today, EPA's Region 9 office announced that Estes Express Lines will pay a $100,000 penalty for violations of the California Truck and Bus Regulation (TBR), including failing to install particulate filters on 73 of its heavy-duty diesel trucks. In addition to the penalty, Estes will pay an additional $290,400 towards projects to educate the out-of-state trucking industry on the regulation and for the replacing of old wood burning devices in the San Joaquin Valley.

The California Truck and Bus Regulation was incorporated in the federal Clean Air Act air quality plan requirements for California in 2012 and applies to privately or federally owned diesel-fueled trucks and buses. The TBR requires companies to upgrade their vehicles to meet specific performance standards that impose limits on emissions of nitrogen oxide (NOx) and particulate matter (PM) in California. The TBR requires that most heavy-duty diesel trucks in California use diesel particulate filters, which can reduce the emissions of diesel particulate into the atmosphere by 85% or more.

Doubt it will come up today but we wanted to make sure you were aware of the announcement.

Laura Allen

Deputy Press Secretary
Office of the Administrator
U.S. Environmental Protection Agency

Email: Allen.Laura@epa.gov

Office: 202-564-1175

Mobile: 202-731-3005

Please consider the environment before printing this email.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 9:29 AM
To: Allen, Laura
Cc: Abrams, Dan
Subject: Volkswagen Clips 10/8/2015

AP (via US News):

http://www.usnews.com/news/business/articles/2015/10/07/testimony-vw-to-stop-delivery-of-2016-diesel-models

Testimony: Volkswagen to withdraw 2016 diesel models

Associated Press Oct. 7, 2015 | 6:26 p.m. EDT + More

By MICHAEL BIESECKER and TOM KRISHER

WASHINGTON (AP) — Volkswagen plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines, the latest hit to the German automaker's credibility and bottom line.

Thousands of new vehicles already manufactured and shipped to the U.S. will remain quarantined in ports. That's a huge loss for American VW dealers, who were hoping to put the new models on sale soon in the wake of last month's admission the company had installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 "clean diesel" cars starting with the 2009 model year.

For some VW dealers, the diesel models accounted for about a third of sales. Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said Wednesday his dealership had already lost three deals with potential buyers because he couldn't get the new cars.

"It's not good," said Backer, who said he typically sells only a small number of diesels. "It's definitely a stain on the brand's image."

It was not immediately clear when, or if, the 2016 diesels will be delivered.

The withdrawal of emissions applications was revealed Wednesday in written testimony submitted by Volkswagen Group of America CEO Michael Horn to the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. Horn is scheduled to appear before the panel Thursday, and witnesses are typically required to provide a copy of their prepared remarks a day in advance.

Horn's testimony says VW was withdrawing its applications for the 2016 diesels because they include software that should have been disclosed to the U.S. Environmental Protection Agency, which must certify them for sale in the country. The automaker is working with the EPA and California regulators to continue the certification process, the testimony said.

Thursday's appearance will be the first on Capitol Hill by Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year. He is expected to face blistering questions about when top executives at the company first learned of the scheme.

VW spokeswoman Jeannine Ginivan told The Associated Press Wednesday that Horn will tell Congress he only learned about the cheating software "over the past several weeks."

He will also echo prior statements by the company's global chief executive apologizing for the cheating.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn will say, according to his prepared remarks. "These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

Also scheduled to testify Thursday are two officials at the EPA who oversee emissions testing and compliance with clean air rules.

VW first confessed the deception to U.S. regulators on Sept. 3, more than a year after researchers at West Virginia University first published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers checked the speed, steering wheel position, air pressure and other factors to determine when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-07/for-volkswagen-new-questions-arise-on-u-s-injury-reporting

VW's U.S. Chief to Tell Congress There's No Schedule for Repairs

Jeff Plungis David Voreacos Alan Katz

October 8, 2015 — 5:00 AM EDT Updated on October 8, 2015 — 6:51 AM EDT

Volkswagen AG's top U.S. executive apologized and promised a full investigation into the automaker's emissions-cheating scandal, even as he stopped short of saying when consumers could expect repairs or what those fixes would do to their cars' performance.

"We are determined to make things right," Michael Horn, the president and chief executive officer of Volkswagen of America, said in written testimony prepared for a House Energy and Commerce investigations subcommittee hearing Thursday. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public."

It will be the first public questioning in the U.S. of a VW executive since the U.S. Environmental Protection Agency and the California Air Resources Board announced their investigation Sept. 18. The scandal has rocked the world's second-largest automaker, leading to the resignation of its chief executive, Martin Winterkorn, and an announced charge of 6.5 billion euros ($7.3 billion) for recall repair costs. Under the Clean Air Act, Volkswagen may be liable for fines as high as $18 billion, based on maximum penalties per car involved.

Lawmakers examining the case want answers both from Volkswagen and the EPA.

"When the world was deceived by a company in such a flagrant way, it's discouraging," Representative Paul Tonko, a New York Democrat, said in an interview. "We have to get to the bottom of this. "

EPA Burden

Representative Marsha Blackburn, a Tennessee Republican, wonders whether EPA officials are so overburdened by enforcing environmental regulations that they're beginning to miss really important things.

"Being oblivious is a pretty big deal," Blackburn said in an interview.

Just how much money Volkswagen made by cheating on U.S. emissions tests will be a factor in the penalties that will be assessed, EPA officials said. The agency intends "to assess the economic benefit to VW of noncompliance and pursue appropriate penalties," Christopher Grundler, director of EPA's Office of Air and Radiation, and Phillip Brooks, director of civil enforcement for air, said in a written statement.

"Remedies should match the wrongdoing," said Erik Gordon, a professor with the Ross School of Business at the University of Michigan. When U.S. regulators lacked statutory authority to impose higher fines on carmakers, including General Motors Co. over flawed ignition switches, "the small fines frustrated the public and Congress," he said.

The Wolfsburg, Germany-based automaker will ultimately face costs and lost revenue from its damaged image of more than 35 billion euros ($39 billion), according to an estimate by Warburg Research.

VW Timeline

Volkswagen has withdrawn applications with the EPA for certification of its vehicles for the 2016 model year, Horn said in his submission for the House hearing. Horn learned in early 2014 that the carmaker might not be following emissions regulations on its diesel models, and the topic came up again later that year, when he was told VW's technical teams had a plan for fixing the cars involved, he said.

The company's initial disclosure to the California Air Resources Board that it had a "second calibration" governing engines during emissions tests on three different diesel engines occurred on July 8, according to the committee. It wasn't until Sept. 3 that the company came clean with the EPA and CARB that this alternative mode was a "defeat device," shutting down pollution-control equipment as the cars drove in the real world.

Responsible parties will be identified and held accountable, and Volkswagen will revive its reputation, Horn said. Technical teams are still working to identify solutions for consumers, he said. Company officials in Germany said Wednesday there will be multiple solutions for different engines and different countries, and that the work would continue at least through the

end of 2016. German Transport Minister Alexander Dobrindt said in a video posted on his ministry's website that across the European Union, Volkswagen will need to exchange or rebuild parts for about 3.6 million engines.

U.S. lawmakers have been hearing from consumers, whose resale values have plummeted, as well as car dealers, who are paying interest to hold vehicles they can't sell, said Representative Michael Burgess, a Texas Republican who sits on the Oversight and Investigations Subcommittee.

"The rules are set, and they're set for a reason," Burgess said. "If you have an outlier in the marketplace, it's harmful at a lot of different levels."

Volkswagen AG reported death and injury claims at the lowest rate of any major automaker in the U.S. over the last decade.

The numbers are so good that some industry experts wonder if they add up.

The average reporting rate of the 11 biggest automakers was nine times higher than Volkswagen's, according to an analysis of government data completed last week by financial advisory firm Stout Risius Ross Inc. at the request of Bloomberg News.

This year, two of Volkswagen's competitors, Honda Motor Co. and Fiat Chrysler Automobiles NV's U.S. unit, have said they underreported claims to the U.S. government, and Honda paid a fine. Volkswagen's rate is lower than Honda and Chrysler's underreported numbers, the data show. To ensure fair comparisons among carmakers of different sizes, the rates were calculated per million vehicles on the road.

"The data demonstrates that even on a fleet-adjusted basis, the number of reported incidents by Volkswagen is significantly below what one would expect based on those reported by other automakers," said Neil Steinkamp, a Stout Risius managing director. "They are also significantly below the reporting of automakers that have already been cited for non-compliance."

Jeannine Ginivan, a Herndon, Virginia-based Volkswagen spokeswoman, declined to comment.

The reporting of death and injury claims is part of the National Highway Traffic Safety Administration's so-called early-warning system to spot vehicle-defect trends in an attempt to reduce fatalities.

In response to the Chrysler admission, U.S. Transportation Secretary Anthony Foxx said Sept. 29 he's summoning automakers to Washington to discuss the need for accurate reporting of safety defects, including the death and injury reports. In December, NHTSA asked automakers to review their compliance with the 15-year-old reporting requirement.

The rule stems from a law enacted in 2000 after reports that Bridgestone Corp.'s Firestone tires were disintegrating in hot-weather states, causing Ford Motor Co. Explorer SUVs to roll over.

Early Warning

The heart of the law was the early-warning report system, created because lawmakers concluded that the Firestone debacle could have been avoided if regulators had known what the companies knew. The intent was to give NHTSA and the public access to a broad overview of data to spot potentially deadly defects earlier.

NHTSA is focused on improving the system of reporting potential defects, both through monitoring automaker reports and making its analysis of the data more effective, spokesman Gordon Trowbridge said in an e-mail. The agency is implementing recommendations of an audit by the Transportation Department's inspector general, including more actively following up on fatality reports and lawsuits, he said. He had no comment on specific automakers' compliance.

Clarence Ditlow, executive director of the Washington-based watchdog Center for Auto Safety, said that Volkswagen's numbers are so low that he questions how they were compiled.

"NHTSA doesn't have the resources to police all of this, but now they're asking the automakers to tell them whether they're in compliance," Ditlow said. "For the automakers, it's a time of

reckoning."

President Barack Obama's budget for next year called for enough money to hire seven additional staff on top of the four who currently analyze early-warning data, Trowbridge said. Congress hasn't acted on the department's budget.

Honda Fined

In January, Honda was fined a record $70 million for underreporting to the same NHTSA database. Fiat Chrysler's U.S. unit last month said it violated the requirements of the same law. Both companies were reporting at a rate at least twice that of Volkswagen, according to the Stout Risius data compiled for Bloomberg.

The Stout Risius analysis compared the number of incidents reported by the automakers to NHTSA over the last decade with the number of vehicles sold by each automaker that were estimated to still be on U.S. roads at the time. That data was converted into a ratio of death and injury reports per million vehicles on the road.

Of the 11 vehicle manufacturers -- representing 88 percent of U.S. industry sales -- General Motors Co. reported the most, at 524 incidents per million vehicles. Volkswagen had the lowest rate, with 34 per million. The average was about 301 per million vehicles on the road. Three companies -- GM, Toyota Motor Corp. and BMW -- were above the average. The underreported rate for Chrysler was 101 while Honda's was 78.

Nissan Motor Co., which also disclosed 78 incidents per million vehicles, "fully complies" with all reporting obligations, spokesman Steve Yaeger said in an e-mail. "Nissan's position is that our reporting rates are not 'low,' but accurate and consistent with our regulatory obligations," he said. Nissan has not been accused of any wrongdoing.

Volkswagen admitted Sept. 18 that it had cheated on U.S. air pollution tests since 2009. The stock price has tumbled and the chief executive officer has been replaced. Michael Horn, Volkswagen of America's president and CEO, is scheduled to testify about the emissions scandal to the House Energy and Commerce Committee's investigations subcommittee on Thursday.

Autocar (UK):

http://www.autocar.co.uk/car-news/industry/volkswagen-boss-admits-company-knew-emissions-cheat-2014

Volkswagen boss admits company knew of emissions cheat in 2014

VW's US boss Michael Horn admits company has broken the trust of customers

by Darren Moss 8 October 2015

Volkswagen's US boss Michael Horn has admitted he knew about the company's 'defeat device' as far back as 2014.

In a statement presented to the US House of Representatives, Horn says he was first made aware of "a possible emissions non-compliance" in the Spring of 2014.

"I was informed that EPA [Environmental Protection Agency] regulations included various penalties for non-compliance with the emissions standards," he said, "and that the agencies can conduct engineering tests which could include “defeat device” testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue."

Horn says he was told later on in 2014 that a technical fix for the defeat device had been identified to "bring the vehicles into compliance", and that engineers "were engaged with the agencies about the process."

The statement also confirms that it wasn't until September of this year that Volkswagen made the EPA aware of the defeat device, thus sparking the current scandal.

In his statement, Horn says the defeat device "could recognise whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

Horn also said the events of the scandal had been "deeply troubling" and he "did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way."

Describing the steps the company is now taking to remedy the situation, Horn promised that "responsible parties will be identified and held accountable," and that technical teams were working "tirelessly" to find a solution.

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CNN:

http://money.cnn.com/2015/10/07/news/companies/volkswagen-scandal-epa-congress/

EPA sizing up penalties for Volkswagen

By Rene Marsh @CNNMoney

The Volkswagen emissions cheating scandal is about to take center stage before lawmakers on Capitol Hill.

Michael Horn, the head of Volkswagen in the U.S., will field questions Thursday from lawmakers demanding answers.

A House committee will also hear testimony from the Environmental Protection Agency, the agency that last month slapped the German automaker for using software to trick emissions tests into believing VW diesel cars were complying with the Clean Air Act. In fact, the cars were spewing as much as 40 times the emissions allowed.

In prepared testimony released in advance of Thursday's hearing, Horn said he first learned of "possible emissions non-compliance" in 2014 and was told Volkswagen engineers were working with regulators on a solution. But it wasn't until last month, Horn said, that VW informed the EPA that it had installed "hidden software" to get around emissions standards.

"These events are deeply troubling," Horn said. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA ordered Volkswagen to recall nearly 500,000 cars in the U.S. to ensure they comply with emissions standards. The company has said as many as 11 million vehicles worldwide might be affected by the scandal. VW said Wednesday it plans to start recalling diesel cars in January.

Christopher Grundler, director of the EPA's office of transportation and air quality, will testify Thursday along with Philip Brooks, director of an EPA office charged with enforcing air standards.

"These vehicles are emitting more nitrogen oxides, or 'NOx,' than regulations allow," according to the testimony. "Exposure to these pollutants has been linked with a range of serious health effects, including increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital."

In prepared testimony, they said the EPA is working closely with the U.S. Department of Justice to figure out "potential penalties and other remedies" to impose on Volkswagen. They said the EPA will determine not only the scope of VW's violations of the Clean Air Act, but also what "economic benefit" the company gained by cheating.

The two officials did not disclose details about the status of their investigation.

Volkswagen has set aside $7.3 billion to cover the cost of the scandal, but most analysts expect that number to multiply rapidly.

The scandal has already brought about change in how the agency goes about conducting vehicle emissions tests. On September 25, the EPA notified all auto manufacturers that it was stepping up its testing activities.

The Guardian:

http://www.theguardian.com/business/2015/oct/08/american-vw-dealers-running-out-of-cars-to-sell-as-emissions-scandal-deepens

VW dealers in U.S. running out of cars to sell as emissions scandal deepens

The company has withdrawn its application for emissions certification for its 2016 diesel models, leaving thousands of vehicles stranded at ports

Volkswagen dealers across the United States face not having any new diesel-powered cars to sell as the scandal engulfing Europe's largest car maker deepens.

VW on Wednesday withdrew applications to the Environmental Protection Agency for emissions certifications for the 2016 versions of its diesel-driven Jettas, Golfs, Passats and Beetles.

The move raises the possibility that an emissions-rigging device similar to earlier models is also included in its new cars.

VW has admitted that four-cylinder diesel cars from the 2009 to 2015 model years had software

that helped the cars cheat on emissions tests. The admission came after the company was confronted by the EPA and California regulators, touching off a worldwide scandal that involves 11 million vehicles.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell.

The application withdrawal was revealed on Wednesday in written testimony submitted by Volkswagen's US chief, Michael Horn, to a congressional subcommittee. It says VW was pulling its application because the cars have software that should have been disclosed to the EPA, which must certify them for sale in the country.

Horn's testimony said the company was working with regulators to obtain certification.

However, it was unclear on Wednesday exactly what the device does. EPA spokeswoman Liz Purchia said VW recently gave the agency information on an "auxiliary emissions control device". The EPA and California's Air Resources Board were investigating "the nature and purpose" of the device, she said.

A Volkswagen spokesman in the US said he did not know what the device did, but the company said that such devices gauge engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

Horn is scheduled to appear before the House panel on Thursday, and witnesses are typically required to provide a copy of their prepared remarks a day in advance.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon in the wake of last month's admission that the company had installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 "clean diesel" cars.

For some VW dealers, the diesel models accounted for about a third of sales. Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership had already lost three deals with potential buyers because he could not get the new cars.

"It's not good," said Backer, who said he typically sells only a small number of diesels. "It's definitely a stain on the brand's image."

Thursday's appearance will be the first on Capitol Hill by Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year. He is expected to face blistering questions about when top executives at the company first learned of the scheme.

Horn will tell Congress he only learned about the cheating software "over the past several weeks", VW spokeswoman Jeannine Ginivan told Associated Press.

He will also echo apologies from VW's global executives as the company continues to come under pressure to identify those responsible, to say how vehicles with illegal software will be fixed and whether it also cheated in Europe.

New chairman Hans Dieter Poetsch said in Germany on Wednesday that it would take time to get to the bottom of the scandal.

"Nobody is served by speculation or vague, preliminary progress reports," Poetsch told a news conference. "Therefore it will take some time until we have factual and reliable results and can provide you with comprehensive information," he added, declining to take any questions.

Also scheduled to testify in the US on Thursday are two officials at the EPA who oversee emissions testing and compliance with clean air rules.

VW first confessed the deception to U.S. regulators on 3 September, more than a year after researchers at West Virginia University first published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

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Fortune:

http://fortune.com/2015/10/08/volkswagen-scandal-fallout/

Fallout from the Volkswagen scandal is hitting consumers and the courts

by Doron Levin @DoronPLevin OCTOBER 8, 2015, 9:01 AM EDT

German automaker facing lawsuits; diesel owners suffering lost value.

The fallout from Volkswagen's stunning admission that it cheated on diesel emission testing, affecting up to 11 million vehicles worldwide, has hit the market for new and used vehicles—and the courts.

Rival automakers, with their sights set on benefitting from VW's troubles, have begun to offer special financial incentives to shoppers willing to switch brands. In the U.S., meanwhile, the value of diesel-powered models made by VW and its Audi luxury brand has taken a hit.

Ford Motor F 2.17% and Fiat Chrysler FCA 0.00% , through their dealers in Europe, are offering incentives of up to $2,000 to new-car buyers who are willing to trade in their VW or Audi diesel. Ford's incentives are available across Europe, FCA's in Italy only.

VW is Europe's leading brand, in terms of sales. Since the Sept. 18 announcement by the U.S. Environmental Protection Agency of VW's deliberately-doctored tests, the value of used VW and Audi diesels in the U.S. has fallen an average of 13%, according to Kelley Blue Book.

"Early indications from auctions are that dealers are more hesitant to buy the VW diesel units," said Tim Fleming, a Kelley Blue Book analyst. The average value of the vehicles fell to $11,160 from $12,830, according to the survey. The average value of gas powered VW and Audi models fell less than 2% during the same period.

Eric Ibara, another Kelley Blue Book analyst, said it's possible that values could rebound, depending on how the automaker handles the crisis and "what the fix will be for the U.S. market."

The first German consumer to file a lawsuit against VW has been identified; and many are sure to follow on the continent and in the U.S. West Virginia's attorney-general also has filed suit against VW on behalf of consumers in that state who were allegedly deceived.

The specifics of a U.S. recall have yet to be announced, pending directives from the EPA. In Germany, new chief executive Matthias Mueller said he hopes the European recall of affected vehicles can begin in the new year and be completed by 2016, once VW's plan is approved by the German government. Some vehicles can be fixed with a software adjustment, others will need fuel injection equipment and catalytic converters.

Mueller told a German newspaper that VW faces "not three, but thousands" of potential solutions for fixing cars because of the mix of engine calibrations and regulatory differences across different markets.

The uncertainty surrounding the recall and its timetable virtually assure that VW's emergence from turmoil will be lengthy. However long it takes, recovery also will be expensive: Warburg Research estimates that lost revenue and expenses, including damaged image, could cost VW $39 billion – roughly equal to two-thirds of its current market capitalization.

Testimony of Michael Horn, President and CEO of Volkswagen Group of America, Inc.
Before the House Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
October 8, 2015

Chairman Upton, Chairman Murphy, Ranking Member Pallone, Ranking Member DeGette, other Members of the Committee, thank you for inviting me to testify before the Committee today.

My name is Michael Horn, and I am the President and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG, headquartered in Wolfsburg, Germany. I have volunteered to come before this Committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter, indeed the investigation is just beginning. Therefore, my testimony and my answers to your questions will, by necessity, have to be considered preliminary and based on my best current recollection and information.

On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime.

In the spring of 2014 when the West Virginia University study was published, I was told that there was a possible emissions non-compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards and that the agencies can conduct engineering tests which could include "defeat device" testing or analysis. I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicles into compliance and that they were engaged with the agencies about the process.

On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA") that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a "defeat device" in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device ("AECD") in connection with the certification process. As a result, we have withdrawn the application for

VW FOIA, EPA 06/20/2017 2017-FFP_029997

certification of our model year 2016 vehicles. We are working with the agencies to continue the certification process.

These events are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.

Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way. I am here to offer the commitment of Volkswagen AG to work with this Committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter.

We are determined to make things right. This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a world-wide scale into how these matters happened. Responsible parties will be identified and held accountable. Thorough investigations have already begun, but any information developed at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it is important for the public to know that, as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected groups of vehicles. These solutions will be tested and validated, and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2.0L diesel engine. Each will require a different remedy, but these remedies can only be our first step for our customers.

Fourth, we will examine our compliance, processes, and standards at Volkswagen and adopt measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees, and the public as we move forward. As first steps, we have set up a designated service line and website to be a channel for this communication, and I have sent a letter to every affected customer.

VW FOIA, EPA 06/20/2017 2017-FFP_029998

I can offer today this outline of a path forward toward the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by words but by our actions over the coming weeks and months.

*

These events are fundamentally contrary to Volkswagen's core principles of providing value to our customers, innovation, and responsibility to our communities and the environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It is inconsistent that the company involved in this emissions issue is also a company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world.

Volkswagen Group has a deep commitment to preserving our environment. As one of the world's largest automobile manufacturers, our commitment to the environment extends throughout every aspect of our business in the more than 150 countries in which we operate. For example, here in the United States, Volkswagen's manufacturing facility in Chattanooga, Tennessee serves as a model for Volkswagen plants around the world for increasing energy efficiency and reducing emissions, water, and materials usage and waste. In recognition of the plant's efficiency, Volkswagen Chattanooga received a platinum certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") program. The facility is the first and only automotive manufacturing plant in the world to receive the Platinum Certification. As environmental protection and sustainability are central to Volkswagen's core values, these events have been particularly troubling. Our conduct in the events that bring us here today belittle the efforts of Volkswagen to lead in environmental responsibility.

Over the 60 years Volkswagen has been in the United States, it has become part of the American culture. There are more than 6,000 Americans employed directly by Volkswagen Group of America in its 60 facilities across the United States: from a customer relations center in Auburn Hills, Michigan and a testing lab in Golden, Colorado, to a parts distribution center in Haslet, Texas, and our state-of-the-art manufacturing facility in Chattanooga, Tennessee. That factory, alone, employs more than 2,200 people and is expanding. We are part of communities all across the country. Thousands more hardworking men and women are employed at our parts suppliers and the network of about 1,000 dealerships across the United States.

In closing, I again apologize on behalf of everyone at Volkswagen. We will fully cooperate with all responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions.

* * *

VW FOIA, EPA 06/20/2017 2017-FFP_029999

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Simon, Karl
Sent: Thur 10/8/2015 2:51:16 PM
Subject: Fwd: Meeting availability

Think this works for me. Let me know if you or your staff want to join us. I will have them come to my office. Thanks

Driving Innovation in Clean Transportation

Begin forwarded message:

From: <Peter.BROERTJES@ec.europa.eu>
Date: October 8, 2015 at 10:44:50 AM EDT
To: <Simon.Karl@epa.gov>
Subject: RE: Meeting availability

Dear Simon,

In addition to my message below, I suggest we meet at 9.30?

We can either meet in our hotel lobby (Concordia 1250 New Hampshire Av), the EU delegation (2175 K St) or your office (1200 Pennsylvania Av, right?) or another place whichever you prefer.

Thanks for getting back to me on this.

Best regards,

Peter

From: BROERTJES Peter (GROW)
Sent: Tuesday, October 06, 2015 10:54 AM
To: 'Simon, Karl'
Cc: BONVISSUTO Barbara (GROW); PERREAU DE PINNINCK Fernando (TRADE); SCHITTEK Carsten (TRADE); ZITKO Sibylle (EEAS-WASHINGTON)
Subject: RE: Meeting availability

Dear Karl,

Thanks for your message and agreeing to meet us. The morning of 10/15 is good for us.

If possible, we would like to discuss some details on the VW case (not surprisingly). On our side of the pond it appears that VW is manipulating with the triggering of the EGR valve. Please note this information is not yet in the public domain. This supposedly only concerns previous generation 'euro 5' cars (no longer in production, new stock still being held at dealers). We're also looking into new generation euro 6 VW diesel cars with the German authorities (also other makes and types btw). Our specific interest is what type of defeating is done on US VW diesel cars (we're reading in the press that this concerns triggering of after treatment systems in general) and what type of other information you can share with us (what is detected by you and how was this 'smoking gun' extracted).

Thanks a lot! Please contact us any time if you want to further discuss prior to our meeting.

Best regards,

Peter

From: Simon, Karl [mailto:Simon.Karl@epa.gov]
Sent: Monday, October 05, 2015 10:37 PM
To: BROERTJES Peter (GROW)
Subject: RE: Meeting availability

Thanks for the note Peter. It looks like the morning of the 15th works best for us so let me know how that is shaping up.

Karl

From: Peter.BROERTJES@ec.europa.eu [mailto:Peter.BROERTJES@ec.europa.eu]
Sent: Thursday, October 01, 2015 4:32 AM
To: Simon, Karl
Subject: Meeting availability

Dear Karl,

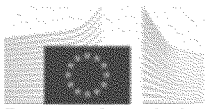
I hope all is well with you. I'm contacting you on behalf of Barbara to arrange a meeting with you when we're in DC for the next TTIP round.

What is your availability on 10/14 AM PM, 10/15 AM or 10/16 AM?

Thanks and best regards,

Peter

Peter Broertjes
Automotive Industry – Safety



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Automotive and Mobility Industries Unit | GROW.C.4

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To: Sutton, Tia[sutton.tia@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Haman, Patricia[Haman.Patricia@epa.gov]
From: Birgfeld, Erin
Sent: Thur 10/8/2015 3:04:24 PM
Subject: FW: VW Hearing Clips/Tweets 10/8/2015

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's

CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the

Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

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To: Allnutt, David[Allnutt.David@epa.gov]; Anderson, Lea[anderson.lea@epa.gov]; Anderson, Steve[Anderson.Steve@epa.gov]; Aranda, Amber[aranda.amber@epa.gov]; Averback, Jonathan[Averback.Jonathan@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]; Bianco, Karen[Bianco.Karen@epa.gov]; Bogoshian, Matthew[Bogoshian.Matt@epa.gov]; Branning, Amy[Branning.Amy@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Chapman, Apple[Chapman.Apple@epa.gov]; Choi, Jake[Choi.Jake@epa.gov]; Cozad, David[Cozad.David@epa.gov]; Crum, Lynda[Crum.Lynda@epa.gov]; Crystal, Roy[crystal.roy@epa.gov]; Davis, Julian[davis.julian@epa.gov]; Dickinson, David[Dickinson.David@epa.gov]; Dierker, Carl[Dierker.Carl@epa.gov]; Dolph, Becky[Dolph.Becky@epa.gov]; Doster, Brian[Doster.Brian@epa.gov]; Dubey, Susmita[dubey.susmita@epa.gov]; Dubois, Roland[Dubois.Roland@epa.gov]; Frey, Bert[frey.bertram@epa.gov]; Froikin, Sara[Froikin.Sara@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Graham, Cheryl[Graham.Cheryl@epa.gov]; Harrison, Ben[Harrison.Ben@epa.gov]; Hoffman, Howard[hoffman.howard@epa.gov]; Hogan, Stephanie[Hogan.Stephanie@epa.gov]; Holmes, Carol[Holmes.Carol@epa.gov]; Igoe, Sheila[Igoe.Sheila@epa.gov]; Jordan, Scott[Jordan.Scott@epa.gov]; Kaplan, Robert[kaplan.robert@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]; Klepp, Robert[Klepp.Robert@epa.gov]; Knapp, Kristien[Knapp.Kristien@epa.gov]; Lee, Michael[lee.michaelg@epa.gov]; Lovett, Lauren[Lovett.Lauren@epa.gov]; Mackey, Cyndy[Mackey.Cyndy@epa.gov]; Manners, Mary[manners.mary@epa.gov]; Marks, Matthew[Marks.Matthew@epa.gov]; Matthews, Julie[Matthews.Juliane@epa.gov]; McConkey, Diane[Mcconkey.Diane@epa.gov]; Mclean, Kevin[Mclean.Kevin@epa.gov]; Moore, Bruce[Moore.Bruce@epa.gov]; Morgan, Jeanette[Morgan.Jeanette@epa.gov]; Moyer, Robert[Moyer.Robert@epa.gov]; Muller, Sheldon[Muller.Sheldon@epa.gov]; Niebling, William[Niebling.William@epa.gov]; Nguyen, Quoc[Nguyen.Quoc@epa.gov]; Adair, Jocelyn[Adair.Jocelyn@epa.gov]; Odendahl, Steve[Odendahl.Steve@epa.gov]; Okoye, Winifred[Okoye.Winifred@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Pastorkovich, Anne-Marie[Pastorkovich.Anne-Marie@epa.gov]; Roberts, Martha[Roberts.Martha@epa.gov]; Rodman, Sonja[Rodman.Sonja@epa.gov]; Rowland, John[Rowland.John@epa.gov]; Schaaf, Eric[Schaaf.Eric@epa.gov]; Schmidt, Lorie[Schmidt.Lorie@epa.gov]; Senn, John[Senn.John@epa.gov]; Shenkman, Ethan[Shenkman.Ethan@epa.gov]; Silverman, Steven[silverman.steven@epa.gov]; Smith, Kristi[Smith.Kristi@epa.gov]; Snyder, Doug[Snyder.Doug@epa.gov]; Srinivasan, Gautam[Srinivasan.Gautam@epa.gov]; Stahle, Susan[Stahle.Susan@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Stern, Allyn[Stern.Allyn@epa.gov]; Tate, Ragan[Tate.Ragan@epa.gov]; Thrift, Mike[thrift.mike@epa.gov]; Tierney, Jan[tierney.jan@epa.gov]; Ting, Kaytrue[Ting.Kaytrue@epa.gov]; Tsirigotis, Peter[Tsirigotis.Peter@epa.gov]; Versace, Paul[Versace.Paul@epa.gov]; Vetter, Rick[Vetter.Rick@epa.gov]; Walker, Mike[Walker.Mike@epa.gov]; Ward, W. Robert[Ward.Robert@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Wilcox, Geoffrey[wilcox.geoffrey@epa.gov]; Williams, Brent[Williams.Brent@epa.gov]; Williams, Melina[Williams.Melina@epa.gov]; Williamson, Timothy[Williamson.Tim@epa.gov]; Zenick, Elliott[Zenick.Elliott@epa.gov]; Wills, Jennifer[Wills.Jennifer@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Blake, Wendy[Blake.Wendy@epa.gov]; Schramm, Daniel[Schramm.Daniel@epa.gov]; Vergeront, Julie[Vergeront.Julie@epa.gov]; Tozzi, Lauren[Tozzi.Lauren@epa.gov]; Coursen, David[Coursen.David@epa.gov]; Pilchen, Zach[Pilchen.Zach@epa.gov]; Skinner-Thompson, Jonathan[Skinner-Thompson.Jonathan@epa.gov]; Vijayan, Abi[Vijayan.Abi@epa.gov]; Roder, Aileen[Roder.Aileen@epa.gov]; Walker, Denise[Walker.Denise@epa.gov]; Caballero, Kathryn[Caballero.Kathryn@epa.gov]; Thompson, Christopher[Thompson.Christopher@epa.gov]; Williams, Christopher[Williams.Christopher@epa.gov]; Matthew, Dayna[Matthew.Dayna@epa.gov]; Reid, Lauren[Reid.Lauren@epa.gov]; Sweet, Andrew[Sweet.Andrew@epa.gov]; Hammons, Jeffrey[Hammons.Jeffrey@epa.gov]; Morris, Rachel[Morris.Rachel@epa.gov]; Nguyen, DucH[Nguyen.DucH@epa.gov]; Jordan, Deborah[Jordan.Deborah@epa.gov]; Charlton, Tom[Charlton.Tom@epa.gov]; Kulschinsky, Edward[Kulschinsky.Edward@epa.gov]; Portmess, Jessica[Portmess.Jessica@epa.gov]; kaminer, joan[Kaminer.Joan@epa.gov]; Kryman, Matthew[Kryman.Matthew@epa.gov]; Greenglass, Nora[Greenglass.Nora@epa.gov]; Spina, Providence[Spina.Providence@epa.gov]
From: Turley, Jennifer

Sent: Thur 10/8/2015 3:20:26 PM
Subject: Air & Radiation Law News for October 8, 2015

Air & Radiation Law News for October 8, 2015

Bloomberg BNA Daily Environment Report™

Air Pollution

Conservation Groups Want Stronger Haze Rules

A coalition of 83 conservation and public interest groups wants the Environmental Protection Agency to strengthen federal regional haze regulations to improve visibility in national parks. The organizations, in an Oct. 7 letter to EPA Administrator...

Air Pollution

EU Parliament Approves Combustion Plant Emissions Limits

European Parliament lawmakers Oct. 7 rubber-stamped a European Union directive that will cap emissions of sulfur dioxide, nitrogen oxides and particulate matter (PM) from about 143,000 medium-size

combustion plants across the EU's...

Air Pollution

France Moves to End Diesel's Tax Break Amid Emissions Scandal

France plans to halt tax breaks for diesel, ending the special status long the fuel has enjoyed in the wake of Volkswagen AG's emissions scandal....

Air Pollution

Senate Finance Questions VW About Tax Credits

The Senate Finance Committee is investigating whether Volkswagen AG made false representations to the Internal Revenue Service when the company certified that its diesel-engine vehicles, which the company has admitted used software to...

Climate Change

Global Emissions Must Peak by 2030, New IPCC Chief Says

The newly elected head of the United Nations body that studies climate science warned Oct. 7 that global greenhouse gas emissions must peak no later than 2030. ...

Climate Change

OECD Cites 'Reasonably Positive' Progress on Climate Finance

Developed countries in 2014 tallied a "reasonably positive" $62 billion of the annual $100 billion they have committed to raising for climate finance for developing countries by 2020, an official from the Organization for Economic...

Climate Regulation

Carbon Trading Not a Clean Power Plan Requirement

The Environmental Protection Agency won't require states to pursue carbon trading programs under the Clean Power Plan even though that forms the basis for the agency's model implementation rule, its top air official said....

Climate Regulation

Law Signed Putting California on Path for Renewables

Half of the electricity sold in California must come from solar, wind and other renewable sources by 2030 under legislation California Gov. Jerry Brown (D) signed into law Oct. 7. ...

Climate Regulation

Massachusetts Court to Hear Appeal of Climate Suit

The Massachusetts Supreme Judicial Court has agreed to hear a lawsuit brought by the Conservation Law Foundation and others seeking to compel the state to issue regulations under the Massachusetts Global Warming Solutions Act (Kain v. Mass....

Climate Regulation

States Seek Records on Clean Power Plan Publication

A coalition of 14 states is fed up with the delay in formally publishing the Environmental Protection Agency's Clean Power Plan and has filed a Freedom of Information Act request to get records concerning the lag in publishing the rule....

Energy Efficiency

Illinois Consumers Offered Smart Thermostat Rebates

Hundreds of thousands of homeowners across Northern Illinois will gain access to the significant energy conservation potential locked in smart thermostats under a rebate program that will be announced Oct. 8 by Environmental Protection...

Energy

Inhofe to Draft Legislation Revising NRC's Budget

Sen. James Inhofe (R-Okla.) said during a Senate oversight hearing that he plans to draft legislation to reform the budget and fee structure for the Nuclear Regulatory Commission....

Energy

Oil-Producing Solar Farm Nears Construction Start in Oman

GlassPoint Solar Inc. will begin work on one of the world's largest solar parks this month, with the first production planned for late 2017....

Energy

Veto Threatened for Bill on Tribal Energy

The White House has threatened to veto a bill that would give Indian tribes more authority over development of energy and other natural resources on their lands....

EPA

EPA Adding to Its Ranks More Slowly Than Expected

The Environmental Protection Agency expects to have 14,840 full time staff by Nov. 1 but is adding new employees at a slower pace than previously expected. ...

International Climate

New Environment Minister Appointed in Japan Cabinet Change

Japan's Prime Minister Shinzo Abe appointed a former television broadcaster to the position of environment minister Oct. 7 in a broader Cabinet reorganization as the premier seeks to revive the world's third-largest economy....

Mining

Chaffetz Expresses Concern Over Uranium Mining Rule

Rep. Jason Chaffetz (R-Utah) expressed concerns about a proposed Environmental Protection Agency rule to protect groundwater at uranium in-situ recovery facilities, saying the agency may be overstepping its authority....

Regulatory Policy

Committee Approves Four Regulatory Bills

Four bills that would make significant changes to the rulemaking process were approved and one measure was withdrawn at a markup by the Senate Homeland Security and Governmental Affairs Committee....

Sustainability

Green Bond Growth Stalls

The breakneck growth in green bonds is stalling this year, weighed down by concerns over the economy and questions about how much they actually help the environment....

Inside EPA's **Weekly Report,** 10/09/2015

http://insideepa.com/newsletters/inside-epa

Latest News

Industries Warn Stricter Ozone NAAQS Creates Clean Air Act Permit 'Limbo'

Industry groups are warning of a Clean Air Act permitting "limbo" created by EPA's failure to issue guidance on implementing its stricter ozone national ambient air quality standard (NAAQS) at the same time as finalizing the standard, saying major projects are unable to proceed as their ozone permit mandates are unclear.

Advocates Weigh Legal Challenge After EPA Denies Mercury Data Petition

Environmentalists are weighing a possible legal challenge among their options for responding to EPA's rejection of a petition from states and environmentalists that urged the agency to collect information on products containing mercury, such as electric switches, as fewer states are gathering the data.

News Briefs

Environmentalists Urge EPA To Tighten Haze Air Rule

A coalition of 83 environmental groups is urging EPA to revise and tighten its regional haze rule that aims to restore visibility to natural conditions in national parks and wilderness areas by 2064, warning that without changes to the existing haze reduction requirements some parks will miss that goal by decades or even centuries.

Lawmakers Question EPA On Proposed Uranium Rule

Republican leaders on the House oversight committee are questioning EPA's proposed groundwater protection rule for in-situ uranium mining, citing concerns raised by the Nuclear Regulatory Commission (NRC) this past summer that the agency may be overstepping its authority with the rule.

Greenwire

AIR POLLUTION:

Utility group bows to the inevitable, gets wish on ozone rule

Amanda Reilly, E&E reporter

Published: Wednesday, October 7, 2015

In late September, the trade group representing investor-owned utilities attended two meetings with top White House and U.S. EPA officials. Its request: Set a new ozone standard at 70 parts per billion.

Six days later, the Obama administration unveiled its final new national ambient air quality standard at that level. With most stakeholders panning the decision, the Edison Electric Institute is among the few offering any sort of support for the agency's choice of 70 ppb.

"EEI advocated throughout the rulemaking process that, should a new ozone standard be set, it should be at the top end of the proposed range at 70 parts-per-billion (ppb)," EEI President Tom Kuhn said in a statement. "While compliance challenges remain with the new standard at 70 ppb, EPA has recognized the serious implementation concerns raised by stakeholders of setting the standard below 70 ppb."

EPA last November had proposed to tighten the existing ozone standard of 75 ppb set in 2008 during the George W. Bush administration to between 65 and 70 ppb based on a review of public health science. The agency found that the 75 ppb limit was no longer adequate to protect the public as the Clean Air Act required.

What followed was an intense lobbying campaign involving dozens of stakeholders. Green groups called on EPA to set a new standard no higher than 60 ppb, while powerful industry and business groups urged EPA to retain the existing standard.

The Edison Electric Institute -- which represents all U.S. investor-owned electric utilities -- did not make anyone available for an interview. But in a review of publicly available documents and statements, the trade group appears to have accepted that a lower ozone standard was inevitable and so pushed for EPA to choose the upper end of its proposed range.

The institute, for example, told EPA in a March public comment that it did not believe EPA should lower the ozone standard. But EEI noted that, if EPA felt it necessary to revise the 2008 limit, the agency should choose 70 ppb.

"Any standard lower than 70 ppb would require significantly greater justification than EPA has provided in its proposal," the institute said.

EEI asked for more "relief mechanisms" to address background levels of ozone, as well as more guidance on how to handle permitting under the tighter standard.

Berkshire Hathaway Energy Co., an EEI member and the largest owner of rate-regulated renewable generation, made similar arguments in a comment to EPA.

In contrast, the Utility Air Regulatory Group, a voluntary group of electric generating companies, argued that the scientific evidence didn't at all justify a new standard and that EPA should retain the 75 ppb limit. Several other power companies individually raised concerns about a tighter standard.

On Sept. 25, three representatives from EEI and two from San Juan Generating Station operator PNM Resources Inc. -- another EEI member -- met with the White House and EPA in back-to-back meetings, according to attendance records. Dan Utech, President Obama's top climate adviser, attended the White House meeting, while EPA acting air chief Janet McCabe attended the one with the agency.

EEI and PNM representatives provided a handout at the EPA meeting titled "Reasons the agency should finalize an achievable level of 70 ppb," according to a document posted yesterday in the public docket.

"The lower the agency sets a new standard, the more it will increase permitting costs and delays while also requiring further regulation of the interstate ozone precursors from all sources," the handout says.

"A final ozone standard of no lower than 70 ppb -- the top end of its proposed range -- would both provide real environmental benefit," the memo continued, "and give states a reasonable path forward to implement the final standard."

The group said a standard lower than 70 ppb would complicate efforts for states to comply with the final Clean Power Plan, EPA's plan for reducing carbon dioxide emissions from existing power plants. A lower standard would also make it difficult for high-elevation areas that experience high background ozone levels to comply, EEI said.

EEI said EPA should take a cue from its experience putting in place the 2010 sulfur dioxide standard, suggesting that the agency has had difficulty finalizing its list of areas that are out of compliance because its limit was too low.

EEI also argued that EPA had "ample support" for setting a 70 ppb standard because it was in the range that the agency's science advisers recommended in June 2014.

Kuhn noted in his statement that the electric power sector has already made "great progress" reducing nitrogen oxides -- a key component of ozone -- as well as sulfur dioxide over the last two decades.

"EEI will continue to work with our members, the states, and affected customers to determine how compliance with the new ozone standard will impact the implementation of other major EPA regulations," Kuhn said.

NUCLEAR WASTE:

Closed Calif. plant's spent fuel to be stored near ocean

Anne C. Mulkern, E&E reporter

Published: Wednesday, October 7, 2015

Nuclear waste from the shuttered San Onofre Nuclear Generating Station in California will be moved to long-term storage beside the Pacific Ocean, the state's Coastal Commission voted unanimously yesterday.

Commissioners said they lacked any viable alternative to granting plant owner Southern California Edison Co. (SCE) a permit to build a new storage facility. The Department of Energy has not approved a location to take spent fuel, they noted, and there are no short-term prospects for one.

An existing storage site at San Onofre lacks the space to take on remaining spent fuel from two generators that were stopped in January 2012, after a leak was found. SCE argued that moving the waste to dry storage was safer than leaving it in the decommissioned plant, and some commissioners said they agreed.

"The worst scenario is to leave this material in the spent fuel pool. I think that's the worst of all of the alternatives that are out there," Commissioner Greg Cox said. "I wish there were other options that we had available now, but frankly, I don't see them."

The decision outraged local residents at the meeting, some of whom began shouting as the vote for passage appeared imminent. Activists decried it as dangerous to "entomb" what they called 3.6 million pounds of radioactive waste at the site. Giving SCE approval to move it to dry storage likely means it will never be moved from there, said Ray Lutz, national coordinator for Citizens' Oversight.

"The public does not expect for a nuclear waste dump to exist at this site," Lutz told the commission. He had urged the agency to delay and get more information, saying, "We're going to put radioactive waste on the coast with only a few months of reviews and it's going to be there for a million years? Please."

About 8.4 million people live in the area around San Onofre, he noted.

"So if terrorists wanted to attack the San Onofre site, they would detonate a conventional weapon and you would have a dirty bomb," Lutz said. "We would have to evacuate all of Southern California."

The new spent fuel storage facility will sit about 100 feet inland of a sea wall at the San Onofre site, located along about a mile of coastline in north San Diego County. A cement container holding casks will fill about 32,000 square feet. The total project including a security perimeter will comprise 100,000 square feet. It will be encased in a berm.

Selecting that location takes into account post-9/11 thinking that seeks to get nuclear waste below grade, to make it less susceptible to terrorism, said Tom Palmisano, vice president of decommissioning and chief nuclear officer at San Onofre.

Residents raised questions about whether the location near the beach could withstand earthquakes, tsunamis and sea-level rise in the years ahead.

Commission staff at the start of the session on San Onofre warned that the agency had limited authority. The Nuclear Regulatory Commission oversees the safety of equipment used to store radioactive waste, said Alison Dettmer, deputy director of the Coastal Commission's energy and ocean resources division. The state panel can only act to protect the coastline environment and access to the beaches.

"The bottom line is our hands are tied here, we know that," said Commissioner Roberto Uranga.

The commission also planned to send a letter to DOE urging it to act promptly in finding a place to put nuclear waste. San Diego's Board of Supervisors already has sent a similar letter, Cox said.

Too heavy to move?

The commission's decision comes about two years after SCE opted to close San Onofre. The generators had not been running since January of 2012, when the leak was found in Unit 3. Unit 2 was down for maintenance at the time and wasn't restarted. An investigation found heavy tube wear and blamed that on a faulty computer program and poor steam quality that had triggered vibrations.

Under the permit approved yesterday, SCE would start construction of the independent spent fuel storage installation, or ISFSI, next year. Loading of the spent fuel would be completed by 2019.

The permit was limited to 20 years, and SCE will have to return before then and provide information about the condition of the casks and the plan to inspect them to ensure they could be moved if that became possible. SCE at the meeting agreed to come back in 2022 with some of that information.

The utility's plan said that if DOE moved the fuel by 2049, the site could be restored by 2051.

There are two possible options for relocating the waste in decades ahead, a commission staff report said. Both are proposals to develop private facilities. One would be at the site of an existing low-level waste storage site in Andrews County, Texas. Another company wants to open an underground interim storage facility in southeastern New Mexico, it said.

But the staff report added that "it remains uncertain whether it will be possible for SCE to remove the ISFSI as planned, in 2051." If the facility had to remain in place for decades or longer, it "would eventually be exposed to coastal flooding and erosion hazards beyond its design capacity, or else would require protection by replacing or expanding the existing [plant] shoreline armoring."

Either would have the potential to harm "marine and visual resources and coastal access," the report said. Staff said that was the reason for adding the condition limiting the permit to 20 years. If the ISFSI needed to stay on site at that point, one possible option would be to move it inside units 2 and 3, which would be decommissioned by then, it said.

Many people who had submitted written comments and who spoke at the meeting expressed concerns about the integrity of the storage option SCE chose. It picked Holtec International's UMAX system, which will have 50 canisters composed of five-eighths-inch-thick stainless steel. Those will be covered by concrete.

Donna Gilmore, who lives 5 miles from San Onofre, said that in Germany and Japan they use "thick cast" technology. She held up a large block and said that was what was in use in Fukushima, Japan, and that the plant's dry storage withstood the 2011 earthquake and tsunami.

The thick casks meet NRC requirements for a coastal area, Gilmore said. "They won't crack," she said. "You can inspect them. You can repair them."

The thinner canisters are a relatively newer model, though based on elements that are proven, SCE's Palmisano said. Mark Lombard, NRC's director of spent fuel storage and transportation, said NRC has confidence in the UMAX choice.

Activists also questioned whether the casks, once filled, would be able to be moved in the future. Lutz said they would be so heavy, at about 450,000 pounds, that they could not be put on a train.

Lombard said the casks would have to be moved on a special-purpose train. The Department of Energy is currently accepting bids on a project to designs cars to move nuclear waste, he said.

Robotic inspections

The agreement SCE made to return in 2022 came after several public speakers said there are no means right now of inspecting the UMAX casks for cracks or other problems. They noted that the language in the proposed permit for SCE only required the utility in 20 years to show that the casks were intact and could be moved. They'd also in two decades need to describe a maintenance and inspection program that would ensure that the casks remained transportable.

Commissioner Mary Shallenberger asked commission staff why, if the agency could seek that inspection data in 20 years, it couldn't ask for it now. Chris Pederson, commission counsel, reiterated that the commission lacked authority over radiological safety issues. The condition on future review was put in to address that there might be a geologically safer place for the casks, which the agency had authority over, he said.

Shallenberger then queried Lombard, who explained that robotic technology is the future of inspections. Currently robots can get to the casks but are not yet at the level NRC wants for identifying the depth of a crack. The technology is improving quickly, however, he said. SCE's Palmisano then said the utility expects to have the better robotic technology in place by 2022.

Commissioner Uranga said he thought the casks should be looked at within five to 10 years. He asked whether the utility would agree to provide inspection information by 2022, and Palmisano agreed. The commission could amend the permit if needed at that time, based on what it learned.

SCE owns 75 percent of San Onofre, while San Diego Gas & Electric Co. has 20 percent, and the cities of Anaheim and Riverside smaller portions.

CLEAN POWER PLAN:

McCabe defends against charges of stealth cap-and-trade rule

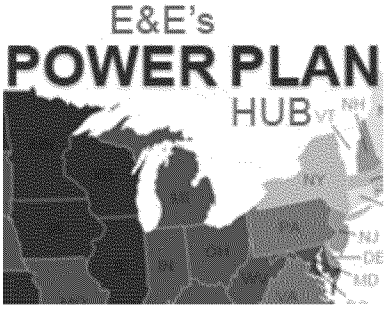
Jean Chemnick, E&E reporter

Published: Wednesday, October 7, 2015

A House Energy and Commerce subcommittee returned today to U.S. EPA's Clean Power Plan, a rule that became final two months ago and that the panel has already voted twice to kill.

This morning's Subcommittee on Energy and Power hearing with acting EPA air chief Janet McCabe was Energy and Commerce's sixth hearing on the rule since the start of 2014, but its first held since EPA finalized the rule -- together with others for new and modified units -- on Aug. 3.

"It certainly to me feels like déjà vu all over again," said Rep. Bobby Rush of Illinois, the senior Democrat on the subcommittee.



Many of the shots fired on either side were also familiar or, as Rush put it, made "for the exceedingly umpteenth time."

Subcommittee Chairman Ed Whitfield (R-Ky.), in extemporaneous remarks at the top of the hearing, said again that by promulgating the rule for existing power plants under the Clean Air Act, EPA was "running roughshod" over Congress and other state and federal decisionmakers.

"Many people view you as nothing but a political arm of the White House today," he told McCabe, referring to President Obama's high-profile 2013 speech at Georgetown University, which he has argued was a political address that set the stage for the Clean Power Plan. "You've actually become a legislative arm."

He also pointed to the Supreme Court's June decision that the agency should have considered the price tag of its 2011 Mercury and Air Toxics Standards before moving ahead with that rule (*Greenwire*, June 30).

EPA's response to the decision was that utilities had already complied with it, but Whitfield said that only demonstrates how important it is for Congress to head off other economically onerous rules before the damage is done.

"In this committee, we're going to continue to do everything we can do to stop you," Whitfield told McCabe. Whitfield has said he plans to float a Congressional Review Act resolution to kill the rule as soon as it is published in the *Federal Register*, which McCabe said would happen in the second half of this month. Whitfield has already sponsored two bills that have cleared the House that would scuttle the rule.

EPA is working "expeditiously" with the *Federal Register* to publish as soon as possible, she said. Publication is also expected to trigger lawsuits by states.

Other panel Republicans joined Whitfield in accusing EPA of seeking to circumvent Congress to set up the carbon dioxide cap-and-trade program the administration sought unsuccessfully during Obama's first term.

Rep. Morgan Griffith (R-Va.) read from the transcripts of hearings reaching back three and four years in which EPA pledged that it had no plans to use the Clean Air Act to implement cap and trade.

But Griffith pointed out that EPA's model federal implementation plan -- proposed at the same time the rules became final -- is designed to facilitate the trading of emissions allowances.

Griffith attributed his own election in 2010 to the fact his opponent, former Rep. Rick Boucher (D-Va.), actively negotiated for and supported the cap-and-trade bill that cleared the House in 2009.

By introducing a similar program, he said, "you're not only showing disrespect to the Congress, disrespect to what the Supreme Court told you in the mercury rule, you're also showing disrespect to the voters of

this country who turned out an awful lot of folks on the 'cap and trade is not a policy this United States should follow,'" he said.

Rep. Joe Barton (R-Texas) noted that he was one of the few members of the committee who were in Congress at the time the Clean Air Act was amended in 1990. He supported the amendments. Section 111 was not contemplated as a provision authorizing cap and trade, he said.

"Your agency is trying to do with it something it was never intended to do," he said. "We would have put it in, I guarantee."

"The Clean Power Plan does not set in place a cap-and-trade program," McCabe responded.

But in her prepared remarks for the hearing, McCabe mentioned the option of emissions trading five times, including as a feature of the proposed federal implementation plan. She notes that systems operators and utilities have asked for that option as a means of easing compliance. And McCabe and other top agency staff routinely refer to trading as one way to allow states to implement the rule while reducing costs and safeguarding grid reliability.

While the bulk of the hearing was devoted to the Clean Power Plan, Whitfield, who will retire at the close of this Congress, also pointed to EPA's basis for its new power plant carbon rule. He noted that the proposal referred to four potential carbon capture and storage (CCS) projects, all of which have since run into problems.

The agency's final rule, which limits coal plant emissions to 1,400 pounds of CO2 per megawatt-hour, would leave utilities with few options other than CCS if they planned to build a new facility. Whitfield noted that the most efficient coal plant currently in operation in the United States exceeds that standard by 400 pounds per MWh.

"There's not any practical way for anyone using reasonable cost figures to comply with this rule," he said.

TAX POLICY:

Lankford floats bill to phase out incentives for renewables

Daniel Bush, E&E reporter

Published: Wednesday, October 7, 2015

Sen. James Lankford introduced legislation today aimed at phasing out tax incentives for renewable energy.

Lankford's (R-Okla.) bill would phase out all incentives for clean energy by 2026, including the production tax credit, or PTC, for wind power.

Congress allowed the PTC to expire at the end of last year after approving a one-year retroactive extension that covered 2014. In July, the Senate Finance Committee included the provision in a broad tax extenders package that passed on a 23-3 vote (*E&ENews PM*, July 21).

Lankford said his bill would help end the annual debate over the PTC by ensuring that Congress can't revive the expired tax credit in the future.

"I am a fan of an all-of-the-above energy strategy, and I certainly support wind as a large part of that

goal," Lankford said in a statement. The wind industry is now "efficient and self-sustainable [and] there is no need for the taxpayer to continue to subsidize a wind start-up tax credit."

Wind power advocates say the PTC provides certainty for developers as the industry continues to grow. But Lankford argued that the industry has grown by 5,000 percent and added millions of megawatts of power since the PTC was created under the Energy Policy Act of 1992.

The two-year PTC extension in the Senate Finance Committee's extenders package would cost $10.5 billion over the next decade, Lankford said.

The proposed legislation comes as both chambers grapple with the tax extenders issue.

Last month, the House Ways and Means Committee passed a small package of extenders that did not include incentives for renewable energy and dozens of other measures.

A floor vote has not yet been set in the House and Senate. In recent years, Congress has waited until the end of the year to take up the issue.

NRC:

Inhofe warns agency it's lacking 'fiscal discipline'

Hannah Northey, E&E reporter

Published: Wednesday, October 7, 2015

Senate Environment and Public Works Chairman James Inhofe called today for major reforms at the Nuclear Regulatory Commission to address rising industry costs as the number of operating reactors declines.

The Oklahoma Republican said the agency's bureaucracy has beyond what's needed to accomplish its mission, adding that Sen. Lamar Alexander (R-Tenn.), chairman of a key Senate Appropriations panel, is also worried about the agency's spending and budget.

In remarks prepared for the hearing, Inhofe said he is considering legislation "to instill fiscal discipline in the agency and ensure that resources are properly focused on safety-significant matters and timely decision-making."

But after the hearing, the senator said he would decide whether or not to write a bill based on NRC's response to his concerns.

The senator in his prepared remarks pointed to "extreme level of corporate overhead costs" at NRC, an increase in reactor oversight spending even though the number of operating plants has dropped, over-budgeting for new reactors and persistent carryover funds.

Inhofe and other EPW Committee Republicans -- including Sens. Mike Rounds of South Dakota and Shelley Moore Capito of West Virginia -- also reiterated that the agency's budget has risen even though the number of operating reactors has fallen.

Republicans' concerns are tied to the fate of the nuclear industry, which pays fees that cover 90 percent of the agency's budget.

But NRC Chairman Stephen Burns said after the hearing that he hadn't seen any legislative proposals and the issue of the fees has been surfacing in recent hearings. He also said the current fee structure has been in place for years.

"This is the structure that's been around for 25, 30 years, so the question is, is that a structure they want to continue?" Burns said. "I don't know anything about particular [legislative] proposals."

NRC Commissioner Kristine Svinicki, a Republican, noted during the hearing that the agency will continue to collect industry fees as long as it's legally required and acknowledged that those fixed costs will be allocated across a smaller number of reactors if plants close. In the future, Svinicki said, that could become untenable for some plant operators and Congress may decide to review the fee structure.

Congressional Republicans have for months complained that the process by which NRC sets fees is opaque and difficult to understand for stakeholders (*E&ENews PM*, June 30).

The House Energy and Commerce Committee this summer asked the Government Accountability Office in a letter to identify NRC's process for setting fees and to compare the commission with other fee-collecting agencies. The panel asked GAO to assess how NRC calculates "productive" staff hours to support its work and how regulating current reactors is in balance with supporting work on advanced nuclear technology.

For fiscal 2014, NRC increased annual fees by almost 8 percent over the previous year, and the fee for operating a nuclear reactor increased by 19 percent, the letter said. In addition, the portion of overhead in NRC's budget jumped from 28 percent in 2004 to 47 percent in 2014, the members wrote.

The criticism arrives even as the commission is following through with "Project Aim 2020," a measure the agency approved this summer to reduce its staff to a target of 3,600 full-time employees by Sept. 30, 2016, and to develop a plan to merge its Office of Nuclear Reactor Regulation and the Office of New Reactors. The commission also called on agency leaders to improve transparency of how NRC fees are calculated and set timelines for announcing any fee changes (*E&ENews PM*, June 8).

Inhofe ended the hearing by acknowledging NRC is downsizing its staff but said that effort is not going far enough.

"I don't think anyone over on our side is satisfied with the [results] so far," Inhofe said.

CALIFORNIA:

Brown to sign landmark climate bill today

Published: Wednesday, October 7, 2015

California Gov. Jerry Brown (D) is expected to sign a broad climate change measure today to increase the state's renewable electricity use by 50 percent and double energy efficiency in existing buildings by 2030.

"We have the technological means, and now we have the legal mandate to reduce carbon pollution," Brown said.

The state Legislature passed the bill last month (*ClimateWire*, Sept. 14).

California is already on track to generate at least a third of its electricity from renewable sources by 2020

(AP/*Wall Street Journal*, Oct. 7). **-- SP**

EPA:

Region 2 chief talks climate, solar power

Published: Wednesday, October 7, 2015

The biggest misconception about climate change is that Americans can't do anything about it, U.S. EPA Region 2 Administrator Judith Enck said.

Enck, speaking ahead of a talk at the State University of New York College of Environmental Science and Forestry in Syracuse, N.Y., said the real question is "what do we do and how much damage will be done before we are able to change the course? Some people feel like it's too big of an issue, too overwhelming."

Upstate New York can help fight climate change by investing in more solar energy, Enck said. Over time, climate change may cause more erratic weather in the region.

"There is no reason why Syracuse University and SUNY-ESF can't get 100 percent of their electricity from renewable energy," Enck said (Taylor Watson, Syracuse *Daily Orange*, Oct. 7). **-- SP**

NUCLEAR WASTE:

Officials quietly hatch emergency plan for fire near landfill

Published: Wednesday, October 7, 2015

Government officials have been quietly planning for a potential "catastrophic event" if a slow-burning fire underneath a St. Louis-area landfill meets a nearby cache of Cold War nuclear waste.

The plan obtained this week by St. Louis radio station KMOX was developed last year to address the risk from a fire at the Bridgeton Landfill that's been burning since at least 2010. About 1,200 feet from the landfill is West Lake Landfill, a Superfund site that was contaminated with uranium processing waste in 1973. U.S. EPA has yet to develop a plan to clean up the waste there (*E&ENews PM*, May 7).

If the fire reaches the waste, "there is a potential for radioactive fallout to be released in the smoke plume and spread throughout the region," according to the plan.

County and landfill officials stressed that the landfill is safe, and the plan is just precautionary.

"County officials and emergency managers have an obligation to plan for various scenarios, even very remote ones," landfill spokesman Russ Knocke said in a statement. The landfill "is safe and intensively monitored" (Jim Salter, AP/ABC News, Oct. 6). **-- BTP**

EPA:

Employee's cookstove crusade earns top federal worker award

Kevin Bogardus, E&E reporter

Published: Wednesday, October 7, 2015

A U.S. EPA employee has won a distinguished civil service award for his work in combating pollution from indoor cookstoves.

Jacob Moss, a senior adviser at the agency, has won a Samuel J. Heyman Service to America Medal, or "Sammie," from the Partnership for Public Service. The award recognizes exceptional federal employees working across the government.

Moss won the medal for his role in conceiving and executing the Cookstove Initiatives. Having raised $800 million in public and private funds, the campaign has sought to improve 500 million lives by 2020 by bringing in cleaner, more efficient cookstoves to homes in the developing world.

Moss first learned of how toxic indoor cookstoves could be as a Peace Corps volunteer in Togo in the 1980s.

Jacob Moss with U.S. EPA won a Samuel J. Heyman Service to America Medal or "Sammie" for his role in developing cleaner, more efficient indoor cook stoves for the developing world. Photo by Aaron Clamage, courtesy of clamagephoto.com.

"These visits couldn't last more than a short while because the smoke from the stoves was so dense I would start coughing, my eyes would sting, and I would have to go outside to breathe," he told the partnership.

In 2002, the EPA employee launched a small international partnership to fight cookstove pollution but realized more needed to be done. Moss envisioned a bigger world platform for the project. That became the Global Alliance for Clean Cookstoves, which has partnered with the United Nations Foundation as its host organization.

Moss "had first the vision and then the follow-through" to raise an already successful program "to an extraordinary level by creating a large-scale partnership," said Janet McCabe, acting assistant administrator for EPA's Office of Air and Radiation.

In 2010, Moss coordinated efforts to bring in 30 new countries and private partners as well as rally U.S. ambassadors and federal agencies in support of the cause.

The alliance has sold more than 20 million new stoves and estimates that, by 2020, the cleaner stoves will help prevent 470,000 premature deaths, keep a billion metric tons of carbon dioxide out of the air every year and create 1.5 million jobs.

"He is the glue," Kris Balderston, former special representative for the Office of Global Partnerships at the State Department, said about Moss. "He is the guy who kept this going."

Moss won praise from the head of the agency for winning the high-profile award.

"Jacob truly embodies the spirit of commitment and service that this award honors," EPA Administrator Gina McCarthy said in a statement. "He has dedicated his professional life to eliminating the risks of toxic smoke from indoor cookstoves -- one of the deadliest threats facing billions of people across the developing world."

Other agency employees picked as Sammie finalists earlier this year include attorney Stephanie Hogan -- who helped the agency address interstate transport of air pollution -- and Robert Kavlock, a scientist who changed how chemical safety can be assessed, saving millions in taxpayer dollars (*Greenwire*, May 4).

PEOPLE:

Head of senior executives group steps down

Kevin Bogardus, E&E reporter

Published: Wednesday, October 7, 2015

Carol Bonosaro, president of the Senior Executives Association, is retiring.

Bonosaro has been the head of the organization that represents career executives in the federal government since 1986. She has often been on the forefront on promoting civil service and fighting for the rights of government workers.

PEOPLE

Bonosaro will leave the organization Nov. 4 and assume the position of president emeritus at the group.

"After 25 years in government, and 29 years as President of SEA, however, it is time that I 'smell the roses.' I have been extremely fortunate to do work about which I am passionate and to meet and interact with talented career executives with critical responsibilities, many of whose accomplishments have been extraordinary," Bonosaro said in a statement.

"It's been an incredible journey, but I am looking forward to my new role and helping to ensure that SEA will continue to be successful in representing the interests of the career Federal executive service."

SEA has picked a new president who will be introduced to the public "in the near future," according to the group.

"We are thankful to Carol for her stalwart support of SEA and all senior executives, and wish her well in

her future endeavors, which will include ongoing support to SEA ideals," said SEA board Chairwoman Barbara Pabotoy. "While we will be installing a new president to lead the association, we will never be able to replace Carol."

RAIL:

Crews clean up fuel from derailed Amtrak train in Vt.

Published: Wednesday, October 7, 2015

Vermont authorities have treated all passengers and crew members from an Amtrak derailment and are now focused on cleaning up the area, Gov. Peter Shumlin (D) said yesterday.

A contractor has removed 406 gallons of fuel from the locomotive's tank, with as much as 900 gallons unaccounted for. It's not yet clear how much fuel spilled during the derailment, said Ted Unkles of the Vermont Department of Environmental Conservation.

"The cleanup will be aggressive and thorough," Unkles said.

Amtrak President and Chief Executive Joseph Boardman said Amtrak would be "responsible for most, if not all, of the costs" of the derailment. But he did not give an estimate on those costs.

The train is thought to have left the rails when it rounded a bend near Northfield, Vt., on Monday morning and hit two large chunks of rock that had fallen from a hillside onto the tracks.

An assistant conductor suffered the worst injuries in the accident, Shumlin said.

Because the National Transportation Safety Board is investigating the incident, Amtrak officials have not been allowed access to the site, Boardman said (C.B. Hall, *Vermont Digger*, Oct. 6). **-- SP**

EMISSIONS:

World Coal Association chief discusses markets, climate talks

Published: Wednesday, October 7, 2015

What is the global coal industry seeking from governments at this December's U.N. climate meeting in Paris? During today's OnPoint, Benjamin Sporton, chief executive of the World Coal Association, explains why he believes developing nations will continue to rely on coal, even as they bring more clean energy online. He also discusses the challenging market dynamics facing the U.S. coal industry and talks about the viability of commercial-scale carbon capture and storage technology.

Click here to watch today's OnPoint.

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CLIMATEWIRE — Thu., October 8, 2015

READ FULL EDITION

1. NATIONS:

In Chile, solar power lights the way to a cleaner, more competitive economy

CALAMA, Chile -- About 765 miles north of Santiago in the Atacama Desert, the Gabriela Mistral recreational center emerges as an unexpected touch of modernity among the sandy-colored mountains. Down a path of crushed stone leading to the cafeteria, the site is peppered with circle-shaped patterns made up of bluish-green rocks -- a telltale sign of the presence of copper oxide.

2. FOOD SECURITY:

Expert says algae cultivation will be needed as rising heat shrinks farmland

Algae may be tiny, but new research suggests the single-celled organisms could play an outsized role in slowing the rate of global warming over the rest of the 21st century.

TODAY'S STORIES

3. FINANCE:

$100B annual fund to help poor nations deal with climate change is halfway there

4. OCEANS:

Warm waters causing 3rd global coral bleaching event on record -- NOAA

5. EXTREME WEATHER:

This year's climate change victim: pumpkins

6. ADAPTATION:

Why short-term fixes to flooding may increase future risks -- study

7. REGULATION:

14 attorneys general seek evidence of deliberate delay of EPA climate rule publication

8. NEGOTIATIONS:

Draft text eliminates idea of facility to aid climate migrants

9. MEDIA:

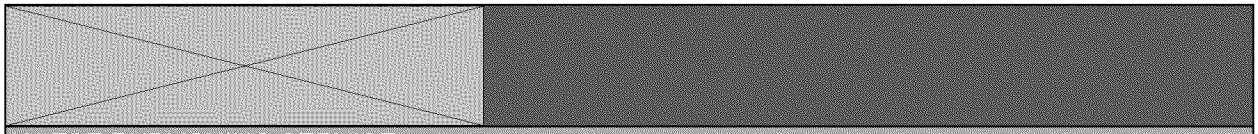
BBC apologizes for radio show presenting views of climate skeptics

10. RESEARCH:

Information about disasters doesn't deter risky living choices -- study

11. TECHNOLOGY:

Creator of 5-hour Energy drink looks to power India's grid with bikes



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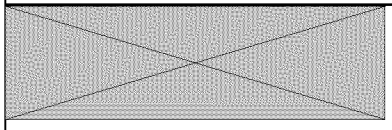
GREATER EXPECTATIONS SPECIAL REPORT



Starting this week, **Greater Expectations: The New Geopolitics of Climate Change** exposes the on-the-ground reality of developing countries challenged by a world that will require every nation to cut carbon emissions. **Go to** the special report.

ENERGYWIRE — Thu., October 8, 2015

READ FULL EDITION

1.CLEAN POWER PLAN:

N.C. may stay 'inside the fence line,' setting up EPA battle

RALEIGH, N.C. -- North Carolina may focus solely on improving the efficiency or "heat rate" at coal-fired power plants in its emissions-reduction scenario for U.S. EPA's Clean Power Plan. That means it likely won't meet the federal plan's goal of cutting carbon emissions by 32.1 percent, the director of Duke University's Nicholas Institute for Environmental Policy Solutions said yesterday.

TOP STORIES

2.REGULATION:
States seek answers on Clean Power Plan delay

3.MISSOURI:
State unveils sweeping energy plan

4.NORTH DAKOTA:
Oil hub sees continued pumping, gets $27M grant for airport

ELECTRICITY

5.POWER MARKETS:
Renewables soon could knock the wind out of natural gas

6.CONGRESS:
Homeland Security gives glimpse of restructuring for cyberthreats

7.ADVOCACY:
Greenpeace aims to buy and close German coal plants

8.POLICY:
Texas town aims for 70% renewable energy

OIL AND GAS

9.PENNSYLVANIA:
House shoots down governor's Marcellus Shale gas tax plan

10.PEOPLE:
New INGAA chairman eyes better federal coordination

11.BUSINESS:
Canadian Oil Sands rejects hostile takeover

12.SHALE:
USGS finds Calif.'s Monterey modest with oil

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List of measured variables VW Touareg V6TDI MY13/14

label	description
EnvP_p	ambient pressure
EnvT_t	ambient temperature
Exh_rNOxNSCDs	nitrogen oxides Sensor 1
Exh_rNOxNoCat2Ds	nitrogen oxides Sensor 2
Exh_stNOxNSCDs	status nitrogen oxides Sensor 1
Exh_stNOxNoCat2Ds	status nitrogen oxides Sensor 2
InjCtl_qCurr	current injection quantity
SCR_pUPmpP	scr pump pressure
SCRMod_dmEG	exhaust gas mass flow
SCRMod_etaEst	SCR efficiency
SCRMod_tAvrg	SCR catalyst temperature (>150°C release condition adblue dosing)
UDosVlv_rPs	duty cicle dosing valve
UDC_mRdcAgDosQnt	total amount metered adblue
SCR_rUTnkLvl	SCR tank level
ASMod_tPFltSurfSim	simulated surface temperature of diesel particulate filter
Exh_pAdapPPFltDiff	differential preasure over diesel particulate filter
Exh_tAdapTOxiCatDs	exhaust gas temperature after DOC
Exh_tAdapTOxiCatUs	exhaust gas temperature before DOC
Exh_tAdapTPFltDs	exhaust gas temperature after DPF
Exh_tAdapTTrbnUs	exhaust gas temperature before turbocharger
PFltLd_mSot	soot load in DPF
PFltLd_mSotSim	calculated soot load in DPF
PFltLd_mSotMeas	measured soot load in DPF by delta p sensor
PFltLd_resFlw	flow resistance of DPF
PFltRgn_stSuc	status of successfull regeneration
Air_tEGRClrDs	temperature EGR cooler downstream
AFS_mAirPerCyl	air mass per cylinder
Air_pCACDs	pressure after air intake cooler
Air_tCACDs	temperature after air intake cooler
APP_r	acceleration pedal
Brk_st	status brake padel
CEngDsT_t	temperature water engine downstream
CoEng_st	status engine
CoEng_tiNormal	engine runtime
EGRVlv_rAct	position EGR-Valve
Epm_nEng	engine speed
Fan_r	ratio fan cooler 1
Fan_r2	ratio fan cooler 2
FuelT_t	fuel temperature
InjCrv_phiMI1Des	angle main injection
InjCrv_qMI1Des	quantity main injection
Oil_tSwmp	oil temperature
PthSet_trqInrAct	engine torque
Rail_pSetPoint	rail pressure
T15_st	status ignition
T50_st	status starter
ThrVlv_rAct	ratio throttle valve

To: Grundler, Christopher[grundler.christopher@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]
Cc: Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Allen, Laura
Sent: Thur 10/8/2015 3:54:30 PM
Subject: FW: VW Hearing Clips/Tweets 10/8/2015

Sharing a few additional media clips since the start of the hearing.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

-

Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday

for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal.”

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

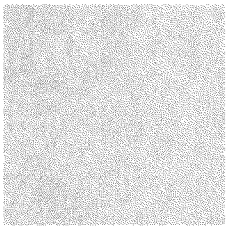
-

From: MSN.com - Hotmail, Outlook, Skype, Bing, Latest News, Photos & Videos
Sent: Thur 10/8/2015 4:27:07 PM
Subject: VW US CEO: No knowledge of defeat devices in 2014
MAIL_CONVERSATION_TOPIC: VW US CEO: No knowledge of defeat devices in 2014
Created: Fri 3/18/2016 7:33:02 PM

Michael Horn, CEO of Volkswagen America, in a hearing on Capitol Hill Thursday, apologized and said VW is "determined to make things right."

View article...

To: Grundler, Christopher[grundler.christopher@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Ex. 6
Sent: Thur 10/8/2015 4:33:31 PM
Subject: How to settle the VW scandal. WSJ Online
how-to-settle-the-vw-scandal 10815.pdf



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From: MSN.com - Hotmail, Outlook, Skype, Bing, Latest News, Photos & Videos
Sent: Thur 10/8/2015 4:57:04 PM
Subject: VW US CEO: 'This company has to bloody learn'
MAIL_CONVERSATION_TOPIC: VW US CEO: 'This company has to bloody learn'
Created: Fri 3/18/2016 7:33:02 PM

Michael Horn, CEO of Volkswagen America, in a hearing on Capitol Hill Thursday, apologized and said VW is "determined to make things right."

View article...

To: Kaul, Meetu[Kaul.Meetu@epa.gov]; Alexander, David[Alexander.David@epa.gov]
From: Belser, Evan
Sent: Thur 10/8/2015 4:59:51 PM
Subject: FW: VW FOIAs
Summary of Volkswagen FOIA requests.docx
vw foia requests Sept 25 to Oct 5.docx

From: Mackay, Cheryl
Sent: Tuesday, October 06, 2015 4:41 PM
To: Shinkman, Susan; Hengst, Benjamin; Belser, Evan; Werner, Jacqueline; Dolph, Becky; Jonesi, Gary
Subject: VW FOIAs

Hi all,

I've attached the handouts from the VW FOIA meeting today, for everyone's reference. There is a list containing descriptions of each of the FOIA requests and a summary page.

Let me know if you have Qs. I look forward to working with everyone!

Cheryl

Cheryl A. Mackay
Office of General Counsel
U.S. Environmental Protection Agency
(202) 564-2023

-----Original Appointment-----
From: Shinkman, Susan
Sent: Friday, October 02, 2015 11:56 AM
To: Shinkman, Susan; Mackay, Cheryl; Hengst, Benjamin; Belser, Evan; Werner, Jacqueline; Dolph, Becky
Subject: FW: FOIAs re: VW Call In# 1-855-564-1700 **Non-Responsive**
When: Tuesday, October 06, 2015 2:00 PM-2:30 PM Customized Time Zone.
Where: Susan's Office

-----Original Appointment-----
From: Shinkman, Susan
Sent: Thursday, October 01, 2015 6:10 PM

To: Shinkman, Susan; Hengst, Benjamin; Belser, Evan; Werner, Jacqueline; Dolph, Becky
Subject: FOIAs re: VW Call In# 1-855-564-1700 Non-Responsive
When: Tuesday, October 06, 2015 2:00 PM-2:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Susan's Office

To: Kaul, Meetu[Kaul.Meetu@epa.gov]
From: E&E Publishing
Sent: Thur 10/8/2015 5:31:49 PM
Subject: October 8 -- Greenwire is ready

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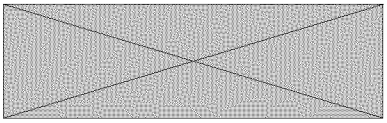

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McCarthy drops speaker bid, plunging House into chaos

House Majority Leader Kevin McCarthy shocked Washington, D.C., today by abruptly dropping out of the speaker's race, throwing the deeply divided GOP conference into further turmoil as it seeks to replace retiring Speaker John Boehner (R-Ohio).

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Misuse, poor security run rampant at VIP lodge -- IG

3.AIR POLLUTION:
VW leader blames software engineers as lawmakers fume

4.AIR POLLUTION:
Foes of new ozone curbs set sights on EPA permitting

CONGRESS

5.OIL:
House GOP pressured over maritime add-ons to exports bill

6.FOREST SERVICE:
5% of timber projects were litigated this year -- chief

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Groups appeal key leasing decision

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13.WILDLIFE:
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LAW

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Lumber Liquidators to pay $10M over illegal logging

15.CHEMICALS:
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16.WATER POLLUTION:
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CLIMATE CHANGE

17.COLORADO:
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18.NEGOTIATIONS:
'Vulnerable 20' nations ask for money, help on climate change

19.OIL AND GAS:
10 companies to pledge 'cleaner' energy

ENERGY

20.ELECTRICITY:
D.C. flips switch on novel sewage-to-power system

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21.USGS:
Seismologist snags Sammie award as top federal employee

22.FEDERAL WORKFORCE:
Cato Institute targets high pay for government employees

TRANSPORTATION

23.GRIDLOCK:
Austin, Texas, mayor pins hopes on driverless cars

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24.COAL:
Alaska grants some water rights to groups in Chuitna mine fight

25.DROUGHT:
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26.CHEMICAL SECURITY:
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27.NEW YORK:
NYC bans open doors while running AC

28.WISCONSIN:
Lawmakers debate large farm well drilling permits

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Subject: October 8 -- Greenwire is ready

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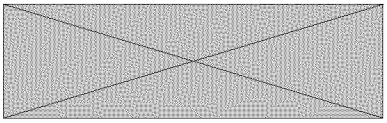

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: McCabe, Janet
Sent: Thur 10/8/2015 5:57:44 PM
Subject: Hearing

I've only seen one post about the VW exec this morning.

Good luck for part 2.

Sent from my iPhone

To: Shinkman, Susan[Shinkman.Susan@epa.gov]; Ellen Mahan[ellen.mahan@usdoj.gov]; Thompson, Christopher[Thompson.Christopher@epa.gov]; Wilkes, Mary[Wilkes.Mary@epa.gov]; Sullivan, Greg[Sullivan.Greg@epa.gov]; OKeefe, Susan[OKeefe.Susan@epa.gov]; Theis, Joseph[Theis.Joseph@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Regional Counsel Contacts[Regional_Counsel_Contacts@epa.gov]; Stewart, Andrew[Stewart.Andrew@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Kelley, Rosemarie[Kelley.Rosemarie@epa.gov]; karen.dworkin@usdoj.gov[karen.dworkin@usdoj.gov]; Sullivan, Tim[Sullivan.Tim@epa.gov]; Lott, Don[Lott.Don@epa.gov]; Fried, Gregory[Fried.Gregory@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Bunnell, Julia[Bunnell.Julia@epa.gov]; Saenz, Diana[Saenz.Diana@epa.gov]; Fogarty, Johnpc[Fogarty.Johnpc@epa.gov]; bruce.gelber@usdoj.gov[bruce.gelber@usdoj.gov]; Ben Fisherow[benjamin.fisherow@usdoj.gov]; Bahk, Benjamin[Bahk.Benjamin@epa.gov]; Denton, Loren[Denton.Loren@epa.gov]; Klepp, Robert[Klepp.Robert@epa.gov]; Kabler, Lauren[Kabler.Lauren@epa.gov]; Pollins, Mark[Pollins.Mark@epa.gov]; Jerison, Joanna[Jerison.Joanna@epa.gov]; Lyons, John[Lyons.John@epa.gov]; Chapman, Apple[Chapman.Apple@epa.gov]; Quast, Sylvia[Quast.Sylvia@epa.gov]; Sierra, Eddie[Sierra.Eddie@epa.gov]; Makepeace, Caroline[Makepeace.Caroline@epa.gov]; Stoy, Alyse[Stoy.Alyse@epa.gov]; Kaplan, Robert[kaplan.robert@epa.gov]; Castanon, Lisa[Castanon.Lisa@epa.gov]; Schefski, Kenneth[Schefski.Kenneth@epa.gov]; Joffe, Brian[Joffe.Brian@epa.gov]
Cc: Nelson, Leverett[nelson.leverett@epa.gov]; Tozzi, Lauren[Tozzi.Lauren@epa.gov]; Simon, Paul[Simon.Paul@epa.gov]; Tommelleo, Nancy[Tommelleo.Nancy@epa.gov]; Cozad, David[Cozad.David@epa.gov]; Nann, Barbara[nann.barbara@epa.gov]; Coe, Mary[Coe.Mary@epa.gov]; Bohan, Suzanne[bohan.suzanne@epa.gov]; Ajl, Diane[Ajl.Diane@epa.gov]; Stern, Allyn[Stern.Allyn@epa.gov]; Madigan, Andrea[Madigan.Andrea@epa.gov]; bigioni, neil[bigioni.neil@epa.gov]; Jonesi, Gary[Jonesi.Gary@epa.gov]; Seager, Cheryl[Seager.Cheryl@epa.gov]; Skelley, Dana[Skelley.Dana@epa.gov]; Frey, Bert[frey.bertram@epa.gov]; Schaaf, Eric[Schaaf.Eric@epa.gov]; Mairs, Stephanie[Mairs.Stephanie@epa.gov]; Berg, Elizabeth[Berg.Elizabeth@epa.gov]; Heard, Anne[Heard.Anne@epa.gov]; Isales, Lydia[Isales.Lydia@epa.gov]; Dolph, Becky[Dolph.Becky@epa.gov]; Eppers, Jim[Eppers.Jim@epa.gov]; Allnutt, David[Allnutt.David@epa.gov]; Vanderhook-Gomez, Katherine (ENRD)[Katherine.Vanderhook-Gomez@usdoj.gov]
From: Holmes, Carol
Sent: Thur 10/8/2015 6:28:18 PM
Subject: Agenda for 10/15/15 OCE-DOJ & RC's Monthly Conf. - 1-866-299-3188 Code: 202 564-3257#
Acting Associate Attorney General Memorandum to Agencies re FRCP Changes....pdf
ENV_DEFENSE-#741229-v1-Foster_-_Opinion_and_Order_denying_in_part_and_gr....pdf
OCE-DOJ-RCs Monthly Agenda-10-15-15.docx

Hello everyone – attached is the agenda for next week's call, with additional reading materials if you are so inclined. Please forward as appropriate, since apparently the Outlook group email lists are not all current/accurate. Thanks!

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Carol S. Holmes
Senior Counsel
Office of Civil Enforcement (MC 2241A)

U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW Washington, DC 20460
Phone (202) 564-8709

From: Shinkman, Susan
Sent: Thursday, December 19, 2013 12:58 PM
To: Shinkman, Susan; Ellen Mahan; Thompson, Christopher; Wilkes, Mary; Sullivan, Greg; OKeefe, Susan; Theis, Joseph; Brooks, Phillip; Regional Counsel Contacts; Stewart, Andrew; Werner, Jacqueline; Kelley, Rosemarie; karen.dworkin@usdoj.gov; Sullivan, Tim; Lott, Don; Fried, Gregory; Starfield, Lawrence; Bunnell, Julia; Saenz, Diana; Fogarty, Johnpc; bruce.gelber@usdoj.gov; Ben Fisherow; Bahk, Benjamin; Holmes, Carol; Denton, Loren; Klepp, Robert; Kabler, Lauren; Pollins, Mark; Moyer, Robert; Jerison, Joanna; Lyons, John; Chapman, Apple; Quast, Sylvia; Sierra, Eddie; Makepeace, Caroline; Stoy, Alyse; Kaplan, Robert; Castanon, Lisa; Schefski, Kenneth; Joffe, Brian; Porter, Amy
Cc: Nelson, Leverett; Tozzi, Lauren; Simon, Paul; Tommelleo, Nancy; Cozad, David; Nann, Barbara; Coe, Mary; Bohan, Suzanne; Ajl, Diane; Stern, Allyn; Madigan, Andrea; bigioni, neil; Jonesi, Gary; Seager, Cheryl; Skelley, Dana; Frey, Bert; Schaaf, Eric; Mairs, Stephanie; Berg, Elizabeth; Murray, Suzanne; Heard, Anne; Isales, Lydia; Dolph, Becky; Eppers, Jim; Allnutt, David; Vanderhook-Gomez, Katherine (ENRD)
Subject: OCE-DOJ & RC's Monthly Conf. - 1-866-299-3188 Code: 202 564-3257#
When: Thursday, October 15, 2015 1:00 PM-2:30 PM.
Where: 3146 WJC South

To: Grundler, Christopher[grundler.christopher@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]
Cc: Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Allen, Laura
Sent: Thur 10/8/2015 6:50:41 PM
Subject: Re: VW Hearing Clips/Tweets 10/8/2015

More clips/tweets

On Oct 8, 2015, at 2:32 PM, Gong, Kristiene <Gong.Kristiene@epa.gov> wrote:

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this

software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

"I personally struggle as well," he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

"Responsible parties will be identified and held accountable," he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he's dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers

in the U.S. are stuck with cars they can't sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company's auto plant in Chattanooga, Tenn., are worried about what the damage to VW's brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed," said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren't as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying "our plan is to fix the cars."

Later, however, he said how to compensate the company's customers is one of the areas the company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

"My answer to myself is that I do everything -- and I don't sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.," Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will “most probably” only require a software solution, which Horn said may begin in the middle of next year because of its “technical complexity.”

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve

the emissions problem.

"Mr. Horn your statements don't give me much confidence that these cars are going to be fixed," Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on

September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a "lean NOx trap." The system collects nitrogen oxide in

a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn't big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That's why other automakers have gone with a method called "selective catalytic reduction," which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It's also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions

compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem.

Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Azoolin, Liel
Required Attendees: Meiburg, Stan; Fritz, Matthew; McCabe, Janet; Grundler, Christopher; Hengst, Benjamin; Niebling, William; Reynolds, Thomas; Vaught, Laura; Liz Purchia (Purchia.Liz@epa.gov); Starfield, Lawrence; Kelley, Rosemarie; Belser, Evan; Avi Garbow; Giles-AA, Cynthia; Carter, Donnell; MCClain, Mike; Rodgers, Ryan; Sampson, Jamaal; Slotkin, Ron; Vitalien, Christal; Ingram, Amir
Location: Alm Conference Room
Importance: Normal
Subject: VW Update Meeting
Start Date/Time: Fri 10/9/2015 6:45:00 PM
End Date/Time: Fri 10/9/2015 7:15:00 PM

******Please DO NOT forward this calendar invitation. You may "Accept" or "Decline" the invitation but DO NOT respond with questions or concerns. If you do have any questions or concerns about this invitation please contact the Scheduling Office at scheduling@epa.gov . ******
SCt: Liel Azoolin

Staff:
Deputy Meiburg, Matt Fritz (OA)
Janet McCabe, Chris Grundler, Ben Hengst, William Niebling (OAR/OTAQ)
Liz Purchia (OPA)
Cynthia Giles, Larry Starfield, Rosemarie Kelley, Evan Belser (OECA)
Avi Garbow (OGC)
Laura Vaught (OCIR)

Conference Line: 866-299-3188 / **Non-Responsive**

Non-Responsive

From: MSN.com - Hotmail, Outlook, Skype, Bing, Latest News, Photos & Videos
Sent: Thur 10/8/2015 6:57:25 PM
Subject: VW US CEO: 'This company has to bloody learn'
MAIL_CONVERSATION_TOPIC: VW US CEO: 'This company has to bloody learn'
Created: Fri 3/18/2016 7:33:02 PM

Volkswagen America CEO Michael Horn apologized Thursday at a hearing on Capitol Hill and said the automaker is "determined to make things right" after years of deception on an air pollution device.

View article...

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
From: Gong, Kristiene
Sent: Thur 10/8/2015 7:04:12 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

—

2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

“I personally struggle as well,” he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

“Responsible parties will be identified and held accountable,” he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he’s dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can’t sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company’s auto plant in Chattanooga, Tenn., are worried about what the damage to VW’s brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed,” said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren’t as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying “our plan is to fix the cars.”

Later, however, he said how to compensate the company’s customers is one of the areas the

company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

“My answer to myself is that I do everything -- and I don’t sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.,” Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will “most probably” only require a software solution, which Horn said may begin in the middle of next year because of its “technical complexity.”

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

“Mr. Horn your statements don’t give me much confidence that these cars are going to be fixed,” Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

-

Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a "lean NOx trap." The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn't big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That's why other automakers have gone with a method called "selective catalytic reduction," which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It's also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system.

But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

—

11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

—

11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

—

10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

—

10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

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10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

___

9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier

models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed

might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the

cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene

Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the

Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's

technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

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Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the

Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a

double whammy of betrayal."

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S.

emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new

cars. “It’s definitely a stain on the brand’s image,” he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand’s American subsidiary last year, intended to tell lawmakers that he learned about the cheating software “over the past several weeks,” VW spokeswoman Jeannine Ginivan said.

‘I did not think that something like this was possible at the Volkswagen Group,” Horn said in his prepared remarks. “We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators.”

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company’s Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars’ engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW’s 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was “determined to make things right.”

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being

operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

-

To: Kerley, David[David.Kerley@abc.com]
From: Grundler, Christopher
Sent: Thur 10/8/2015 7:18:18 PM
Subject: RE: Good luck

How did you think the VW boss did?

From: Kerley, David [mailto:David.Kerley@abc.com]
Sent: Thursday, October 08, 2015 1:34 PM
To: Grundler, Christopher
Subject: Good luck

Interested in how deep you go..

David Kerley | Correspondent

1717 DeSales St NW | Washington, DC 20036

':202-222-7254 | @David_Kerley

To: Allen, Laura[Allen.Laura@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]
From: Grundler, Christopher
Sent: Thur 10/8/2015 7:53:22 PM
Subject: Re: Ryan Beene- Auto news

I can do 4:15.

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. EPA
202-564-1682 (DC)
734-214-4207 (Ann Arbor)

On Oct 8, 2015, at 3:52 PM, Allen, Laura <Allen.Laura@epa.gov> wrote:

> Here's more info on what Ryan Beene, Auto News, wants to discuss:
>
> •□□□□□□□ More about the EPA procedure to validate a VW remedy. What does that include? Actual testing?
>
> •□□□□□□□ Remedy- how long do you think it will take before a fix can actually be installed in cars?
>
> •□□□□□□□ VW certification process: what happens now? Do they resubmit? I was told it was a temporary withdrawal. But I know cert was also revoked by EPA/CARB so what do they have to do to get 2016s certified?
>
> •□□□□□□□ What is the aux device that Reuters mentioned in a story yesterday? (here's the story he is referencing: http://www.reuters.com/article/2015/10/08/us-volkswagen-emissions-idUSKCN0S113S20151008)
>
> Should we shoot for 4 or 4:15? Let me know what would be best for you and I'll let Ryan know. He's flexible.

To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]
From: Allen, Laura
Sent: Thur 10/8/2015 7:54:16 PM
Subject: RE: Ryan Beene- Auto news

Great, I'll come up a few mins before

Julia/Erin- feel free to join

From: Grundler, Christopher
Sent: Thursday, October 08, 2015 3:53 PM
To: Allen, Laura
Cc: Birgfeld, Erin; Valentine, Julia
Subject: Re: Ryan Beene- Auto news

I can do 4:15.

Christopher Grundler, Director

Office of Transportation and Air Quality

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•□□□□□□□ What is the aux device that Reuters mentioned in a story yesterday? (here's the story he is referencing: http://www.reuters.com/article/2015/10/08/us-volkswagen-emissions-idUSKCN0S113S20151008)

Should we shoot for 4 or 4:15? Let me know what would be best for you and I'll let Ryan know. He's flexible.

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Thur 10/8/2015 8:01:16 PM
Subject: P.M. NEWSCAST: VW scandal: Horn denies knowing of 'defeat devices'; Mexico workers on edge; HQ raided | FCA to hike Tier-2 pay? | Trio of Toyota concepts | Tiny robot, big debut

October 8, 2015

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TOP STORY: VW exec in hot seat

Mexico workers on edge »
FCA to hike Tier-2 pay? »

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To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
From: Gong, Kristiene
Sent: Thur 10/8/2015 8:02:55 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

NY Times:

http://www.nytimes.com/2015/10/09/opinion/vw-and-michael-horn-need-to-come-clean-now.html

VW Needs to Come Clean, Now

By THE EDITORIAL BOARD

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage.

Since they were forced to admit one the biggest frauds in auto industry history last month, the executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars. But none of that has explained who ordered, approved and designed the software that enabled the cars to cheat on emissions tests while belching pollutants when they were on the road. Nor has VW explained how and when it plans to fix the cars, which many customers bought in the belief that they were fuel efficient and clean.

These and many more questions were angrily hurled at Michael Horn, the head of the Volkswagen Group of America, when he appeared before a congressional hearing on Thursday. Yet beyond more apologies and an admission that he did hear of "possible emissions noncompliance" back in the spring of 2014, Mr. Horn had few answers. In May 2014, a nonprofit environmental research group alerted government regulators that Volkswagen and Audi cars with certain diesel engines in the United States were spewing far more emissions on

the road than in tests. That was also when Volkswagen began misleading regulators with claims that the study was flawed, and then with a recall that failed to fix the problem.

Given the huge emphasis Mr. Horn's American operation was putting on "clean diesel" to boost VW's flagging American sales at the time, it is hard to believe that he did not follow up those initial reports with corporate leaders at Volkswagen headquarters in Wolfsburg, Germany. Instead on Thursday, he offered the standard defense — so often used by corporate executives in the face of misconduct — that no one of any importance knew anything of a fraud that has now caused the company's share price to decline by a third in value. Mr. Horn would only say that this deception was the work of "a couple of software engineers," and not a corporate decision.

On Thursday, German prosecutors raided the corporate offices as part of their investigation. Meanwhile, Matthias Müller, the newly appointed Volkswagen chief executive, continued to insist that his predecessor, Martin Winterkorn, who resigned shortly after the scandal broke in September, knew nothing. "Do you really think that a chief executive had time for the inner functioning of engine software?" he said in an interview with Frankfurter Allgemeine Zeitung, as if the problem was some minor malfunction and not an elaborate effort to deceive regulators and customers around the world.

If Mr. Winterkorn was not responsible, who is? Nobody believes that the handful of senior managers suspended so far, three of them involved in engine development, could have carried out this scheme without any support. Hans-Dieter Pötsch, newly appointed as supervisory board chairman, issued a statement on Wednesday saying it would take time before Volkswagen could made public the findings of its internal inquiries. "We must overcome the current crisis," he explained, "but we must also ensure that Volkswagen continues to grow." That seems to miss the point that Volkswagen will neither overcome the crisis nor grow unless it can produce some credible answers and explanations in short order.

Even if they manage to fix millions of cars, Volkswagen executives will still face a monstrous challenge from lawsuits, potential prosecutions, lost sales and the blow to VW's reputation for quality engineering. There is no defeat device to deflect the angry and urgent questions that lawmakers hurled at Mr. Horn. Apologizing is the easy part.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 3:04 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull,

George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

—

2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed

by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical

House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

"I personally struggle as well," he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

“Responsible parties will be identified and held accountable,” he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he’s dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can’t sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company’s auto plant in Chattanooga, Tenn., are worried about what the damage to VW’s brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed,” said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren’t as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying “our plan is to fix the cars.”

Later, however, he said how to compensate the company’s customers is one of the areas the company is looking at.

“We are determined to make things right,” Horn said. “This includes the consequences of our

acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the

human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

“My answer to myself is that I do everything -- and I don’t sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.,” Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will “most probably” only require a software solution, which Horn said may begin in the middle of next year because of its “technical complexity.”

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

“Mr. Horn your statements don’t give me much confidence that these cars are going to be fixed,” Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn’t suffer financially for the company’s “misdeeds.”

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a “lean NOx trap.” The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn’t big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That’s why other automakers have gone with a method called “selective catalytic reduction,” which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It’s also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

“You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst

– the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr.

Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current

Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take

years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

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11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

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11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

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10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

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10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her

grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay

Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material

that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials,

after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

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Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal.”

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new cars. "It's definitely a stain on the brand's image," he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's

American subsidiary last year, intended to tell lawmakers that he learned about the cheating software "over the past several weeks," VW spokeswoman Jeannine Ginivan said.

'I did not think that something like this was possible at the Volkswagen Group," Horn said in his prepared remarks. "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was "determined to make things right."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the

software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy

group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*.
http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

-

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: Gong, Kristiene
Sent: Thur 10/8/2015 8:08:54 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP:

http://bigstory.ap.org/article/8fab9def3da5407398288aedba31e011/vws-us-ceo-face-tough-questions-congressional-hearing

VW executive apologizes but says scandal not his fault

By MICHAEL BIESECKER and MATTHEW DALY

WASHINGTON (AP) — Volkswagen's top U.S. executive offered deep apologies yet sought to distance himself Thursday from the emissions scandal enveloping the world's largest automaker. He asserted that he and other top corporate officials had no knowledge of the cheating software installed in 11 million diesel cars.

Though he said he hadn't been briefed on the preliminary findings of the ongoing internal investigation, Volkswagen of America CEO Michael Horn told a congressional subcommittee that a tiny group of software developers in Germany was responsible for the computer code that enabled the cars to trick U.S. government emissions tests. Three lower-level managers have been suspended.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said, adding that he felt personally deceived.

That explanation left members of the House panel investigating the scheme incredulous.

"I agree it's very hard to believe," Horn conceded.

Rep. Chris Collins, R-N.Y., was among the lawmakers who said he could not accept VW's characterization that "this was the work of a couple of rogue engineers." He added, "This didn't happen in one day."

Collins, an engineer, said it appears that VW executives "are complicit in a massive cover-up at the highest levels that continues to this day."

For more than two hours, Horn, the 51-year-old German, sat calmly, occasionally sipping from a cup of water as news photographers' camera shutters clicked away. As the elected officials expressed anger, disappointment and skepticism at the company where he has worked for nearly half his life, Horn apologized but provided little new information.

More than a month after the company first confessed the emissions-rigging to U.S. regulators, Horn said it doesn't yet have a detailed plan for fixing the nearly 500,000 "clean diesel" cars sold in the U.S. with the suspect software since the 2009 model year. Such a solution will likely take up to two years, he said, adding that each car might require between 5 and 10 hours' work by a mechanic to meet clean air standards.

The cars are safe to drive, the government says, but Horn suggested Volkswagen could compensate some owners, possibly by paying them for the lost value of their vehicles.

Shortly before Horn began his testimony, German police and prosecutors raided VW's global headquarters in Wolfsburg and other locations seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

In the U.S., the Environmental Protection Agency and the Justice Department are conducting a

criminal investigation. VW also potentially faces billions in fines for violating the Clean Air Act, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

Horn said VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide. It was not immediately clear what a newly revealed device found in the new VW models does, or when the company might resubmit the applications needed to sell the cars.

Liz Purchia, an EPA spokeswoman, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The lack of certification is bad news for American VW dealers who had hoped to put the new models on sale soon. For some dealerships, the diesel models account for about one-third of sales.

During the hearing, lawmakers from both parties fondly recalled their first VWs before hammering the iconic company for betraying the public's trust.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

It was Rep. Morgan Griffith, a Virginia Republican, who most directly channeled the anger and hurt of Volkswagen's customer base.

He recounted that when his mother could afford her first new car, she bought the stick-shift Volkswagen Squareback on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still owns.

He bought a Rabbit in the 1980s, and in the 1990s a gas-powered Jetta, Griffith said. He then bought a 2003 gasoline-powered Passat and racked up 376,225 miles, followed by a 2012 diesel Passat — one of the cars caught up in the scandal.

"I'm your consumer," Griffith told Horn, his voice stern. "I'm your VW driver who has always trusted your company, and I'm very disappointed."

–

AP Auto Writer Tom Krisher contributed to this report from Detroit.

The Guardian:

http://www.theguardian.com/business/2015/oct/08/vw-scandal-two-simple-questions-two-complex-answers

VW scandal: two simple questions, two complex answers

The US Congress hearing into the emissions-rigging scandal mixed frustration with incredulity at answers from Volkswagen's US CEO Michael Horn

Graham Ruddick

Thursday 8 October 2015 15.24 EDT Last modified on Thursday 8 October 2015 15.27 EDT

Despite Volkwagen's congressional hearing lasting more than two hours and the carmaker's US boss facing almost constant criticism, Congress was only fixated on a pair of questions – who is

to blame for the diesel emissions scandal and how are you going to fix it?

Unfortunately for Michael Horn and VW, the energy and commerce committee in Congress was not satisfied with either answer.

Horn warned it will take "one to two years minimum" to fix the half-a-million cars in the US fitted with a defeat device.

The vast majority of these cars – 430,000 – will require software and hardware repairs that could even involve a new tank being fitted to the vehicle. However, Horn admitted that the fix was still being tested and the solution is "complex".

Frank Pallone, representative for New Jersey, refused to believe that VW's repairs would not effect the performance of the vehicle. He also urged VW to consider offering customers a full refund for their vehicle.

However, if the committee was frustrated with Horn's explanation with VWs' plan to fix the affected cars, it was nothing compared to their incredulity at his answer about who fitted the defeat devices that allowed vehicles to cheat emissions tests.

Horn regurgitated the official VW answer that it was "not a corporate decision" and that "a couple of software engineers" put the device into the vehicles. Three people have been suspended by the company according to Horn, whose official title is president and chief executive of Volkswagen Group of America.

"Do you know how that defies credulity?" Michael Burgess from Texas said.

Chris Collins went even further. The representative from New York said he "categorically rejects" VW's version of events and that either the carmaker is incompetent or guilty of a "massive cover-up".

Did the company not wonder how its engineers had managed to lower the emissions on a car that was 40 times over the legal limit, he asked? If they had actually done this it would have been "massive breakthrough technology" and surely VW would have looked to patent the device that did it.

"It goes way, way higher than that," Collins said of the explanation that rogue engineers are to blame.

Perhaps as a defensive strategy aimed at winning over the committee or perhaps because he genuinely does doubt the company's official version of events, Horn said he also struggled to believe this story.

"I agree too, it is very hard to believe, and personally I struggle as well," Horn said.

Horn described how the defeat device was actually a line of code "hidden in millions of software code", meaning it was possible it was missed by others in VW.

However, he also criticised his own company, urging VW to "bloody learn and use the opportunity to get its act together". The way the carmaker manages its 600,000 staff needs to change, he added.

The scandal was ultimately caused by "pressure in the system to get resolutions and cost pressures", according to Horn. "It is dead wrong if you put corporate profits before people."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:03 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher

Subject: RE: VW Hearing Clips/Tweets 10/8/2015

NY Times:

http://www.nytimes.com/2015/10/09/opinion/vw-and-michael-horn-need-to-come-clean-now.html

VW Needs to Come Clean, Now

By THE EDITORIAL BOARD

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage.

Since they were forced to admit one the biggest frauds in auto industry history last month, the executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars. But none of that has explained who ordered, approved and designed the software that enabled the cars to cheat on emissions tests while belching pollutants when they were on the road. Nor has VW explained how and when it plans to fix the cars, which many customers bought in the belief that they were fuel efficient and clean.

These and many more questions were angrily hurled at Michael Horn, the head of the Volkswagen Group of America, when he appeared before a congressional hearing on Thursday. Yet beyond more apologies and an admission that he did hear of "possible emissions noncompliance" back in the spring of 2014, Mr. Horn had few answers. In May 2014, a nonprofit environmental research group alerted government regulators that Volkswagen and Audi cars with certain diesel engines in the United States were spewing far more emissions on the road than in tests. That was also when Volkswagen began misleading regulators with claims that the study was flawed, and then with a recall that failed to fix the problem.

Given the huge emphasis Mr. Horn's American operation was putting on "clean diesel" to boost VW's flagging American sales at the time, it is hard to believe that he did not follow up those

initial reports with corporate leaders at Volkswagen headquarters in Wolfsburg, Germany. Instead on Thursday, he offered the standard defense — so often used by corporate executives in the face of misconduct — that no one of any importance knew anything of a fraud that has now caused the company's share price to decline by a third in value. Mr. Horn would only say that this deception was the work of "a couple of software engineers," and not a corporate decision.

On Thursday, German prosecutors raided the corporate offices as part of their investigation. Meanwhile, Matthias Müller, the newly appointed Volkswagen chief executive, continued to insist that his predecessor, Martin Winterkorn, who resigned shortly after the scandal broke in September, knew nothing. "Do you really think that a chief executive had time for the inner functioning of engine software?" he said in an interview with Frankfurter Allgemeine Zeitung, as if the problem was some minor malfunction and not an elaborate effort to deceive regulators and customers around the world.

If Mr. Winterkorn was not responsible, who is? Nobody believes that the handful of senior managers suspended so far, three of them involved in engine development, could have carried out this scheme without any support. Hans-Dieter Pötsch, newly appointed as supervisory board chairman, issued a statement on Wednesday saying it would take time before Volkswagen could made public the findings of its internal inquiries. "We must overcome the current crisis," he explained, "but we must also ensure that Volkswagen continues to grow." That seems to miss the point that Volkswagen will neither overcome the crisis nor grow unless it can produce some credible answers and explanations in short order.

Even if they manage to fix millions of cars, Volkswagen executives will still face a monstrous challenge from lawsuits, potential prosecutions, lost sales and the blow to VW's reputation for quality engineering. There is no defeat device to deflect the angry and urgent questions that lawmakers hurled at Mr. Horn. Apologizing is the easy part.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 3:04 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of

"possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

"I personally struggle as well," he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

"Responsible parties will be identified and held accountable," he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he's dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can't sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company's auto plant in Chattanooga, Tenn., are worried about what the damage to VW's brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed," said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren't as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying "our plan is to fix the cars."

Later, however, he said how to compensate the company's customers is one of the areas the company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

"My answer to myself is that I do everything -- and I don't sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.," Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will “most probably” only require a software solution, which Horn said may begin in the middle of next year because of its “technical complexity.”

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

"Mr. Horn your statements don't give me much confidence that these cars are going to be fixed," Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a "lean NOx trap." The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn't big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That's why other automakers have gone with a method called "selective catalytic reduction," which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It's also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

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9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-

congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a

spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's

subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the

emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were

outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the

government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

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Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is

committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal.”

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new cars. "It's definitely a stain on the brand's image," he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, intended to tell lawmakers that he learned about the cheating software "over the past several weeks," VW spokeswoman Jeannine Ginivan said.

'I did not think that something like this was possible at the Volkswagen Group," Horn said in his prepared remarks. "We have broken the trust of our customers, dealerships, and employees, as

well as the public and regulators."

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was "determined to make things right."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and,

Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday

morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957

model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

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To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Thur 10/8/2015 8:12:43 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Imperial Valley Press):

http://www.ivpressonline.com/news/politics/the-latest-lawmakers-press-epa-on-its-response-to-vw/article_519e6c47-5fa8-5567-be83-f59310e4f4a8.html

The Latest: Lawmakers press EPA on its response to VW case

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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3:06 p.m.

Members of a House subcommittee are grilling two Environmental Protection Agency officials about why they're allowing diesel-powered Volkswagens to stay on the road when they are spewing out more pollution than allowed by law.

Rep. Jan Schakowsky, D-Ill., asked what authority the EPA has to leave the cars on the road when they're emitting 10 to 40 times the pollution allowed by law.

EPA Director of Transportation and Air Quality Christopher Grundler says the agency will look for ways to make VW mitigate the environmental damage.

EPA Air Enforcement Director Phillip Brooks says the agency can't take the pollution out of the air, but in the past it has required offenders to reduce pollution in the future.

The officials say it's likely that VW will face significant fines and possible criminal charges

against the company due to the cheating.

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2:53 p.m.

A top official says the U.S. Environmental Protection Agency is pressing Volkswagen for fixes on its emissions-cheating diesel engines and hopes to see solutions as early as next week.

EPA Director of Transportation and Air Quality Christopher Grundler says he has told VW to present more than one fix. He says the EPA will look at the impact on car owners before approving anything.

In testimony before a House subcommittee Thursday, Grundler says he wishes the EPA would have caught VW sooner. He says the agency has changed testing procedures so they are unpredictable to automakers.

Grundler says the EPA won't go after individual car owners, but it is investigating Volkswagen's conduct.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:09 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP:

http://bigstory.ap.org/article/8fab9def3da5407398288aedba31e011/vws-us-ceo-face-tough-questions-congressional-hearing

VW executive apologizes but says scandal not his fault

By MICHAEL BIESECKER and MATTHEW DALY

WASHINGTON (AP) — Volkswagen's top U.S. executive offered deep apologies yet sought to distance himself Thursday from the emissions scandal enveloping the world's largest automaker. He asserted that he and other top corporate officials had no knowledge of the cheating software installed in 11 million diesel cars.

Though he said he hadn't been briefed on the preliminary findings of the ongoing internal investigation, Volkswagen of America CEO Michael Horn told a congressional subcommittee that a tiny group of software developers in Germany was responsible for the computer code that enabled the cars to trick U.S. government emissions tests. Three lower-level managers have been suspended.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said, adding that he felt personally deceived.

That explanation left members of the House panel investigating the scheme incredulous.

"I agree it's very hard to believe," Horn conceded.

Rep. Chris Collins, R-N.Y., was among the lawmakers who said he could not accept VW's characterization that "this was the work of a couple of rogue engineers." He added, "This didn't happen in one day."

Collins, an engineer, said it appears that VW executives "are complicit in a massive cover-up at the highest levels that continues to this day."

For more than two hours, Horn, the 51-year-old German, sat calmly, occasionally sipping from a cup of water as news photographers' camera shutters clicked away. As the elected officials expressed anger, disappointment and skepticism at the company where he has worked for nearly half his life, Horn apologized but provided little new information.

More than a month after the company first confessed the emissions-rigging to U.S. regulators, Horn said it doesn't yet have a detailed plan for fixing the nearly 500,000 "clean diesel" cars sold in the U.S. with the suspect software since the 2009 model year. Such a solution will likely take up to two years, he said, adding that each car might require between 5 and 10 hours' work by a mechanic to meet clean air standards.

The cars are safe to drive, the government says, but Horn suggested Volkswagen could compensate some owners, possibly by paying them for the lost value of their vehicles.

Shortly before Horn began his testimony, German police and prosecutors raided VW's global headquarters in Wolfsburg and other locations seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

In the U.S., the Environmental Protection Agency and the Justice Department are conducting a criminal investigation. VW also potentially faces billions in fines for violating the Clean Air Act, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

Horn said VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide. It was not immediately clear what a newly revealed device found in the new VW models does, or when the company might resubmit the applications needed to sell the cars.

Liz Purchia, an EPA spokeswoman, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The lack of certification is bad news for American VW dealers who had hoped to put the new models on sale soon. For some dealerships, the diesel models account for about one-third of sales.

During the hearing, lawmakers from both parties fondly recalled their first VWs before hammering the iconic company for betraying the public's trust.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

It was Rep. Morgan Griffith, a Virginia Republican, who most directly channeled the anger and hurt of Volkswagen's customer base.

He recounted that when his mother could afford her first new car, she bought the stick-shift Volkswagen Squareback on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still owns.

He bought a Rabbit in the 1980s, and in the 1990s a gas-powered Jetta, Griffith said. He then bought a 2003 gasoline-powered Passat and racked up 376,225 miles, followed by a 2012 diesel Passat — one of the cars caught up in the scandal.

"I'm your consumer," Griffith told Horn, his voice stern. "I'm your VW driver who has always trusted your company, and I'm very disappointed."

–

AP Auto Writer Tom Krisher contributed to this report from Detroit.

The Guardian:

http://www.theguardian.com/business/2015/oct/08/vw-scandal-two-simple-questions-two-complex-answers

VW scandal: two simple questions, two complex answers

The US Congress hearing into the emissions-rigging scandal mixed frustration with incredulity at answers from Volkswagen's US CEO Michael Horn

Graham Ruddick

Thursday 8 October 2015 15.24 EDT Last modified on Thursday 8 October 2015 15.27 EDT

Despite Volkwagen's congressional hearing lasting more than two hours and the carmaker's US boss facing almost constant criticism, Congress was only fixated on a pair of questions – who is to blame for the diesel emissions scandal and how are you going to fix it?

Unfortunately for Michael Horn and VW, the energy and commerce committee in Congress was not satisfied with either answer.

Horn warned it will take "one to two years minimum" to fix the half-a-million cars in the US fitted with a defeat device.

The vast majority of these cars – 430,000 – will require software and hardware repairs that could even involve a new tank being fitted to the vehicle. However, Horn admitted that the fix was still being tested and the solution is "complex".

Frank Pallone, representative for New Jersey, refused to believe that VW's repairs would not effect the performance of the vehicle. He also urged VW to consider offering customers a full refund for their vehicle.

However, if the committee was frustrated with Horn's explanation with VWs' plan to fix the affected cars, it was nothing compared to their incredulity at his answer about who fitted the defeat devices that allowed vehicles to cheat emissions tests.

Horn regurgitated the official VW answer that it was "not a corporate decision" and that "a couple of software engineers" put the device into the vehicles. Three people have been suspended by the company according to Horn, whose official title is president and chief executive of Volkswagen Group of America.

"Do you know how that defies credulity?" Michael Burgess from Texas said.

Chris Collins went even further. The representative from New York said he "categorically rejects" VW's version of events and that either the carmaker is incompetent or guilty of a "massive cover-up".

Did the company not wonder how its engineers had managed to lower the emissions on a car that was 40 times over the legal limit, he asked? If they had actually done this it would have been "massive breakthrough technology" and surely VW would have looked to patent the device that did it.

"It goes way, way higher than that," Collins said of the explanation that rogue engineers are to blame.

Perhaps as a defensive strategy aimed at winning over the committee or perhaps because he genuinely does doubt the company's official version of events, Horn said he also struggled to believe this story.

"I agree too, it is very hard to believe, and personally I struggle as well," Horn said.

Horn described how the defeat device was actually a line of code "hidden in millions of software code", meaning it was possible it was missed by others in VW.

However, he also criticised his own company, urging VW to "bloody learn and use the opportunity to get its act together". The way the carmaker manages its 600,000 staff needs to change, he added.

The scandal was ultimately caused by "pressure in the system to get resolutions and cost pressures", according to Horn. "It is dead wrong if you put corporate profits before people."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:03 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

NY Times:

http://www.nytimes.com/2015/10/09/opinion/vw-and-michael-horn-need-to-come-clean-now.html

VW Needs to Come Clean, Now

By THE EDITORIAL BOARD

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage.

Since they were forced to admit one the biggest frauds in auto industry history last month, the

executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars. But none of that has explained who ordered, approved and designed the software that enabled the cars to cheat on emissions tests while belching pollutants when they were on the road. Nor has VW explained how and when it plans to fix the cars, which many customers bought in the belief that they were fuel efficient and clean.

These and many more questions were angrily hurled at Michael Horn, the head of the Volkswagen Group of America, when he appeared before a congressional hearing on Thursday. Yet beyond more apologies and an admission that he did hear of "possible emissions noncompliance" back in the spring of 2014, Mr. Horn had few answers. In May 2014, a nonprofit environmental research group alerted government regulators that Volkswagen and Audi cars with certain diesel engines in the United States were spewing far more emissions on the road than in tests. That was also when Volkswagen began misleading regulators with claims that the study was flawed, and then with a recall that failed to fix the problem.

Given the huge emphasis Mr. Horn's American operation was putting on "clean diesel" to boost VW's flagging American sales at the time, it is hard to believe that he did not follow up those initial reports with corporate leaders at Volkswagen headquarters in Wolfsburg, Germany. Instead on Thursday, he offered the standard defense — so often used by corporate executives in the face of misconduct — that no one of any importance knew anything of a fraud that has now caused the company's share price to decline by a third in value. Mr. Horn would only say that this deception was the work of "a couple of software engineers," and not a corporate decision.

On Thursday, German prosecutors raided the corporate offices as part of their investigation. Meanwhile, Matthias Müller, the newly appointed Volkswagen chief executive, continued to insist that his predecessor, Martin Winterkorn, who resigned shortly after the scandal broke in September, knew nothing. "Do you really think that a chief executive had time for the inner functioning of engine software?" he said in an interview with Frankfurter Allgemeine Zeitung, as if the problem was some minor malfunction and not an elaborate effort to deceive regulators and customers around the world.

If Mr. Winterkorn was not responsible, who is? Nobody believes that the handful of senior managers suspended so far, three of them involved in engine development, could have carried out this scheme without any support. Hans-Dieter Pötsch, newly appointed as supervisory board chairman, issued a statement on Wednesday saying it would take time before Volkswagen could made public the findings of its internal inquiries. "We must overcome the current crisis," he explained, "but we must also ensure that Volkswagen continues to grow." That seems to miss the

point that Volkswagen will neither overcome the crisis nor grow unless it can produce some credible answers and explanations in short order.

Even if they manage to fix millions of cars, Volkswagen executives will still face a monstrous challenge from lawsuits, potential prosecutions, lost sales and the blow to VW's reputation for quality engineering. There is no defeat device to deflect the angry and urgent questions that lawmakers hurled at Mr. Horn. Apologizing is the easy part.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 3:04 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

—

2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

"I personally struggle as well," he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

"Responsible parties will be identified and held accountable," he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he's dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can't sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company's auto plant in Chattanooga, Tenn., are worried about what the damage to VW's brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed," said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who

purchased vehicles that weren't as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying "our plan is to fix the cars."

Later, however, he said how to compensate the company's customers is one of the areas the company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

“My answer to myself is that I do everything -- and I don’t sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.,” Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the

U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will "most probably" only require a software solution, which Horn said may begin in the middle of next year because of its "technical complexity."

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

"Mr. Horn your statements don't give me much confidence that these cars are going to be fixed," Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received

tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on

emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld,

Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to

defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a "lean NOx trap." The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn't big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That's why other automakers have gone with a method called "selective catalytic reduction," which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It's also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM

To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S.

regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen

brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a

given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

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11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

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10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

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10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

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9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them

for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US

regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help

with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it

was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and

put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

-

Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

"The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year," Upton continued. "But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new cars. "It's definitely a stain on the brand's image," he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, intended to tell lawmakers that he learned about the cheating software "over the past several weeks," VW spokeswoman Jeannine Ginivan said.

'I did not think that something like this was possible at the Volkswagen Group," Horn said in his prepared remarks. "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was "determined to make things right."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The

Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as

well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

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To: Brooks, Phillip[Brooks.Phillip@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Emmerson, Caroline[Emmerson.Caroline@epa.gov]; Niebling, William[Niebling.William@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Haman, Patricia[Haman.Patricia@epa.gov]
From: Levine, Carolyn
Sent: Thur 10/8/2015 8:17:22 PM
Subject: VW hearing Panel 1 hearing transcript
Panel 1 - VW hearing transcript- HEC hearing-Oct8.docx

Hi all,

Thanks to Chris and Phil for ably representing EPA at today's hearing. Committee staff sent a note thanking Phil and Chris for the good information provided at the hearing.

This link is for the VW part of the hearing. EPA's will be posted later. I also saved it as a word file, attached.

http://www.cq.com/doc/congressionaltranscripts-4769538?3

Carolyn Levine

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House Energy and Commerce Subcommittee on Oversight and Investigations Holds Hearing on Volkswagen, Panel 1

LIST OF PANEL MEMBERS AND WITNESSES

Partial Text - complete transcript not yet available

MURPHY:
Could members of the media please move out of our way so we can begin this hearing?

Mr. Horn, you can go ahead and sit in that chair. Thank you.

Thank you, and good morning. We now convene this hearing of the Oversight and Investigations Subcommittee on Volkswagen emissions cheating allegations, initial questions.

Let me start off by saying my first car was a Volkswagen. It was a '76 Volkswagen Beetle. I learned a lot about cars and internal combustion engines, and I could take that thing apart and put it back together and it actually continued to work. I did all the maintenance myself because the Beetle and the Volkswagen had a legacy as the people's car, to be people-friendly.

I loved that car, loved it a lot -- not so much as to call it Brad, but I loved that car. But I trusted the car to get me around. And I trusted that Volkswagen would continue to build a reliable car.

That word "trust" alone, as you know, is the key factor in building customer loyalty, and that trust is what helped build Volkswagen because we believed this company looked out for customers first.

Then just three weeks ago, car owners around the world were shocked to learn that Volkswagen AG, the world's largest automaker, admitted that it installed software for a number of years in millions of its diesel models that effectively defeated emission controls during routine driving.

This news followed the Environmental Protection Agency's public announcement on September 18th that it had sufficient evidence to support allegations that VW was cheating on its emissions tests. As EPA reported at the time, when the cars were subject to emission testing, the diesel vehicle switched into an operational mode designed specifically to pass the test, and then switched back to a different mode during normal driving, a mode that emitted nitrogen oxides up to 10 and 40 times the federal limits.

In the United States alone, some 482,000 Volkswagen and Audi models were affected by the cheating software. Worldwide, the software was used in an estimated 11 million vehicles involving several VW lines.

In the wake of this apparently massive deception, the Energy and Commerce Committee opened a bipartisan investigation to get answers for the American public. This investigation will seek to understand the facts and circumstances surrounding the VW actions, the impact of its decisions and related issues about emissions compliance generally.

At this morning's hearing, we will receive testimony from the head of Volkswagen's American operations, Mr. Michael Horn, and from EPA officials tasked with ensuring the automobiles on American roads meet federal environmental standards. In addition, this subcommittee intends to pursue answers to critical initial questions concerning the troubling revelations about VW's actions, what happened, who was involved, and most importantly, why.

Let me acknowledge that Mr. Horn is appearing before us voluntarily today and say that I expect he and the Volkswagen organization will continue to cooperate with our inquiry. This means providing documents and information to the committee as quickly as possible, including documents that have already been discussed publicly in connection with Volkswagen's various board members -- board meetings in Germany.

As I said before, there are a number of core questions we will begin to pursue today both for Volkswagen and for the EPA. Most critically, what happened, who was involved, why were these actions taken? And we also have a number of questions concerning the impact of these decisions on customers, family-owned dealerships and the American public.

I hope today Mr. Horn can provide some important context for us and expand upon the facts he represents in his testimony. We will look to him to explain the current understanding of VW executives about what exactly was done to these engines, and was it done to deliberately deceive government regulations and regulators. And what is VW doing to fix the problem and make whole those who have been affected by the actions?

At some point, prior to 2009, VW made a choice to move forward with engines and evidence -- engines that evidence now suggests were not compliant with U.S. emission standards. The illegal software was initially deployed in a first generation of these diesel engines, which account for approximately 340,000 of the affected vehicles.

However, despite apparent advancement in their emissions control systems in two future generations of these engines, the software remained in place. And if the technology was improving, why did the company understand -- what did the company understand about the software cheat? And what does this mean for fixing these vehicles? Will some be easier than others?

Of course, for EPA, we have questions about its compliance and recall programs. I hope we can get some clear answers today from that agency. Why did EPA's standard compliance tests and audits fail to detect problems, especially in the older technology? What is EPA doing to ensure any fix it requires of the automaker does not negatively affect vehicle performance?

There is some need for a sense of proportion regarding this matter. The 480,000 or so VW vehicles implicated in the scandal represent only 0.2 percent of the cars and light trucks on United States highways. And so far, we have no evidence that the software similar to what was used by VW is present in any other U.S. vehicles.

EPA's ongoing testing will help address this question, but I hope our witnesses from VW and EPA can understand why our confidence has been shaken.

At root, the behavior to which VW admitted represents a fundamental violation of public test and the reverberations of this violation can be seen across the United States and across the world as people grapple with the implications. We need to develop a clear understanding of the facts and circumstances surrounding this case, and this hearing will be a first important step towards that goal.

I now recognize the ranking member of the subcommittee, Ms. DeGette, for five minutes.

DEGETTE:
Thank you, Mr. Chairman.

And in the spirit of bipartisanship of this investigation, I'll tell you my first car was also a Volkswagen. It was a 1960 VW Beetle with a ragtop sunroof that I inherited from my grandmother. And I will tell

you that that 1960 Beetle -- I still miss that car. It didn't have any lines of computer code required to operate that vehicle.

In this situation, fast forward to today, we know some things, but we don't know enough. And that's why I'm glad we're having this investigation. We know that in May 2014, West Virginia University published a study commissioned by the International Council on Clean Transportation that found that on-road emissions from Volkswagen's cars were above VW's standard. They also did not match the emissions outputs found under testing conditions.

We know that VW tried to justify this discrepancy to regulators with explanations of technical issues and unexpected in-use conditions. We know that in December 2014, VW initiated a voluntary recall of nearly half a million vehicles to resolve, among other things, the emissions issues. Yet when the California Air Resources Board tested the fixed vehicles, they found that the emissions were still above the legal standards.

And we know that by July of this year, the EPA and CARB told VW that they would not approve the company's 2016 model year diesel vehicles for sale unless the emissions issues could be explained.

VW was essentially forced to come clean, and they ultimately confessed that they had installed a defeat device in their diesel cars designed to circumvent EPA emissions standards for certain air pollutants.

We know that this defeat device sensed when the vehicles were undergoing emissions testing and ensured emissions control systems were under-operating to pass. And we know that during normal road use, the emissions controls were reduced and the cars were producing up to 40 times more nitrogen oxide than is allowed by emissions standards. We know that half a million cars -- almost half a million cars in the United States might be affected by this.

Now, Mr. Horn, I'm glad you've come today to testify here because while we know all of the things I just talked about, there's a lot more things we don't know and that we need answers for. For example, VW hasn't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests.

You haven't revealed when and how the engines equipped with this device will be fixed. You haven't told us whether this fix will affect fuel economy or performance of the vehicles. You haven't revealed what Volkswagen told regulators over the last year as EPA and the California board were trying to figure out why the vehicles' emissions were out of compliance.

You haven't revealed whether the voluntary recall that VW set in place in 2014 was just merely a ruse. Was the VW Group of America actually trying to find out what was wrong with the cars and fix them, or did VW know that the cars had defeat devices on them and were only trying to buy time with the regulators?

You haven't revealed who's responsible for this scheme. We don't know if it came from Germany and who knew about it in the United States. Now, we've all seen the press reports and we can all speculate about what happened here and why, but until Volkswagen comes forward with some answers and provides some assurances that we can trust about what they're saying, the American people, the regulators and Congress are all left in the dark.

So I hope, Mr. Horn, that you've come prepared to answer some of these questions, and I also hope that VW will be prepared to work with this committee as we move forward. Hundreds of thousands of owners invested money and trust in VW. Many of them bought those cars specifically because they were seeking environmentally-friendly vehicles.

Now they're left with cars with much higher levels of pollution. They don't have any answers about when or how their car will be fixed or what kind of car they'll be left with.

Earlier this week, I visited a Volkswagen dealership in Denver. I saw the pollution control equipment on VW diesel vehicles firsthand. These cars account for almost 25 percent of the sales at that particular dealership and a significant percentage of sales at VW dealerships in Colorado and across this country.

Now because they can't sell them, these cars are just sitting on the lots, which is a scene that's being repeated across the country.

So as Mr. Chairman, you say it's a small percentage of all the cars on the road in the U.S., it's a tremendous economic impact to these dealers and also to the consumers who don't know what's going to happen to their cars. And so that's perhaps the key answer that I'm looking for today. What do we do moving forward?

Now, Mr. Chairman, this subcommittee's been here before. In the last 15 years, we've had Ford and Firestone, Toyota, GM and Takata before this committee. We were able to get information from all these committees to help us understand what happened. But most importantly, we've used this information to chart a path forward and to help the consumers affected by this event.

I hope that Volkswagen can similarly tell us today what's happening, and I hope that they will get beyond this series of terrible decisions and do something to restore the public trust.

Thank you, and I yield back.

MURPHY:
Gentlelady yields back. Now recognize the chairman of the full committee, gentlemen from Michigan, Mr. Upton, for five minutes.

UPTON:
Good morning. Thank you, Mr. Chairman.

Fahrvergnugen -- it makes a car a Volkswagen. That ad campaign swept the nation in the '90s. VW has long enjoyed an almost cultish following dating back to the Beetle, VW van and the Rabbit. But through the years, something apparently became rotten in Wolfsburg and cheating and betrayal became part of that game plan.

There's a lot that we don't know about VW's actions or their motivations in attempting to skirt emissions standards, but regardless of intent, they have betrayed the trust of regulators, dealers and suppliers, and most important, the driving public.

Probably the most famous congressional hearing question is, What did you know and when did you know it, asked by Senator Howard Baker back in the '70s at Watergate. Now we learn that you knew some 18 months ago. So we add, what did you really do to fix it and come clean, versus simply going along?

Ultimately, the saying rings true, cheaters never prosper, and that's why we're here today. We have many questions about how we got here and the road ahead.

UPTON:
Why would one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? And why did they for years, even as the technology improved, continue that path? If they were willing to cut corners here, what else have they done? How will you fix the flaw and when? Will the fix affect the performance of these vehicles?

Unraveling these questions will take time, and I don't expect that we're going to discover all the answers today. But if VW is serious about rebuilding this broken trust, its leaders will need to demonstrate a serious commitment to answer these and many other questions prompted by its actions.

This requires transparency, cooperation and clear, consistent communication not only with this committee, the EPA and other ongoing investigations, but also with its customers, suppliers, dealers and general public.

VW will inevitably pay a steep price for this dirty little secret. How it responds to the failure will go a long way to rebuilding or further eroding the public's trust.

VW must also consider what implications these actions have for the thousands of Americans that it employs, including their facility in Auburn Hills, Michigan. Every single one of us who has ties to Michigan is proud of our rich tradition that is so closely intertwined with the success of the automobile.

In fact, Michigan is one of several states that have launched their own investigations. All automakers must advance by imagination and innovation, not by gaming the system and breaking the law.

We will get some additional insight today, but the committee's investigation is just beginning. This hearing is an important step. As we receive documents and information, new details are certain to emerge. I look forward to getting to the bottom of this issue as quickly as possible.

I take this very personally. As the author of the Tread Act to protect the public, Congress was very clear in our work to protect consumers from abuses from automakers, which included steep fines, and yes, criminal prosecution.

VW has betrayed a nation, a nation of regulators, loyalists, suppliers and innocent customers. It's time to clean it up or get off the road.

I yield the balance of my time to Marsha, Blackburn, the vice chairman.

BLACKBURN:
Thank you, Mr. Chairman.

Mr. Horn, thank you for being here. And I think it's completely appropriate that you come before the committee, that you apologize for the actions, and that you and VW take full responsibility for what has transpired. It is disappointing. I'm fully aware that our governor has been at the Chattanooga facility, and I know that the governor, state legislators, the other members of the congressional delegation and I are quite concerned about this.

You've got a lot of hard-working, honest Tennesseans who are at that Chattanooga facility. And we are quite concerned about the actions of a few, so -- a few VW employees, not Chattanoogans and not Tennesseans.

We're going to be very precise with you and VW. It is, as the chairman said -- as Chairman Murphy has said, it is basically the who, what, when, where, how and why. Why you did it, how you did it, when you did it, when you knew. Who carried this out? Where did this take place? Did it go across the brands? Was it pointed at EU regulations? Was it pointed at some of the climate regulations? Is the EPA too overburdened to have noticed this?

This is a systemic failure. And I will also point out some want to say it's a safety issue. No, sir. This is an issue of integrity. So we appreciate that you are here. We look forward to hearing from you.

And I want to yield the balance of my time to the vice chair of the subcommittee, Mr. McKinley.

MCKINLEY:
Thank you. And thank you, Mr. Chairman, for holding this meeting.

Those (ph) of you have talked about the car. My first was a 1957 Volkswagen. I think I've got everybody beat on that.

But listen, there should be zero tolerance for this unethical behavior and flagrant disregard of the U.S. laws, public health and consumer. That's why this hearing is important to us today. The American people need to understand what happened, how it happened and how it will be resolved.

And they feel in West Virginia that they've been deceived. And so on Monday, there was action taken by our attorney general to file action against this.

I also want to just touch on the university. West Virginia University used a fraction of the money that we spend with EPA, just a fraction of the money to make this discovery. And they found out, as you know, that 15 -- one of the cars that they tested was 15 to 35 times more emissions than they were allowed. Another was 5 to 20 times more emissions.

So Mr. Chairman, this -- I want to touch on the fact that this opportunity about WVU and what its research -- how research dollars can work. And this is what was happening, not the EPA, but this was a university that was able to accomplish this.

So I'm looking forward to this hearing and getting some clarity for what this is. So I thank you very much for holding this (inaudible)

MURPHY:
Thank you.

MCKINLEY:
... and look forward to the conversation.

MURPHY:
Thank you. We now recognize the ranking member of the committee, Mr. Pallone, for five minutes.

PALLONE:

Mr. Chairman, thank you for holding this hearing.

We're here today because Volkswagen lied. They lied to regulators, they lied to their customers and they lied to the American people. We all have many important questions that deserve answers. What did Volkswagen do to its cars, why did they do it, and who knew this was happening both in Germany and here in the United States?

This whole scheme makes me question how much we should trust Volkswagen, and to be honest, this committee's investigations over the last five years make me question how much we should trust the auto industry in general.

Let me remind the committee of the difficult history the American driver has had with the auto industry in recent years. In 2010, this committee investigated Toyota's recall of 9 million vehicles worldwide for unexplained cases of sudden, unintended acceleration. Dozens of people died in accidents linked to runaway Toyota vehicles. Our committee held multiple hearings, and in the end, it was determined that Toyota knew about certain problems with their vehicles that if fixed early, would likely have saved lives.

In early 2014, we launched an investigation of General Motors ignition switches that killed many people. Our committee's investigation found that individuals within GM knew about the deadly ignition defect for nearly a decade before the company initiated a recall.

Later in 2014, we learned of the exploding Takata airbags installed in vehicles made by at least 11 auto manufacturers. The recalls for airbag problems begin as early as 2008, yet Takata and NHTSA continued to investigate whether additional recalls are still necessary and Takata still has not determined the root cause of the defect, which has killed a number of people worldwide and injured hundreds more.

And now we have Volkswagen, a company that told regulators that their vehicles met emission standards but had actually installed defeat devices to bypass emission controls.

Over the past five years, the world's three largest automakers have come before this committee to admit that they have cheated the system and lied to American customers. This seems to be a pervasive culture of deception in the auto industry, and it has to stop now.

Mr. Chairman, the American people need to know that they're safe on our roads and they need to know that when they decide to buy a car, they are actually getting what they paid for. The auto industry has deliberately chosen to perpetuate lies and mislead consumers, but the American public are not crash test dummies and cannot be treated as such.

Mr. Horn, I understand that you won't have all the answers here today, but please don't hide behind an internal investigations excuse. It's time for Volkswagen to be forthcoming with its customers, regulators and Congress about what you did to the cars and why. We deserve an explanation.

And I'd like to yield, Mr. Chairman, my time to Ms. Schakowsky.

SCHAKOWSKY:
Thank you for yielding, Mr. Ranking Member.

We'll hear a lot from Volkswagen today. We'll hear apologies, I'm sure, for Volkswagen's deliberate deception of the American people and federal and state public health agencies. We's hear a pledge to get to the bottom of this issue without delay and to fully cooperate with investigators. We'll hear how the use of so-called defeat devices are incompatible with Volkswagen's corporate culture.

And I want to tell you, Mr. Horn, I don't buy it. The American people, the EPA and their counterparts around the world have been defrauded by Volkswagen. The company's word isn't worth a dime.

The only thing I want to hear today is exactly how will Volkswagen make this right by consumers. Saying it will take time to design and implement a fix is insufficient, and I think unacceptable. People shouldn't have to wait to get the fuel economy, the low emissions and performance that they already paid for. If they wanted, every Volkswagen clean diesel vehicle owner should be able to get their money back, all of it.

The American people deserve answers. Yes, there are a lot of questions, but there are also thousands of owners of clean diesel Volkswagens out there, and what they're wanting to know is what are you going to do for them and when. And I say now. So I expect those answers to be provided today.

And I yield back to the ranking member of the full committee.

PALLONE:
Thank you, Mr. Chairman. Unless anyone else on this side would like the time, I'm going to yield back. I yield back, Mr. Chairman.

MURPHY:
Thank you. Gentleman yields back.

I also ask unanimous consent that the written opening statements by the members of the committee be introduced into the record, and without objection, the documents will be entered into the record.

You are aware that the committee is holding an investigative hearing, and when do you so, has the practice of taking testimony under oath, Mr. Horn. Do you have any objections to testifying under oath?

Thank you. The chair then advises you that under the rules of the House and the rules of the committee, you are entitled to be advised by counsel. Do you desire to be advised by counsel during your testimony today?

In that -- then -- one moment -- then in that case, would you please raise your right hand and I'll swear you in. Stand and raise your hand. Do you swear the testimony you are about to give is the truth, the whole truth and nothing but the truth? Thank you.

The record show the witness answered yes.

You are now under oath and subject to the penalties set forth in Title 18, Section 1001 of the United States code. You may now give a five-minute summary of your written statement. If you'll please make sure your microphone is on and pulled close to you so we can hear you.

Press the button. Is it on? OK?

HORN:
Right. Thank you very much, Chairman Upton, Chairman Murphy, ranking member Pallone, ranking member DeGette, other members of the committee. Thank you for inviting me here today to testify before the committee.

My name is Michael Horn, and I'm president and CEO of Volkswagen Group of America, a subsidiary of Volkswagen AG headquartered in Germany, in Wolfsburg.

I volunteered to come here before this committee at the very outset of these inquiries in an effort to show our commitment to cooperation. We have not had the opportunity to review all aspects of this matter. Indeed, the investigation is just beginning. Therefore, my testimony and my answers to your questions will be by necessity have to be considered preliminary and based on my best current recollection and information.

On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime.

In the spring of 2014, when the West Virginia University study was published, I was told that there was a possible emissions non- compliance that could be remedied. I was informed that EPA regulations included various penalties for non-compliance with the emissions standards, and also that the agency could conduct engineering tests on their own, which could include analysis on defeat devices or other auxiliary equipment.

Let me be very clear about this. While I was told about the EPA process, I was not then told, nor did I have any reason to suspect or to believe that our vehicles included such a device.

I was also informed that the company engineers would work with the agencies to resolve the issue. Later in 2014, I was informed that the technical teams had a specific plan for remedies to bring the vehicle into compliance and that they were engaged with the agencies about the process. And you mentioned this also in your statements.

On September 3rd, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board and the U.S. Environmental Protection Agency that emissions software (inaudible) in the diesels in form -- (inaudible) in the diesels vehicles for model years 2009 unto 2015 contained a defeat device in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those vehicles emit high levels of nitrogen oxides when the vehicles were driven in actual road use, rather than laboratory testing.

In Volkswagen's recent ongoing discussions with the regulators, we described to the EPA and CARB that our emissions-control strategy also included a software feature that should be disclosed to and approved by them as an auxiliary emissions control device, which is also called AECD, in connection with the certification process.

As a result, in order to show that we act immediately, we have withdrawn the application for certification for all model year '16 vehicles, and we are now working with the agencies to continue the certification process.

These events -- and I fully agree on this -- are deeply troubling. I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, employees, as well as the public and the regulators.

HORN:
And let me be very clear. We at Volkswagen take full responsibility for our actions, and we are working with all the relevant authorities in a cooperative way. I'm here to offer the commitment of Volkswagen AG to work with this committee to understand what happened and how we will move

forward.

EPA, CARB, the U.S. Department of Justice, states' attorneys general, as well as other authorities, are fulfilling their duties to investigate this matter. And we are determined to make things right. This includes accepting the consequences of our acts, providing a remedy and beginning to restoring the trust of our customers, dealerships, employees, the regulators and the American public.

We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods.

Our immediate goal is to develop a remedy for our customers. While much work is still to be done, I'd like to talk today about how we get from where we are now to that goal.

First, we are conducting investigations on a worldwide scale on how these matters could have happened. Responsible parties will be identified and held accountable. Thorough Investigations have already begun, but any information development at this stage is preliminary. We ask for your understanding as we complete this work.

Second, it's important for the public to know that as the EPA has said, these vehicles do not present a safety hazard and remain safe and legal to drive.

Third, technical teams are working tirelessly to develop remedies for each of the affected group of vehicles. The solutions will be tested and validated and then shared with the responsible authorities for approval. There are three groups of vehicles involved, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy, but these remedies can only be our first step to our customers.

Fourth, we will examine our compliance processes and standards at Volkswagen and head up (ph) measures to make certain that something like this cannot happen again.

Fifth, we commit to regular and open communication with our customers, dealers, employees and the public as we move forward. And as first steps, we have set up a designated service line Web site micro-site to be a channel for this communication, and I sent a personal letter to every affected customer.

I can offer today this outline of a path forward towards the goal of making things right. Nevertheless, Volkswagen knows that we will be judged not by our -- judged not by our words but clearly by our actions over the coming weeks and months.

These events are fundamentally contrary to Volkswagen's core principles of proving value to our customers, innovation and responsibility to our communities and our environment. They do not reflect the company that I know and to which I have dedicated 25 years of my life. It's inconsistent that this company involved in this emissions issue is a also company that has invested in environmental efforts to reduce the carbon footprint in our factories around the world, where our plant in Tennessee is the best factory in this respect.

In closing, again, I apologize on behalf of everyone at Volkswagen. We will fully cooperate with the responsible authorities. We will find remedies for our customers, and we will work to ensure that this will never happen again.

Thank you again for allowing me to testify today, and I look forward to your questions. Thank you.

MURPHY:

Thank you, Mr. Horn. I now recognize myself for five minutes of questioning.

On September 3rd, 2015, VW admitted to CARB and EPA that it had installed defeat devices in certain model year 2009 and model year 2015 vehicles. To the best of your knowledge, did VW install this software for the express purpose of defeating emissions controls?

HORN:
To our understanding -- and this is also part of the investigation -- it was installed to this purpose, yes -- for this purpose.

MURPHY:
Now, in your written testimony, you noted that you were made aware of potential emissions compliances in the spring of 2014?

HORN:
Uh-huh.

MURPHY:
You also noted discussions at the time about penalties for non-compliance and the EPA's ability to test for defeat devices. At that time, were you aware or informed that these vehicles contained defeat devices?

HORN:
No.

MURPHY:
When did you first learn, then, that VW vehicles contained a defeat device?

HORN:
Around the September 3rd meeting, a couple of days before.

MURPHY:
And then why were you having discussions about defeat devices in the spring of 2014, then, if there was no knowledge or at least a concern that these vehicles contained a defeat device?

HORN:
So the University of West Virginia made the study. There was a Jetta and a Passat in there and another off-road vehicle. I don't want to name the brand now. And the results were communicated.

And in this context, I was told by our experts in the Auburn Hills office -- and it was also, you know, just four months into this market -- that, of course, you know, not complying with emission standards as relating to fines, and hefty fines specifically here in the U.S., that those experts, including the German technology department, would check on the study, and the study results, as you also mentioned, was a small team. Results have been published with all the emissions which went overboard, and that they will check this. Point one.

Point two is they also would look and with all the responsible departments, and there was a number of expert (ph) department in Germany, and then how to possibly fix this. And then there was the notion in this communication that also the EPA or the agencies could check also on their own -- which to my degree (ph) is normally around the world, that agencies check once in a while on their own -- for auxiliary devices, including defeat devices.

And at that point of time, I had no understanding what a defeat device was and I had no indication whatsoever that a defeat device could have been in our cars.

MURPHY:
So let me go back, Mr. Horn. The new chief executive of Volkswagen, Mr. Mueller, has been quoted in media reports this morning saying that only a few people were involved with the deception.

Now, I have to say that I don't take much comfort in that, especially knowing that Volkswagen is renowned for superb engineers and mechanics. Now, isn't it -- who -- I wonder, shouldn't they have picked up on this? But isn't it true that technology was installed in the automobiles at least initially because the cars could not meet the new, more stringent emissions standards for diesel engines?

HORN:
Yes, to your last question. This appears to be this way. And to newspaper articles about possible quotes of Mr. Mueller, I don't want to quote. This -- you know, as I said also, the investigations are preliminary. One week, our group revospom (ph) did the investigation from September 22nd to October 1st.

And then the entire investigations on this matter is turned over to an external agency law firm called Johns Dade (ph), American company, which is now going through the systems, outside advice, outside counsel.

MURPHY:
I think what we find amazing is that the University of -- West Virginia University discovered this, and your army of brilliant engineers and talented mechanics didn't know something was amiss. And I'm sure we'll have more questions about that.

But I want to ask you this. In terms of VW's status for remedying these defeat devices, who is responsible for developing and testing a solution?

HORN:
The responsibility for developing and testing the engine and drive chain softwares lies within the engine and drivetrain division in Germany in Wolfsburg for the two-cylinder, for the four- cylinder TDI engines.

MURPHY:
Now, will this require a software patch or changes to the actual vehicle's architecture and hardware?

HORN:
Yes, thank you for this question. I think we have to differentiate now into the three groups of cars. You have mentioned that roughly 500,000 cars are affected. But of those, round about 430,000 cars are the gen-1 vehicles, which were the very early vehicles, started here in 2009. And for those cars, we believe that a software-only solution will not be possible because also, to be quite frank in logic (ph), you know, if it would have been possible, they would have done it in the first place. So for those cars, we are working on both software and hardware solutions.

And there are different strategies about additional (inaudible) catalytic converter, as well as an SCR rear tank. So -- and but this is something which is hardware engineering, which is a little bit -- it's complex, and it takes time to develop and to test this. This is one of the strategies.

The generation-2 vehicles, which is just the Passat model -- I have here the -- 90,000 cars here in the U.S., this will be most probably a software solution. This is tested now and could involve one or the other, let's say, sensor.

But whatever I explain to you now anyways is being discussed in a timely manner now, in the next couple of weeks with the California Air Resources Board and the (inaudible)

For the generation-3 vehicles -- so the actual...

MURPHY:
Can I ask -- because I've gone way over time.

HORN:
Sure.

MURPHY:
I'm sure other colleagues are going to be asking some more detailed questions, and we'll get to that.

HORN:
OK.

MURPHY:
I now need to yield five minutes to Ms. -- recognize Ms. DeGette for five minutes.

DEGETTE:
Thank you, Mr. Chairman. Now, Mr. Horn, your company acknowledged that it installed these defeat

devices on a number of models dating back to 2009, correct?

HORN:
Sorry, I have a problem understanding with all this noise down here.

DEGETTE:
Oh, Mr. Chairman -- Mr. Chairman, can you please have the quiet in the room so Mr. Horn can understand me?

HORN:
Yes. Thank you.

MURPHY:
(inaudible) will please be quiet, especially up front. Thank you -- so you're not distracted.

HORN:
Thank you.

DEGETTE:
All right, I'll ask that again. And if I can have the clock reset to five minutes?

Mr. Horn, your company has acknowledged that it installed these defeat devices on a number of models back to 2009. Yes or no.

HORN:
Yes.

DEGETTE:
And do you know how the various defeat devices installed in the cars actually work at this point?

HORN:
Personally, no. I'm not an engineer.

DEGETTE:
Does someone at VW know how these defeat devices work?

HORN:

I believe this is also within the investigations and I believe that...

DEGETTE:
Could you please give us the information when you find out?

HORN:
We will. We will. We have...

DEGETTE:
Thank you very much. Now, you mentioned this West Virginia University study that was conducted in May of 2014, which found that the real world NOx emissions on several Volkswagen vehicles exceeded EPA standards by as much as 35 times.

Following publication of that study, VW represented to the California Air Resources Board, or CARB, and to the EPA that the increased emissions were due to technical issues and unexpected in-use conditions, correct?

HORN:
I'm sorry. I'm -- you guys cough here all the time. And I have trouble...

DEGETTE:
All right. I'll ask the question again.

HORN:
Thank you.

DEGETTE:
After that study by West Virginia University, isn't it true that VW told the EPA and the California board that the increased emissions were due to technical issues and unexpected in-use conditions?

HORN:
Yes.

DEGETTE:
Yes.

HORN:
True.

DEGETTE:
And those representations at that time were, in fact, incorrect and false, weren't they, sir.

HORN:
Yes.

DEGETTE:
Yes, they were. Now, to your knowledge, did anybody at the Volkswagen Group of America know at that time that, in fact, those discrepancies were due to these defeat devices when they made those representations to the regulators?

HORN:
To my knowledge at this point of time, no.

DEGETTE:
No one in the U.S. did.

HORN:
No.

DEGETTE:
OK. Now, in December 2014, VW proposed a recall of 500,000 vehicles to, quote -- to resolve the, quote, "technical issues." Is that correct?

HORN:
Uh-huh.

DEGETTE:
And in fact, a number of those vehicles were recalled, is that correct?

HORN:
Yes, most of them.

DEGETTE:
And -- but after they were recalled, the California regulators still said that that fix did not work. Isn't that correct?

HORN:
That is correct.

DEGETTE:
Now, to your knowledge, did anyone at the Volkswagen Group of America know about the existence of these defeat devices when the company announced that recall in December 2014?

HORN:
To my best knowledge today, no.

DEGETTE:
Mr. Horn, when did you personally learn of the defeat device, and under what circumstances?

HORN:
Around the meeting on September 3rd with CARB and EPA.

DEGETTE:
OK. Now, you talked -- when the chairman asked you about these cars -- I'm concerned about what we're going to do about the 500,000 cars we have on the road in the U.S. and the first thing is, as you just testified, about 430,000 of those cars cannot be fixed by a software-only solution. Is that correct?

HORN:
Yes.

DEGETTE:
And that's because of the way that the engine is designed in these vehicles, correct?

HORN:
I wouldn't not -- I would say not the engine is designed but all the after-treatment systems.

DEGETTE:
Right. And I've got to say -- I've got to acknowledge my wonderful dealer, Fred Emmick (ph), who's here today. And he let me come and talk to his wonderful mechanics on Monday. They gave me this chart right here. I tried to take the part itself, but it was too heavy and they told me I'd have to probably pay them $2,000 if I lost it. So I decided to take the chart instead.

This is the chart of the exhaust system on these 430,000 cars. And as I could clearly see, you can't

do a minor little fix to fix this problem. So what is VW going to do for these 430,000 cars so that the users can use them and so that they can pass the emissions tests?

HORN:
So from this distance, I can't see the chart. But I believe it's maybe something out of our service literature or customer literature?

DEGETTE:
It's the exhaust system for these cars.

HORN:
Yes. But...

DEGETTE:
What can be done to fix that?

HORN:
There's two scenarios next to the software adjustments. In one scenario...

DEGETTE:
But these are for the cars that can't have -- that the software adjustments will not work.

HORN:
We're talking now about generation-1 cars, the 430,000 cars.

DEGETTE:
That's right.

HORN:
The picture you have shown and the treatment software alone doesn't work because otherwise, they would have done it...

DEGETTE:
Right. So what are you going to do for those cars?

HORN:
Two technical scenarios. Either in urea tank, SCR tank, to put Adblu in there, or a specific catalizator for the NOx.

DEGETTE:
OK, but those...

HORN:
Technical scenarios.

DEGETTE:
But those cars don't have the urea tank right now.

HORN:
No. That's why it has to...

DEGETTE:
So this would be a major fix, correct?

HORN:
Yes, ma'am.

DEGETTE:
Now, what is the timeframe VW has set for that fix?

HORN:
We are still working on the timeframe, and it's too early to say when this fix exactly is going to take place.

DEGETTE:
When are you -- when are these dealers going to be allowed to sell these cars?

HORN:
The dealers -- the issue with the dealers, as Fred Emmick (ph) told, is that we have -- we have -- we have model year '16 certified, and we have stopped sale on our own -- on our own...

DEGETTE:
Right. When is that going to be fixed?

HORN:
(OFF-MIKE) the model year -- (OFF-MIKE)

DEGETTE:
Is he going to be able to sell those cars.

HORN:
There's two scenarios. A scenario, we are now trying to get a conditional approval with the EPA until we have the final software fix beginning of next year.

DEGETTE:
Beginning of next year. And in the meantime, what are the dealers and the customers supposed to do, the ones who have these cars?

HORN:
Well, in the meantime, no customer can buy a car because it's not available for them. And with the dealers, we have very early started a program to work with them to also help them financially and to communicate with them (OFF-MIKE)

DEGETTE:
OK, but the 430,000 cars that are already on the road, what are those customers supposed to do? Their cars cannot pass the emissions test.

HORN:
EPA has said, and they have repeated this also in their statement, that these cars are legal and safe to drive. And until now, there is no indication that they didn't pass any emissions tests.

MURPHY:
Thank you. (inaudible) time has expired.

Now we need to recognize the chairman of the full committee, Mr. Upton (OFF-MIKE) for five minutes.

UPTON:
Well, thank you, Mr. Chairman.

I want to go back to the specifics of the defeat device. So I live in Michigan. Where I live, we don't need to test our cars for emissions on an annual basis, as many states require. Certainly, in this region here in D.C., I know they do. So how is this defeat device actually set up so that it was different when an individual drove it down the road, versus taking it to a /service station and getting the emissions sticker that is often required in the states that requires such?

HORN:
So I'm...

UPTON:
I've been told a couple things. I just want to know if you can walk me...

HORN:
I can tell you...

UPTON:
... through how that could change the emissions system. What happens?

HORN:
I can share my best knowledge, but I'm not an engineer, neither a software engineer.

UPTON:
Well, I...

HORN:
But let me try to explain. Let me try to explain. My understanding at this point of time is that the software was designed that the vehicle -- the software could detect whether it was on a dynamo (ph), on testing laboratory environment, or whether it was on the street.

And one example of this, as experts have explained to me, is that the software could detect whether the steering wheel made an angle. So -- and there might have been -- and there will be other parameters, like maybe speed and then change of speed and those things...

UPTON:
Maybe the weight of the driver in the driver's seat?

HORN:
I don't think so. But maybe. I don't know.

UPTON:
So wouldn't it be easy to develop the software that would just remove that?

HORN:
Yes. This will be -- this software will be ready...

UPTON:
But of course, when that happens, the car isn't going to meet the emissions test.

HORN:
Regarding the model year '16 and '15, which we are -- the generation-3 cars, which we are discussing right now with the agencies, the defeat device will be either switched off, and from January onwards will be completely taken out of the car. and those cars will pass the emissions tests.

UPTON:
But the earlier -- how -- so how many vehicles will not pass the emissions test of the ones that you've identified?

HORN:
Now, the -- I mean, my question...

UPTON:
So the early -- so you'll be able to do that with the later versions, right?

HORN:
We have to...

UPTON:
But not the -- not the earlier versions of the vehicle. They won't be able to pass. By turning off the device, the defeat device, there will be a number of cars that, in fact, will not meet the current standards. And that's -- that's your -- that's your (inaudible)

HORN:
The current standards, yes. You're right.

UPTON:
And how many-0 and how many of those vehicles are there on the road?

HORN:
Well, we have a total of 500,000, 430,000 generation-1 vehicles, 95,000 generation-2 vehicles, and then it's around 70,000 generation-1 (sic) vehicles. And so all of these cars are out of the legal compliance, clearly. But as EPA has said, all these cars are legal and safe to drive for the owners.

So we're not selling the cars, but the owners can legally and safely drive their cars.

UPTON:
So your dealers across the country, they have their finance plans, where they have quite an inventory, I would guess, of cars that they are now unable to sell.

They paid in advance for those under the financing plan that dealers have, and they are not going to be able to sell them for a number of months, perhaps even as long as six months at a minimum until the fixes can be done.

What -- why type of remedies are you offering the dealers in terms of financial incentives, knowing that they've -- they've have paid for these cars, and frankly, lost a boatload, I would imagine.

HORN:
Yes. And this is...

UPTON:
That inventory has got to be a pretty big loss.

HORN:
This is also one of the things which troubles we personally very much because the last one-and-a-half years, we worked very hard and we brought profitability up, and all of those things.

But I'll tell you exactly. On Friday, the 18th, the notice of violation was communicated. We had a call with the National Dealer Council. Some of the folks are sitting behind me. On Monday, we issued our first financial relief aid. So we put all the TDIs, used cars, CPO cars and new cars on free flooring (ph).

We took all the bonus thresholds out for car sales, so we paid maximum bonus for each car sold, and we took also out the customer satisfaction targets, objectives, and we paid maximum customer satisfaction bonus on those cars. And this is more than $1,000, $1,500 per car.

One (inaudible) coming towards October now, we provided every dealer around the U.S. with a discretionary fund, with a discretionary fund which was explained to them through the district managers, the states' operations managers, and which was wired to the dealers October 1st. I don't want to call out the number, but a significant amount of money in order for them to have flexibility.

So no accountability towards us, flexibility to solve the most urgent customer cases or to invest or to

put the money where they think it would be fit.

And now, you know, when I come out of this congressional hearing, on Friday, we look at the next programs in order how can we help the dealers with the cash flow of their cars for their cash position, because one thing is very, very clear -- and I'm damned sincere about this -- the dealer profitability in this country is my first objective. And I said this on January 1st, and I continue to say this.

So this is one part. And also, on Friday, we looked very intensively into the customer remedies and what we need to do for the customers, and there will be the first scenarios on the table.

MURPHY:
All right. Thank you. Gentleman's time has expired. Now recognize the ranking member of the full committee, Mr. Pallone, for five minutes.

PALLONE:
Thank you, Mr. Chairman.

Mr. Horn, your statements so far don't give me much confidence that we're ever going to see a fix for these vehicles that are impacted. You know, you say that you can't be fixed by a software- only solution. You don't have a necessary timetable as to when the fix is going to begin.

Have you been given enough information about how the defeat device affects the engine to actually make informed judgments on whether the fix will actually work? I mean, how do we know that what you're proposing to do is actually going to work?

HORN:
Whatever I tell you here today is agreed (ph) and is coming from the technical engineering department in Wolfsburg. And alongside our actions in Europe, we have to have our actions in the U.S. And the technical...

PALLONE:
No, I understand, but...

(CROSSTALK)

PALLONE:
Is it fair to say that you really don't know whether you can fix these vehicles to achieve the emission standards?

HORN:
We know that we can fix these vehicles to achieve emissions standards.

PALLONE:
All right, but then what happens -- what happens with regard to other things, like fuel economy, engine performance? You know, people bought these vehicles thinking they were going to have -- meet the emissions standards, they were going to have good fuel economy, they were going to have good engine performance.

Can you guarantee that any fix you make to the vehicles doesn't affect fuel economy or engine performance or both?

HORN:
At this point of time, my understanding is if we correct the nitrogen oxide emissions to the emissions standards, the customer will get the MPG on the Monroney label. That's my current understanding.

Whether the full performance of the car -- and this something also our chairman, Matthias Mueller, our CEO Matthias Mueller, said in Germany -- maybe on top speed, they might be -- one or two miles per hour might be missing. But this is, of course, something which we will share with the agencies. But current understanding is that the customer will keep the Monroney label miles per gallon.

PALLONE:
I mean, the concern I have is, you know, when you buy one of these cars, you're relying on not only emissions standards but the fuel economy's good and the performance is good. Maybe, you know, I think you get to the issue of damages here. In other words, if I'm an owner and I don't -- and the fix doesn't achieve good performance, good fuel mileage, then I'm going to expect to be compensated in some way, if that's not the case.

And you know, I just remain concerned that any fox is going to substantially change the cars and that it's unfair to the consumers who bought the cars and relied on them because they expected them to perform a certain way.

But you're telling me that the fix will guarantee good performance and will guarantee good fuel economy.

HORN:
I said to my current understanding, in achieving the emission standards, the Monroney label miles per gallons will be achieved. There might be a slight impact on the performance. And this is naturally the -- not only the discussions with the agencies, but of course, we will look into compensating our customers. And of course, if there would be significant differences, this would be part of the discussion.

PALLONE:
Well, Et me get to another issue. What about the impact on clean air? I mean, we know that -- that there's all kinds of health impacts, asthma, other respiratory illnesses that can seriously affect people, send them to the hospital or get sick because of NOx and these other problems. I mean, you -- you obviously agree that NOx pollution can result in serious health and environmental effects. I would assume you would agree with that.

HORN:
I have also read the EPA statement, and in general, and not specifically to Volkswagen, they have indicated there might be respiratory problems, which could also lead -- I mean, I'm quoting yesterday, basically -- to hospital visits.

PALLONE:
Well, what are you going to do to rectify that? How do you plan to mitigate the harm caused by this excess pollution emitted into the air the last seven years? My understanding is that the NOx emissions from the affected vehicles are up to 40 times the allowable limits.

So what are you going to do with regard to this excess pollution and the impact it may have had?

HORN:
I think that, first of all, many different studies. And so I would go back -- like to go back to the EPA yesterday of what they said. I think it will be part of the discussion.

But I would also like to point out that if you look at 100 percent of nitrogen oxide emissions in the U.S., the car and truck industry is having 5 percent. Our group here in the U.S. has 4 percent of the 5 percent, which is .2 percent.

And out of this, 20 percent is TDI, which is .05. And now we can multiply this, which is not belittling this. And it's clearly unacceptable, but within this context, clearly, the discussion will come up and needs to be addressed.

PALLONE:
All right. Thank you.

Thank you, Mr. Chairman.

MURPHY:
I now recognize Ms. Blackburn for five minutes.

BLACKBURN:
Thank you, Mr. Chairman.

Mr. Horn, you said profitability is your top priority when you were speaking -- of the dealers.

HORN:
For the dealers, yes.

BLACKBURN:

Yes. I would hope that safety, quality, integrity are top priorities and profitability comes along there as a part of that picture.

Let me ask you about this. Are you going to buy back the inventory that the dealers have?

HORN:
No. Our plan is not to buy back the inventory.

BLACKBURN:
No, you do not...

(CROSSTALK)

HORN:
Our plan is to fix the cars.

BLACKBURN:
OK. Let me move on with you. Have you identified the individual or group of individuals that are responsible for the defeat device?

HORN:
These investigations are ongoing.

BLACKBURN:
You've known about this since the spring of 2014, a year-and-a-half.

HORN:
We know about this since September 3rd, that the violation is there. And since this time, the -- and since the September 18th notice of violation, the board has acted and asked Johns Dade (ph) to investigate it.

BLACKBURN:
But you've known that there was some activity around this defeat device since the spring of 2014, correct?

HORN:
No, I did not know. As I said...

BLACKBURN:
OK. So you did not know it in the spring of 2014.

HORN:
No.

BLACKBURN:
So you just learned about it September 3rd...

HORN:
Around the September 3rd events, yes, ma'am.

BLACKBURN:
OK. All righty. Let's go to your six-point remedy plan. You've talked some about point three, which is that they are developing remedies. And I would assume that if this landed on your plate September 3rd that you all have put all efforts and energy into this plan, correct? Into the remedies?

HORN:
Yes. Correct.

BLACKBURN:
Very good. All right, then let's go to point number one. You state that Volkswagen will examine its compliance processes and standards and adopt measures to make certain that something like this cannot happen again.

HORN:
Uh-huh.

BLACKBURN:
So why don't you give us a little bit of specificity on that and what, if any, steps are currently under way to handled these compliance issues. What did you start as of September 3rd, 2015, and what is your timeline? How long is it going to take you to bring this into compliance?

HORN:
So as I'm the CEO of Volkswagen Group of America, I can only report to you on what is managed by Volkswagen Headquarters Worldwide at this point of time. And as I said, it's Jones Day. They manage all the investigations in terms of who did what when, how and why and what do we need to do in order to rectify this for the future in terms of process adjustments and compliance adjustments.

BLACKBURN:
But then you are saying, as of now, you do not have a plan?

HORN:
As of now, we are still in the investigations, yes.

BLACKBURN:
OK.

When can we expect you to have a plan to handle compliance; to make the owners of your vehicles whole, if you will; to make the dealers that have trusted in you, to make them whole?

Also the individuals that are employed by your facilities, when are they going to have some certainty as it relates to the job?

So you all say you are still investigating.

So on your timeline, when do you expect that you are going to be able to say, this is the way forward?

HORN:
But you mentioned six points. And we started with the first point, compliance. I don't have a timeline for this yet. We are working instantaneously with the dealers and developing plans by the week as we go, as we go. And you can ask those folks behind me on whether this works or not.

And for the customer, it depends on the technical remedies. So again, this is generation three, January this year -- January next year -- sorry -- we will start, you know, to give the software to the agencies. Generation tool, middle of the year; most probably generation three, due to the technical complexity, will be a little bit later.

So there's different timings. And I apologize not for having a full-fledged plan of the board by Volkswagen company right now here in my pocket.

BLACKBURN:
So you are certain it is going to be a multiyear plan?

HORN:
Excuse me?

BLACKBURN:
You are certain the remedy will end up being a multiyear approach?

HORN:
Yes. If you look at -- if you alone at 430,000 cars and the repairs might take five to 10 hours even in order to fix this, you know, technical fixes. And if you look at your recall history in this market, also with Nissan (ph), then these actions take, you know, one, two years minimum, minimum.

If the -- when the fix is available for everybody, including parts and discuss with the agencies and agree to.

BLACKBURN:
OK.

Let's see. My time has expired. I do have one other question about point two in your remedy plan.

Mr. Chairman, I will submit that and...

MURPHY:
Thank you.

BLACKBURN:
... and yield back the time.

MURPHY:
Thank you very much.

Now I recognize Ms. Castor for five minutes.

CASTOR:
Well, thank you, Mr. Chairman, for calling the hearing.

Mr. Horn, according to reports, VW's defeat device is found in nearly 500,000 vehicles.

Are you confident in that number?

Could it be more? Could it be less?

HORN:
We are very confident in this number.

CASTOR:
Pardon me?

HORN:
We are very confident in this number.

CASTOR:
OK.

Have you calculated the loss in value to customers, car owners?

HORN:
No, not yet. That's the matter of the -- not only investigations but the calculations are ongoing. And on Friday, we will look at the first scenarios.

CASTOR:
OK. You have called your investigation preliminary. But you have known about this for a year and a half. The problems first came to light in May 2014.

Is that correct?

HORN:
No, this is not correct. As I explained, the study was published. And had no reason to believe that there was a defeat device in those cars.

CASTOR:
Well, you found out, according to reports in 2014, that there was an issue.

Isn't that correct?

HORN:
An emissions issue, yes, that's correct.

CASTOR:
So what did you do at that point in time?

HORN:
At that point of time a plan was asked for from the engineers. And in July 2014, middle of the year, presented a plan to me which was -- and this is very important also -- which was agreed and discussed with the product safety committee worldwide. And these are those guys who manage all the recalls, all the service action worldwide, including technical procurement, legal, service and those things.

They came back with a plan, first of all, acknowledging that those results were correct and, secondly,

with a clear timing on when those cars would get a software fix, which was also mentioned in one of the opening statements as of last -- end of last year.

CASTOR:
Do you feel like you have been personally deceived now after you found out subsequently that the defeat devices...

HORN:
Yes. Yes.

(CROSSTALK)

CASTOR:
Explain that.

HORN:
Look, I worked 25 years for this company. And, you know, beyond my personal objective of dealer profitability, integrity, quality, you know, and not cheating was always for me given for this company.

CASTOR:
And then...

HORN:
When I learned this, I'm as touched and moved, sorry, as my employees and as...

CASTOR:
Well, you know, and -- another group feeling the effects of the VW defeat devices defrauding are the VW dealers and their hard- working employees all across this country in addition to consumers. A recent Associated Press article noted that dealers are facing, quote, "a flood of angry calls, e-mails," et cetera from Volkswagen owners who feel betrayed because they believed they had bought a car that polluted less without sacrificing the good gas mileage and the performance that comes with a diesel engine.

Mr. Horn, how many VW dealerships are there in the U.S.?

HORN:
We have around about 650 VW dealers and 350 Audi dealers.

CASTOR:
And on average, how much of a VW dealer's business do these diesel models...

HORN:
Twenty-five percent.

CASTOR:
And these dealers are now the front line for unhappy customers who feel betrayed by the Volkswagen brand.

And Media Count (ph) yesterday quoted one dealer, saying this is the biggest fraud I've ever seen.

What do you have to say in response to that?

What do you tell these business owners and their employees who lively -- whose livelihoods depend on the...

HORN:
I went out immediately out to the -- with the dealer counsel on a call. I made a dealer video, which was sent out. And the dealers even showed it to their children, because -- and their families and their employees because they said that's the right thing on what we are approaching this.

CASTOR:
So detail for us how VW is informing dealers about the defeat devices and the solutions to fix cars that feature these defeat devices.

HORN:
As soon as we have the information necessary already and have discussed this with EPA and CARB about the timing or alongside the dealers will be naturally informed.

CASTOR:
They are not getting any information right now?

HORN:
Oh, of course, they are getting information.

CASTOR:
So what -- detail that for us.

HORN:
First of all, they get the information that we financially help them through this crisis.

Secondly, as I -- you know, the first thing is we talked the bonus trash was out (ph). They have free

flooring (ph). They got the discretionary fund. We have increased the incentives by $2,000 for loyal customer, for loyal Volkswagen customers in our loyalty program...

(CROSSTALK)

CASTOR:
... what does that mean?

HORN:
That means we get them started and don't let them dry out in the field.

CASTOR:
Is that -- is that a direct payment to customers or to dealers?

HORN:
The first two points, the bonus payments and the floor plan is directly to the dealers. The discretionary funds is directly to the dealers. And the incentives are for them. This is -- this is a certain cash incentive that they can manage to bring loyal customers and whether it's a TDI customer or a gas customer.

CASTOR:
So is that -- the intention there for the dealers then to contact customers who have purchased cars since the model year 2009?

HORN:
Yes, as one of the -- as one of the possibilities, sure. Yes.

CASTOR:
Well, is there -- VW is not giving any direction to dealers and their employees on contacting customers at this point in time?

HORN:
No. Of course. We having -- we set up in the frequently asked question. We are guiding the dealers with real-time -- what -- the same information we have in, which goes to all call centers as well because those, you know, have visited the call center in Auburn Hills. Those people are also front line. They need the same information. And as soon as we have it, the other people get it as well.

CASTOR:
All right.

What has VW told dealers about how existing Volkswagen models will be affected, cars that dealers have already sold and cars that are now sitting on the lots?

HORN:
We've informed the dealers directly on September 18 in a call, the national deal counsel. We followed up with letters and videos to do this.

MURPHY:
Thank you.

CASTOR:
OK, I'm (inaudible).

MURPHY:
The gentlelady's time expired.

Now recognize Mr. Barton for five minutes (inaudible).

BARTON:
Thank you, Mr. Chairman. And thank you and Ms. DeGette for organizing this hearing.

I am not a registered professional engineer anymore, but at one time I was. I still am an engineer by training. My daughter drives a Volkswagen Beetle. My former stepdaughter drives a Volkswagen Jetta. I don't think they're diesel; I think they're gasoline powered but they're both Volkswagens.

I've always had the highest respect for Volkswagen. I think it's a fine company, engineering wise and product wise.

But I must tell you, sir, it is extremely disappointing to look at the -- I don't know the right word to use -- immorality of the corporate decision to knowingly and willfully cheat on the U.S. emissions standards.

BARTON:
I mean, Volkswagen is one of the premier name brands in auto manufacturing in the world. And it's a reputation that's been gained over the last 50 or 60 years. And to have a company of your stature knowingly and willfully make a decision at the highest levels of the company to put a software program in your products that are meant intentionally to deceive or to cheat on U.S. emissions standards, to me, is -- I wouldn't have believed it if it wasn't factually proven.

So my first question to you is, I'm told that this was a decision made in Germany at the corporate level, is that correct?

HORN:
Two answers to this. First of all, the investigations are ongoing. But this was not a corporate decision, from my point of view. To my best knowledge today, the corporation and no board meeting or no supervisor report meeting has authorized this. But this was a couple of software engineers, who put this in for whatever reasons. And I would also like to find out. And I fully agree to...

(CROSSTALK)

BARTON:
So -- and this is an oversight were hearing. So I assume that you're testifying under oath.

Is that correct?

HORN:
This is -- I am under oath. I understand this, sir.

BARTON:
OK.

So what you're saying is that the senior -- the president of Volkswagen International did not know about this when it happened?

HORN:
What I said was, to my understanding, this was not a corporate decision. This was something individuals did.

BARTON:
OK. Now, that's not -- that's not what I was led to believe. But I take you at your word.

So I'll ask the second question. When did senior management, i.e., the president of Volkswagen International, the executive vice president, whoever your senior day-to-day corporate officers are, when did they learn of this action?

HORN:
To my understanding, also around the September 3rd notification of the agencies.

BARTON:
But it occurred years ago? Do you...

HORN:
Yes, sir.

BARTON:
... do you really believe, as good, as well run as Volkswagen has always been (inaudible) be that senior level corporate managers and administrators had no knowledge for years and years?

HORN:
I agree it's very hard to believe. And personally I struggle as well.

BARTON:
Yes, I -- that's an honest answer. I appreciate that.

Well, I don't know what to do but I do know that you can have an honorable disagreement about emissions standards and we've had that on this committee.

But as somebody who voted for the Clean Air Act amendments and as a conservative who believes that, if it's the law, it should be -- it should be implemented.

And corporate, especially international corporations, should honor those laws. Your company has not. I don't know what the penalty should be but it should be more than just a slap on the wrist.

I mean, this -- you know, I'm going to listen to the rest of the testimony and the questions and the staff recommendations.

But in every other case since I've been a congressman, when we have had problems with manufacturers, automobile manufacturers, in every case, it's been something happened that was really a mistake, an accident that they just didn't foresee it. That's not the case here.

HORN:
Yes.

BARTON:
There was a knowingly and willful decision to deceive in one of the most important markets in the world. And that, sir, is just wrong.

HORN:
With that, we agree.

BARTON:
Thank you, sir.

HORN:
Thank you.

MURPHY:
We will now recognize Mr. Kennedy for five minutes.

KENNEDY:
Thank you, Mr. Chairman.

Mr. Horn, thank you for being here today. I understand you have said several times your testimony is preliminary and there's investigation investigations ongoing. I want to -- so I appreciate that and I recognize that.

I do want to go back to what a number of my colleagues has gone to, with regards to timeline here. My understanding and from your testimony was that in the spring, I think specifically May of 2014, was when Volkswagen became aware that there were some issue with regards to emissions.

Is that right?

HORN:
Yes.

KENNEDY:
And then it was from May to December that CARB and EPA launched investigations into those -- the emissions. And the company itself, VW, started an investigation as to what led to the oddities, if you will, with regards to the emissions testing, right?

HORN:
I can't answer this really. I mean, I know that the -- that the actions to remedy these findings were discussed with CARB and EPA. Whether they have undergone own investigations between May 2014 and December 2014, I don't know. I know they did this afterwards when we started to flash the cars with the new software.

KENNEDY:
So -- OK.

If I tell you that EPA and CARB continued an investigation after that preliminary report from May, that there was -- and continued -- they continued their investigations, then December 2nd, 2014, VW shared testing results with EPA and CARB and proposed a recalibration fix.

Is that accurate?

HORN:
Yes.

KENNEDY:
And then VW initiated a voluntary recall of approximately 500,000 vehicles to try to deal with that recalibration issue.

In May, CARB commenced testing -- May 6th, I believe, 2015, CARB commenced testing to discern whether the fix that VW had proposed adequately and accurately fixed the underlying issue.

HORN:
Yes.

KENNEDY:
May 6th through July -- through July 2015, CARB conducted laboratory and on-road testing to confirm the efficacy of the recall.

What I'm getting at here, sir, is July 8th, CARB shared test results with VW and the EPA prompting a series of technical meetings, from my understanding. And according to CARB in the course of those meetings, VW disclosed that there were several issues that Gen 1, Gen 2 and the 2015 model of the improved SER (ph) vehicle known as Gen 3 had a second calibration intended to run during -- only during confirmatory testing.

So there was some knowledge, at least in July of this year, that there was some manipulation of software code with regards to the testing, was there not?

HORN:
This meeting you're referring to, I don't know. I can tell you that the first issue I got to -- got back to me and my attention was on the 20th of July, when my people of product marketing came to me and said we don't get model year '16 diesel certified.

And then I immediately wrote a letter to the -- or an e-mail to Dr. Jacob Noiser (ph) the EVP for research and engineering in Valsburg (ph), and I escalated this. And I said -- and the explanation was twofold. Either it was new systems -- and I don't know whether this is right -- and, B, there is still information missing.

So also my teams in Hernden (ph) with the national states (ph) company did not have this information. And then only in the weeks afterwards it started to unfold.

KENNEDY:
And so, sir, if I am understanding just kind of the broad aspects of your testimony correctly, this essentially, as you have said a number of times, this was not a company decision. This was a decision made by a number of individuals yet to be ascertained, underneath, at some other levels of the company that does not affect a corporate decision by the board by yourself.

Is that accurate?

HORN:

That's my understanding, yes.

KENNEDY:
So as number of now, at least according to press reports as of this morning, there's four individuals that have been suspended.

Is that right?

HORN:
I don't know. This is press reports.

KENNEDY:
Has there been, to your knowledge, has anybody been suspended at this point?

HORN:
I can't share names with you. There's no...

(CROSSTALK)

KENNEDY:
... has there been anybody that's been suspended at this point?

Has anybody, as of now, after Volkswagen, for knowing at least of some inconsistencies with test reports for the past 18 months, has anybody been suspended or lost their job?

HORN:
To my understanding, there have been three people suspended but I don't -- I cannot share the names here due to German law.

KENNEDY:
And I'm not asking for their names, sir.

You've mentioned the figures roughly, that this would take one to two years, five to 10 hours per car and roughly 430,000 cars.

Do you have any estimate at this point as to what the direct loss is for Volkswagen would be because of this incident?

HORN:
I think the losses are depending, A, on the fines we will get and we will have to pay and then also, B, on how much money it takes to fix those cars and, C, on how much money we will have to pay to

compensate the customers for what we did. And this is a whole lot of money, I'm quite -- I'm quite sure.

KENNEDY:
And so, sir, I think the overall question that you're sensing from myself (sic) and colleagues is that I understand that this was a decision that you're indicating was made by people underneath you.

It does get to the overall corporate integrity of the company.

And so what, if you can say, is going to be done to restore faith in the overall corporate structure of Volkswagen?

HORN:
First, very important clarification: it was done by people under me. I'm the CEO, president and CEO of Volkswagen Group of America. And those things have been developed in the relevant software departments in Germany, which is totally out of my jurisdiction or steering.

And the second, to get to your -- to get your answer, hopefully in the right way, with the -- with the compliance investigations, we have to streamline our processes and we have to -- this company has to bloody learn and use this opportunity in order to get their act together. And 600,000 people worldwide have to be managed in a different way. This is very, very clear.

KENNEDY:
Thank you, sir.

I yield back.

MURPHY:
I now recognize the vice chair of the full committee, Mr. McKinley, for five minutes.

MCKINLEY:
Thank you, Mr. Chairman.

Several things. First, you option not to challenge the WVU (ph) decision that the research that was done. So it is -- you've not challenged the research that was done. Everyone has recognized you did knowingly then violate it.

Is that correct?

HORN:
I don't understand this question, sir. I'm sorry.

MCKINLEY:
Did -- were you -- you opted not to challenge or appeal the findings from the WVU.

So does that mean you knowingly violated...

HORN:
No. No, sir.

MCKINLEY:
You did -- you did challenge and appeal the WVU findings?

HORN:
I did not challenge because software actions, recalls, service complaints, in the millions for this company, is normally doing business. I was worldwide service and parts executive for Volkswagen Worldwide. I have been to the product safety committee. I know how the system is working with all the experts and that we got a seal of approval onto those actions. And I am not the technical experts. There is enough people in the system...

MCKINLEY:
Well, let me get to the crux of more of my question.

Is this -- I know the EPA fines -- we just had a situation where a small poultry farm was fined $17,000 a day because they were allowing dust to come out of their chicken house, out into the neighborhood. We've seen steel mills being fined $3 million, $5 million, $7 million daily until they clean up their discharge into a river. We've seen coal mines and other -- so there has to be -- you -- I think you can understand. There's -- there ought to be consequences for this violation.

So I'm curious -- I assume you are accruing something on your financial sheets for what could be a fair -- what is -- could be an expected penalty for having violated the laws here in the United States.

Can you share with us or will you share with us what you're accruing on your balance sheet for penalties, expected penalties?

(CROSSTALK)

HORN:
For the time being, I mean, there is an official information that the company has accrued directly 6.5 billion euros in the first step in this year. Maybe this is enough. Maybe this is not enough. I don't know. And the rest will have to be worked out with the specific experts as we have hired enough experts, I can tell you.

(CROSSTALK)

MCKINLEY:

Thank you. Now when the imports your vehicles in, you have to provide a certificate of conformity with the EPA standards. And the -- from what I understand the defeat device was not included in that certificate of conformity.

Is that correct?

HORN:
That's my understanding, yes, sir.

MCKINLEY:
Can you share with us why you -- why someone would try to deceive the American government?

Why that wasn't included in the application of conformity?

HORN:
Because those people who did the applications most probably did not know, did not know that it was in there.

MCKINLEY:
Who -- can you share with us who is responsible for this failure to include a description?

Is this limited to one, two people?

HORN:
That's -- we have an -- we have an office, which is called EEO in Auburn Hills, which is directly linked to the German research and development department. They work together. They get all the informations, all the results, testing, things, technical specifications. And then they file the applications for conformity and all those...

MCKINLEY:
Mr. Horn, thank you for testifying before us. Let me just one last question is we've all been -- many of us have been talking about this defeat device.

For the American public to understand what this is, can you explain what this -- what this defeat device is and how it functions?

HORN:
Yes. To my understanding, the defeat device is not a device but it's a software code in the engine and exhaust system management and -- which detects -- this software detects whether a car is on the dynotesting environment or whether the car is on the road being driven.

And one example, for instance, is the steering wheel angle and how many times it's been changed because once a car is on the dyno, it's on the dyno. Nothing changes. And if the car is on the street,

the steering wheel changes. And there -- since there are so many sensors in there, these are one of the examples people gave me on how this device, which is a software code, again, worked.

But hidden in millions of software codes. So if you don't know this, very difficult to detect from my limited technical understanding.

MCKINLEY:
Thank you.

I yield back my time.

MURPHY:
Thank you. The gentleman yields back.

Now recognize Ms. Schakowsky for five minutes.

SCHAKOWSKY:
Thank you, Mr. Chairman.

I have in my hand a letter from Volkswagen that was sent to one of my senior staff because she is an owner of your car. I remember when she bought the car and how excited she was about the clean diesel.

The letter says, "Your vehicle remains both safe to drive and legal to drive. You do not need to take any action at this time. All we ask is for your patience."

I have to tell you, if I were a driver of one of these vehicles that's contributing up to 40 times the amount of emissions, I would want that addressed right away. I have a son and a grandchild who regularly uses an inhaler. I'm not excited about contributing to or driving a car that has that kind of emissions.

So how much patience is my staff supposed to have?

What's the timeline here?

What's the best scenario and the worst scenario in terms of timeline for fixing this?

HORN:
For the Generation 3 cars, this model year '16 and '15, the timeline is the beginning of next year, complete fix.

For the Generation 2 cars, it's still underdevelopment. This won't start, from my judgment, before middle of next year. And for the Generation 1 cars, which is the biggest -- which is the biggest fleet, I cannot give you a date right now.

But within the next couple of weeks, we'll start discussing those scenarios with EPA and CARB and alongside the development guides we'll have to do that...

SCHAKOWSKY:
So these cars unfixed could be on the road for more than a year, let's say?

HORN:
Yes.

SCHAKOWSKY:
Or two years?

HORN:
More than a year, definitely.

SCHAKOWSKY:
I wanted to follow up on a question that Mr. Pallone asked. It sounded like you were saying that the fix could manage fuel economy, engine performance and emissions, that all of that could be fixed.

If that's so, why didn't Volkswagen do that initially?

Why wouldn't you make a car that would achieve those goals?

HORN:
I think it's a great question.

SCHAKOWSKY:
I mean, I can only assume that maybe cheating was cheaper?

HORN:
To my understanding, what I have learned, some people have made the wrong decisions in order to get away with something, which will have to be found out.

SCHAKOWSKY:
Let me ask you this.

Have you considered financial compensation, for example, allowing customers to actually return the car for what they paid for it?

HORN:
This is one of the areas we're looking into right now in terms of how to compensate our customers,

yes.

SCHAKOWSKY:
Providing rebate for lost value of the car?

HORN:
Sure.

SCHAKOWSKY:
And what about right now, if I had one of those cars and I wanted a loaner, would you compensate the dealer to give me a loaner instead of having to drive that polluting car?

HORN:
We would have to discuss and consider this. Right now I would say no, honestly, because the EPA has said these cars are legal and safe to drive.

SCHAKOWSKY:
And so, even though they -- you know that there's up to 40 times more pollution, if I -- if I went to my dealer, who might, because they're in a fix right now, say, OK, we'll give you a loaner, the company would not do anything to make ultimately your customer happy?

HORN:
So there's a general policy. And this is exactly the reason why we gave the dealers the discretionary funds which they could use at their discretion in order to help customers, very significant cases. And whether they do a loaner car program for the specific customer or whether they take them out of the car or whatever they think is best in this particular customer situation they can do with this money, no questions asked, yes.

SCHAKOWSKY:
But there is no policy that dealers could say they could -- that loaners would be available?

I realize 500,000 loaners would be probably a hard thing to do. But you see how that would be a desirable remedy for many people.

HORN:
I understand your point, yes.

CQ Transcriptions, Oct. 8, 2015**List of Panel Members and Witnesses**

PANEL MEMBERS:
REP. TIM MURPHY, R-PA. CHAIRMAN

REP. DAVID B. MCKINLEY, R-W.VA.

REP. MICHAEL C. BURGESS, R-TEXAS

REP. MARSHA BLACKBURN, R-TENN.

REP. MORGAN GRIFFITH, R-VA.

REP. LARRY BUCSHON, R-IND.

REP. BILL FLORES, R-TEXAS

REP. SUSAN W. BROOKS, R-IND.

REP. MARKWAYNE MULLIN, R-OKLA.

REP. RICHARD HUDSON, R-N.C.

REP. CHRIS COLLINS, R-N.Y.

REP. KEVIN CRAMER, R-N.D.

REP. JOE L. BARTON, R-TEXAS

REP. FRED UPTON, R-MICH. EX OFFICIO

REP. DIANA DEGETTE, D-COLO. RANKING MEMBER

REP. JAN SCHAKOWSKY, D-ILL.

REP. KATHY CASTOR, D-FLA.

REP. PAUL TONKO, D-N.Y.

REP. JOHN YARMUTH, D-KY.

REP. YVETTE D. CLARKE, D-N.Y.

REP. JOSEPH P. KENNEDY III, D-MASS.

REP. GENE GREEN, D-TEXAS

REP. PETER WELCH, D-VT.

REP. FRANK PALLONE JR., D-N.J. EX OFFICIO

WITNESSES:
MICHAEL HORN, PRESIDENT AND CEO, VOLKSWAGEN GROUP OF AMERICA

Source: **CQ Transcriptions**
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To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Thur 10/8/2015 8:24:27 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Quartz:

http://qz.com/520425/volkswagens-us-ceo-gets-grilled-by-congress/

Volkswagen's US CEO gets grilled by Congress

Ashley Rodriguez

Volkswagen Group of America CEO Michael Horn was grilled by an inflamed US House subcommittee today (Oct. 8) over the emissions-cheating device that the company used to defraud the public and how the automaker plans to make it right.

The representatives, a few of whom were current or former Volkswagen owners, were not softened by Horn's apologies during his opening remarks.

"There seems to be a pervasive culture of deception in the auto industry and it has to stop now," said Representative Frank Pallone of New Jersey, citing the subcommittees past investigations into Toyota and other automakers. "The American public are not crash test dummies and cannot be treated as such."

During the hearing, the subcommittee fixated on establishing a timeline for when Volkswagen's leadership learned about the defeat device that affected 11 million vehicles worldwide and when it will make consumers and dealers, who now have worthless cars sitting on their lots, whole again.

Horn was asked repeatedly throughout the hearing when he and Volkswagen's top brass first discovered the emissions-cheating devices. He said it was around the company's Sept. 3 meeting with regulators.

When pressed by Texas Republican Joe Barton on whether he truly believed that the automaker's bosses had no idea that cars dating back to 2009 were cheating emissions tests, Horn replied: "I agree. It's very hard to believe and personally I struggle [with it] as well."

The committee also sought to understand exactly how the defeat device worked, how it could be fixed, and why it was created to begin with, but none of Horn's answers seemed to satisfy them. He said he expects it to take one to two years minimum to fix all of the 500,000 affected vehicles on US roads today, once a solution is approved, and could not outline precisely when that would occur.

In what was perhaps one of the most heated moments of the hearing, Representative Peter Welch read aloud questions from Vermont citizens that underscore the "white heat anger" Americans have about the deception, rhetorically asking: "What will you, VW, be reading while you're in jail?" and "How do you sleep at night?

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Mirror (UK):

http://www.mirror.co.uk/news/business/volkswagen-refund-owners-full-cost-6599664

Volkswagen may refund owners full cost of their car after emissions scandal

BY GRAHAM HISCOTT

Motor giant's chief Michael Horn said it was "one of the areas we are looking at"

Volkswagen is considering full refunds for owners of "cheat switch" cars as compensation.

The motor giant's chief in the US confirmed it was "one of the areas we are looking at".

Michael Horn was being quizzed by a Congressional hearing and was urged to refund the cost of cars found to have the device which illegally beat tough US diesel emission rules.

The move would rocket VW's estimated £4.7billion costs.

Congressman Chris Collins, who accused VW of "arrogance", suggested bosses should budget for 10 times that.

Mr Horn said he didn't sleep at night and that VW "could take one to two years minimum" to upgrade 430,000 cars' exhausts in the US.

His evidence emerged as police raided Volkswagen's HQ in Germany.

The defeat device was fitted to 11m cars and vans worldwide, including nearly 1.2m in the UK.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:13 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia; Purchia, Liz
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Imperial Valley Press):

http://www.ivpressonline.com/news/politics/the-latest-lawmakers-press-epa-on-its-response-to-vw/article_519e6c47-5fa8-5567-be83-f59310e4f4a8.html

The Latest: Lawmakers press EPA on its response to VW case

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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3:06 p.m.

Members of a House subcommittee are grilling two Environmental Protection Agency officials about why they're allowing diesel-powered Volkswagens to stay on the road when they are spewing out more pollution than allowed by law.

Rep. Jan Schakowsky, D-Ill., asked what authority the EPA has to leave the cars on the road when they're emitting 10 to 40 times the pollution allowed by law.

EPA Director of Transportation and Air Quality Christopher Grundler says the agency will look for ways to make VW mitigate the environmental damage.

EPA Air Enforcement Director Phillip Brooks says the agency can't take the pollution out of the air, but in the past it has required offenders to reduce pollution in the future.

The officials say it's likely that VW will face significant fines and possible criminal charges against the company due to the cheating.

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2:53 p.m.

A top official says the U.S. Environmental Protection Agency is pressing Volkswagen for fixes on its emissions-cheating diesel engines and hopes to see solutions as early as next week.

EPA Director of Transportation and Air Quality Christopher Grundler says he has told VW to present more than one fix. He says the EPA will look at the impact on car owners before approving anything.

In testimony before a House subcommittee Thursday, Grundler says he wishes the EPA would have caught VW sooner. He says the agency has changed testing procedures so they are unpredictable to automakers.

Grundler says the EPA won't go after individual car owners, but it is investigating Volkswagen's conduct.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:09 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP:

http://bigstory.ap.org/article/8fab9def3da5407398288aedba31e011/vws-us-ceo-face-tough-questions-congressional-hearing

VW executive apologizes but says scandal not his fault

By MICHAEL BIESECKER and MATTHEW DALY

WASHINGTON (AP) — Volkswagen's top U.S. executive offered deep apologies yet sought to distance himself Thursday from the emissions scandal enveloping the world's largest automaker. He asserted that he and other top corporate officials had no knowledge of the cheating software installed in 11 million diesel cars.

Though he said he hadn't been briefed on the preliminary findings of the ongoing internal investigation, Volkswagen of America CEO Michael Horn told a congressional subcommittee that a tiny group of software developers in Germany was responsible for the computer code that enabled the cars to trick U.S. government emissions tests. Three lower-level managers have been

suspended.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said, adding that he felt personally deceived.

That explanation left members of the House panel investigating the scheme incredulous.

"I agree it's very hard to believe," Horn conceded.

Rep. Chris Collins, R-N.Y., was among the lawmakers who said he could not accept VW's characterization that "this was the work of a couple of rogue engineers." He added, "This didn't happen in one day."

Collins, an engineer, said it appears that VW executives "are complicit in a massive cover-up at the highest levels that continues to this day."

For more than two hours, Horn, the 51-year-old German, sat calmly, occasionally sipping from a cup of water as news photographers' camera shutters clicked away. As the elected officials expressed anger, disappointment and skepticism at the company where he has worked for nearly half his life, Horn apologized but provided little new information.

More than a month after the company first confessed the emissions-rigging to U.S. regulators, Horn said it doesn't yet have a detailed plan for fixing the nearly 500,000 "clean diesel" cars sold in the U.S. with the suspect software since the 2009 model year. Such a solution will likely take up to two years, he said, adding that each car might require between 5 and 10 hours' work by a mechanic to meet clean air standards.

The cars are safe to drive, the government says, but Horn suggested Volkswagen could compensate some owners, possibly by paying them for the lost value of their vehicles.

Shortly before Horn began his testimony, German police and prosecutors raided VW's global headquarters in Wolfsburg and other locations seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

In the U.S., the Environmental Protection Agency and the Justice Department are conducting a criminal investigation. VW also potentially faces billions in fines for violating the Clean Air Act, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

Horn said VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide. It was not immediately clear what a newly revealed device found in the new VW models does, or when the company might resubmit the applications needed to sell the cars.

Liz Purchia, an EPA spokeswoman, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The lack of certification is bad news for American VW dealers who had hoped to put the new models on sale soon. For some dealerships, the diesel models account for about one-third of sales.

During the hearing, lawmakers from both parties fondly recalled their first VWs before hammering the iconic company for betraying the public's trust.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

It was Rep. Morgan Griffith, a Virginia Republican, who most directly channeled the anger and hurt of Volkswagen's customer base.

He recounted that when his mother could afford her first new car, she bought the stick-shift Volkswagen Squareback on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still owns.

He bought a Rabbit in the 1980s, and in the 1990s a gas-powered Jetta, Griffith said. He then bought a 2003 gasoline-powered Passat and racked up 376,225 miles, followed by a 2012 diesel Passat — one of the cars caught up in the scandal.

"I'm your consumer," Griffith told Horn, his voice stern. "I'm your VW driver who has always trusted your company, and I'm very disappointed."

–

AP Auto Writer Tom Krisher contributed to this report from Detroit.

The Guardian:

http://www.theguardian.com/business/2015/oct/08/vw-scandal-two-simple-questions-two-complex-answers

VW scandal: two simple questions, two complex answers

The US Congress hearing into the emissions-rigging scandal mixed frustration with incredulity at answers from Volkswagen's US CEO Michael Horn

Graham Ruddick

Thursday 8 October 2015 15.24 EDT Last modified on Thursday 8 October 2015 15.27 EDT

Despite Volkwagen's congressional hearing lasting more than two hours and the carmaker's US boss facing almost constant criticism, Congress was only fixated on a pair of questions – who is to blame for the diesel emissions scandal and how are you going to fix it?

Unfortunately for Michael Horn and VW, the energy and commerce committee in Congress was not satisfied with either answer.

Horn warned it will take "one to two years minimum" to fix the half-a-million cars in the US fitted with a defeat device.

The vast majority of these cars – 430,000 – will require software and hardware repairs that could even involve a new tank being fitted to the vehicle. However, Horn admitted that the fix was still being tested and the solution is "complex".

Frank Pallone, representative for New Jersey, refused to believe that VW's repairs would not effect the performance of the vehicle. He also urged VW to consider offering customers a full refund for their vehicle.

However, if the committee was frustrated with Horn's explanation with VWs' plan to fix the affected cars, it was nothing compared to their incredulity at his answer about who fitted the defeat devices that allowed vehicles to cheat emissions tests.

Horn regurgitated the official VW answer that it was "not a corporate decision" and that "a couple of software engineers" put the device into the vehicles. Three people have been suspended by the company according to Horn, whose official title is president and chief

executive of Volkswagen Group of America.

"Do you know how that defies credulity?" Michael Burgess from Texas said.

Chris Collins went even further. The representative from New York said he "categorically rejects" VW's version of events and that either the carmaker is incompetent or guilty of a "massive cover-up".

Did the company not wonder how its engineers had managed to lower the emissions on a car that was 40 times over the legal limit, he asked? If they had actually done this it would have been "massive breakthrough technology" and surely VW would have looked to patent the device that did it.

"It goes way, way higher than that," Collins said of the explanation that rogue engineers are to blame.

Perhaps as a defensive strategy aimed at winning over the committee or perhaps because he genuinely does doubt the company's official version of events, Horn said he also struggled to believe this story.

"I agree too, it is very hard to believe, and personally I struggle as well," Horn said.

Horn described how the defeat device was actually a line of code "hidden in millions of software code", meaning it was possible it was missed by others in VW.

However, he also criticised his own company, urging VW to "bloody learn and use the opportunity to get its act together". The way the carmaker manages its 600,000 staff needs to change, he added.

The scandal was ultimately caused by "pressure in the system to get resolutions and cost pressures", according to Horn. "It is dead wrong if you put corporate profits before people."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:03 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

NY Times:

http://www.nytimes.com/2015/10/09/opinion/vw-and-michael-horn-need-to-come-clean-now.html

VW Needs to Come Clean, Now

By THE EDITORIAL BOARD

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage.

Since they were forced to admit one the biggest frauds in auto industry history last month, the executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars. But none of that has explained who ordered, approved and designed the software that enabled the cars to cheat on emissions tests while belching pollutants when they were on the road. Nor has VW explained how and when it plans to fix the cars, which many customers bought in the belief that they were fuel efficient and clean.

These and many more questions were angrily hurled at Michael Horn, the head of the Volkswagen Group of America, when he appeared before a congressional hearing on Thursday.

Yet beyond more apologies and an admission that he did hear of "possible emissions noncompliance" back in the spring of 2014, Mr. Horn had few answers. In May 2014, a nonprofit environmental research group alerted government regulators that Volkswagen and Audi cars with certain diesel engines in the United States were spewing far more emissions on the road than in tests. That was also when Volkswagen began misleading regulators with claims that the study was flawed, and then with a recall that failed to fix the problem.

Given the huge emphasis Mr. Horn's American operation was putting on "clean diesel" to boost VW's flagging American sales at the time, it is hard to believe that he did not follow up those initial reports with corporate leaders at Volkswagen headquarters in Wolfsburg, Germany. Instead on Thursday, he offered the standard defense — so often used by corporate executives in the face of misconduct — that no one of any importance knew anything of a fraud that has now caused the company's share price to decline by a third in value. Mr. Horn would only say that this deception was the work of "a couple of software engineers," and not a corporate decision.

On Thursday, German prosecutors raided the corporate offices as part of their investigation. Meanwhile, Matthias Müller, the newly appointed Volkswagen chief executive, continued to insist that his predecessor, Martin Winterkorn, who resigned shortly after the scandal broke in September, knew nothing. "Do you really think that a chief executive had time for the inner functioning of engine software?" he said in an interview with Frankfurter Allgemeine Zeitung, as if the problem was some minor malfunction and not an elaborate effort to deceive regulators and customers around the world.

If Mr. Winterkorn was not responsible, who is? Nobody believes that the handful of senior managers suspended so far, three of them involved in engine development, could have carried out this scheme without any support. Hans-Dieter Pötsch, newly appointed as supervisory board chairman, issued a statement on Wednesday saying it would take time before Volkswagen could made public the findings of its internal inquiries. "We must overcome the current crisis," he explained, "but we must also ensure that Volkswagen continues to grow." That seems to miss the point that Volkswagen will neither overcome the crisis nor grow unless it can produce some credible answers and explanations in short order.

Even if they manage to fix millions of cars, Volkswagen executives will still face a monstrous challenge from lawsuits, potential prosecutions, lost sales and the blow to VW's reputation for quality engineering. There is no defeat device to deflect the angry and urgent questions that lawmakers hurled at Mr. Horn. Apologizing is the easy part.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 3:04 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

“I personally struggle as well,” he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

“Responsible parties will be identified and held accountable,” he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he’s dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can’t sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company’s auto plant in Chattanooga, Tenn., are worried about what the damage to VW’s brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed,” said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren’t as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying “our plan is to fix the cars.”

Later, however, he said how to compensate the company’s customers is one of the areas the company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

“My answer to myself is that I do everything -- and I don’t sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.,” Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will “most probably” only require a software solution, which Horn said may begin in the middle of next year because of its “technical complexity.”

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

“Mr. Horn your statements don’t give me much confidence that these cars are going to be fixed,” Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a “lean NOx trap.” The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn’t big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That’s why other automakers have gone with a method called “selective catalytic reduction,” which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It’s also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the numbers, "but within this context it needs to be addressed."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

—

11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

—

11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

—

10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

—

10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then

turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator

inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM

To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers,

whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan

coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

-

Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene

Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution

protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal.”

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new cars. "It's definitely a stain on the brand's image," he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, intended to tell lawmakers that he learned about the cheating software "over the past several weeks," VW spokeswoman Jeannine Ginivan said.

'I did not think that something like this was possible at the Volkswagen Group," Horn said in his prepared remarks. "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was "determined to make things right."

From: Gong, Kristiene

Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that

their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of

nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The

agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

-

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Thur 10/8/2015 8:31:55 PM
Subject: DAILY: VW's Horn says older diesels will need software and hardware fixes | FCA-UAW deal would boost Tier 2 pay to $29/hour | Toyota at Tokyo show | Is Ferrari worth $12.4 billion? | VW HQ searched

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October 8, 2015

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THE VW DIESEL CRISIS

Older VW diesels will need software and hardware fixes, Horn tells lawmakers

A software fix won't be enough to bring most of the 482,000 vehicles involved in its emissions violations scandal into compliance with U.S. clean air laws, Volkswagen Group of America CEO Michael Horn testified in a congressional hearing today.

New FCA-UAW contract deal would raise Tier 2 pay to $29 an hour, report says

Fiat Chrysler is offering so-called second-tier UAW members as much as $29 an hour -- up from $25 previously proposed -- under a new tentative agreement which avoided a strike by 40,000 union members, two people

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familiar with the matter told Bloomberg today.

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Toyota is going big at the Tokyo Motor Show this month, with an eclectic display parading everything from a snappy compact sports car and futuristic hydrogen vehicle to a whacked-out retro concept and pocket-sized humanoid robot.

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VW headquarters searched by German prosecutors

Ferrari's coveted status as a maker of cars for the super rich is helping push up its value in an initial public offering to as much as $12.4 billion, people familiar with the matter told Bloomberg.

Prosecutors raided VW's headquarters in Germany and other offices today as part of their investigation into the carmaker's rigging of diesel emissions tests.

Why trouble for VW made in Germany means Mexico headache

NEWS ANALYSIS

VW's U.S. recall could be thwarted by reluctant diesel owners

VW Credit not subject to parent company's hiring freeze in wake of scandal

Suppliers shouldn't pay for VW diesel scandal, executive says

THE VW DIESEL CRISIS

VW cheat software was switched on in Europe, report says

UAW touts 'significant gains' after securing deal with FCA at deadline

Fiat Chrysler workers skeptical of new UAW deal's impact on wages

GM to recall 31,685 SUVs in North America

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HANNAH LUTZ

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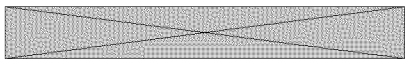

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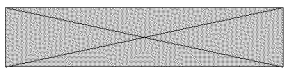
by DMEautomotive



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From: Gong, Kristiene
Sent: Thur 10/8/2015 8:39:38 PM
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Vice News:

https://news.vice.com/article/lawmakers-slam-volkswagen-executive-during-congressional-hearing

Lawmakers Slam Volkswagen Executive in Emissions Cheating Hearing

By Olivia Becker

October 8, 2015 | 4:25 pm

CEO of Volkswagen America, Michael Horn, appeared before Congress on Thursday to testify about how Volkswagen knowingly installed software that skirted emission regulations in 11 million of its cars, almost 500,000 of which in the US.

Horn calmly apologized for Volkswagen's actions, which he called "deeply troubling," but it did little to protect him from the wrath of the lawmakers on the subcommittee.

"VW has betrayed a nation," said Representative Fred Upton, the chairman of the House committee on Energy and Commerce. "It's time to clean up or get off the road."

The company admitted last month that for the past six years the it has installed special software on VW diesel engines which detects when the vehicle is undergoing an official emissions test. The so-called "defeat devices" were programmed to limit car emissions for the duration of the

test, after which the car would return to emitting nitrogen oxide at levels up to 40 times the legal limit.

The German car company, which up until now has had a largely positive reputation, has subsequently found itself at the center of what lawmakers today called a worse scandal than Enron. On September 18, the Environmental Protection Agency issued a federal notice to Volkswagen, which has halted sales of its diesel cars in the US and issued a recall of all affected vehicles. The company's CEO, Martin Winterkorn, has resigned and the company's stock has plummeted.

The subcommittee members warned Horn they were not going to go easy on him from the outset.

"We're going to be very precise with you and VW," said Rep. Marsha Blackburn at the start of the hearing. She, along with her fellow representatives, then spent the next two hours asking him questions including whose decision it was at the company to implement the defeat devices, who designed the software, how far up in the company it went, when Horn first knew about it, how exactly the software operated, and why Volkswagen chose to do it in the first place.

Horn insisted that several rogue software engineers developed the defeat devices on their own and that he personally had no idea that they were being used. "This was not a corporate decision, to the best of my knowledge," said Horn.

But that answer did not please Horn's questioners. If that was true, responded Representative Chris Collins, a Republican from New York, "either your entire organization is incompetent, and I don't believe that for a second, or they are complicit, at the highest levels, in a massive cover up that continues today."

Horn himself later admitted in the hearing that his own claim that the devices were not a top-down decision was "hard to believe."

Apparently German investigators don't believe Horn either. As the hearing was proceeding on Capitol Hill, authorities in Germany were searching Volkswagen's offices in an attempt to find

more information on who at the company had been involved in the design and implementation of the software, reported National Public Radio.

Horn said that Volkswagen had fired three employees who were involved in developing the software and that the company is conducting its own internal investigation.

When asked what the company planned to do to compensate for all the Volkswagen vehicles currently sitting on car dealership lots and unable to be legally sold, Horn explained that the dealerships would receive compensation, although he did not say how much. Horn also explained that the company was working to fix the exhaust systems in three separate groups of cars that had the devices and to ensure that this would never happen again.

But Representative Frank Pallone, a Democrat from New Jersey, said that Horn's statements did not give him much confidence that Volkswagen would actually fix the vehicles.

US Representative Peter Welch, a Democrat from Vermont, was one of the last to take his turn questioning Horn. He was visibly upset as he shared some of the letters he had received from his constituents, one of which said, "VW is the Lance Armstrong of the [auto] industry."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:24 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia; Purchia, Liz
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Quartz:

http://qz.com/520425/volkswagens-us-ceo-gets-grilled-by-congress/

Volkswagen's US CEO gets grilled by Congress

Ashley Rodriguez

Volkswagen Group of America CEO Michael Horn was grilled by an inflamed US House subcommittee today (Oct. 8) over the emissions-cheating device that the company used to defraud the public and how the automaker plans to make it right.

The representatives, a few of whom were current or former Volkswagen owners, were not softened by Horn's apologies during his opening remarks.

"There seems to be a pervasive culture of deception in the auto industry and it has to stop now," said Representative Frank Pallone of New Jersey, citing the subcommittees past investigations into Toyota and other automakers. "The American public are not crash test dummies and cannot be treated as such."

During the hearing, the subcommittee fixated on establishing a timeline for when Volkswagen's leadership learned about the defeat device that affected 11 million vehicles worldwide and when it will make consumers and dealers, who now have worthless cars sitting on their lots, whole again.

Horn was asked repeatedly throughout the hearing when he and Volkswagen's top brass first discovered the emissions-cheating devices. He said it was around the company's Sept. 3 meeting with regulators.

When pressed by Texas Republican Joe Barton on whether he truly believed that the automaker's bosses had no idea that cars dating back to 2009 were cheating emissions tests, Horn replied: "I agree. It's very hard to believe and personally I struggle [with it] as well."

The committee also sought to understand exactly how the defeat device worked, how it could be fixed, and why it was created to begin with, but none of Horn's answers seemed to satisfy them. He said he expects it to take one to two years minimum to fix all of the 500,000 affected vehicles on US roads today, once a solution is approved, and could not outline precisely when that would

occur.

In what was perhaps one of the most heated moments of the hearing, Representative Peter Welch read aloud questions from Vermont citizens that underscore the "white heat anger" Americans have about the deception, rhetorically asking: "What will you, VW, be reading while you're in jail?" and "How do you sleep at night?

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Mirror (UK):

http://www.mirror.co.uk/news/business/volkswagen-refund-owners-full-cost-6599664

Volkswagen may refund owners full cost of their car after emissions scandal

BY GRAHAM HISCOTT

Motor giant's chief Michael Horn said it was "one of the areas we are looking at"

Volkswagen is considering full refunds for owners of "cheat switch" cars as compensation.

The motor giant's chief in the US confirmed it was "one of the areas we are looking at".

Michael Horn was being quizzed by a Congressional hearing and was urged to refund the cost of cars found to have the device which illegally beat tough US diesel emission rules.

The move would rocket VW's estimated £4.7billion costs.

Congressman Chris Collins, who accused VW of "arrogance", suggested bosses should budget for 10 times that.

Mr Horn said he didn't sleep at night and that VW "could take one to two years minimum" to upgrade 430,000 cars' exhausts in the US.

His evidence emerged as police raided Volkswagen's HQ in Germany.

The defeat device was fitted to 11m cars and vans worldwide, including nearly 1.2m in the UK.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:13 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia; Purchia, Liz
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Imperial Valley Press):

http://www.ivpressonline.com/news/politics/the-latest-lawmakers-press-epa-on-its-response-to-vw/article_519e6c47-5fa8-5567-be83-f59310e4f4a8.html

The Latest: Lawmakers press EPA on its response to VW case

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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3:06 p.m.

Members of a House subcommittee are grilling two Environmental Protection Agency officials about why they're allowing diesel-powered Volkswagens to stay on the road when they are spewing out more pollution than allowed by law.

Rep. Jan Schakowsky, D-Ill., asked what authority the EPA has to leave the cars on the road when they're emitting 10 to 40 times the pollution allowed by law.

EPA Director of Transportation and Air Quality Christopher Grundler says the agency will look for ways to make VW mitigate the environmental damage.

EPA Air Enforcement Director Phillip Brooks says the agency can't take the pollution out of the air, but in the past it has required offenders to reduce pollution in the future.

The officials say it's likely that VW will face significant fines and possible criminal charges against the company due to the cheating.

2:53 p.m.

A top official says the U.S. Environmental Protection Agency is pressing Volkswagen for fixes on its emissions-cheating diesel engines and hopes to see solutions as early as next week.

EPA Director of Transportation and Air Quality Christopher Grundler says he has told VW to present more than one fix. He says the EPA will look at the impact on car owners before approving anything.

In testimony before a House subcommittee Thursday, Grundler says he wishes the EPA would have caught VW sooner. He says the agency has changed testing procedures so they are unpredictable to automakers.

Grundler says the EPA won't go after individual car owners, but it is investigating Volkswagen's conduct.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:09 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP:

http://bigstory.ap.org/article/8fab9def3da5407398288aedba31e011/vws-us-ceo-face-tough-questions-congressional-hearing

VW executive apologizes but says scandal not his fault

By MICHAEL BIESECKER and MATTHEW DALY

WASHINGTON (AP) — Volkswagen's top U.S. executive offered deep apologies yet sought to distance himself Thursday from the emissions scandal enveloping the world's largest automaker. He asserted that he and other top corporate officials had no knowledge of the cheating software installed in 11 million diesel cars.

Though he said he hadn't been briefed on the preliminary findings of the ongoing internal investigation, Volkswagen of America CEO Michael Horn told a congressional subcommittee that a tiny group of software developers in Germany was responsible for the computer code that enabled the cars to trick U.S. government emissions tests. Three lower-level managers have been suspended.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said, adding that he felt personally deceived.

That explanation left members of the House panel investigating the scheme incredulous.

"I agree it's very hard to believe," Horn conceded.

Rep. Chris Collins, R-N.Y., was among the lawmakers who said he could not accept VW's characterization that "this was the work of a couple of rogue engineers." He added, "This didn't

happen in one day."

Collins, an engineer, said it appears that VW executives "are complicit in a massive cover-up at the highest levels that continues to this day."

For more than two hours, Horn, the 51-year-old German, sat calmly, occasionally sipping from a cup of water as news photographers' camera shutters clicked away. As the elected officials expressed anger, disappointment and skepticism at the company where he has worked for nearly half his life, Horn apologized but provided little new information.

More than a month after the company first confessed the emissions-rigging to U.S. regulators, Horn said it doesn't yet have a detailed plan for fixing the nearly 500,000 "clean diesel" cars sold in the U.S. with the suspect software since the 2009 model year. Such a solution will likely take up to two years, he said, adding that each car might require between 5 and 10 hours' work by a mechanic to meet clean air standards.

The cars are safe to drive, the government says, but Horn suggested Volkswagen could compensate some owners, possibly by paying them for the lost value of their vehicles.

Shortly before Horn began his testimony, German police and prosecutors raided VW's global headquarters in Wolfsburg and other locations seeking material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

In the U.S., the Environmental Protection Agency and the Justice Department are conducting a criminal investigation. VW also potentially faces billions in fines for violating the Clean Air Act, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

Horn said VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide. It was not immediately clear what a newly revealed device found in the new VW models does, or when the company might resubmit the applications needed to sell the cars.

Liz Purchia, an EPA spokeswoman, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The lack of certification is bad news for American VW dealers who had hoped to put the new models on sale soon. For some dealerships, the diesel models account for about one-third of sales.

During the hearing, lawmakers from both parties fondly recalled their first VWs before hammering the iconic company for betraying the public's trust.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

It was Rep. Morgan Griffith, a Virginia Republican, who most directly channeled the anger and hurt of Volkswagen's customer base.

He recounted that when his mother could afford her first new car, she bought the stick-shift Volkswagen Squareback on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still owns.

He bought a Rabbit in the 1980s, and in the 1990s a gas-powered Jetta, Griffith said. He then

bought a 2003 gasoline-powered Passat and racked up 376,225 miles, followed by a 2012 diesel Passat — one of the cars caught up in the scandal.

"I'm your consumer," Griffith told Horn, his voice stern. "I'm your VW driver who has always trusted your company, and I'm very disappointed."

–

AP Auto Writer Tom Krisher contributed to this report from Detroit.

The Guardian:

http://www.theguardian.com/business/2015/oct/08/vw-scandal-two-simple-questions-two-complex-answers

VW scandal: two simple questions, two complex answers

The US Congress hearing into the emissions-rigging scandal mixed frustration with incredulity at answers from Volkswagen's US CEO Michael Horn

Graham Ruddick

Thursday 8 October 2015 15.24 EDT Last modified on Thursday 8 October 2015 15.27 EDT

Despite Volkwagen's congressional hearing lasting more than two hours and the carmaker's US boss facing almost constant criticism, Congress was only fixated on a pair of questions – who is to blame for the diesel emissions scandal and how are you going to fix it?

Unfortunately for Michael Horn and VW, the energy and commerce committee in Congress was not satisfied with either answer.

Horn warned it will take "one to two years minimum" to fix the half-a-million cars in the US fitted with a defeat device.

The vast majority of these cars – 430,000 – will require software and hardware repairs that could even involve a new tank being fitted to the vehicle. However, Horn admitted that the fix was still being tested and the solution is "complex".

Frank Pallone, representative for New Jersey, refused to believe that VW's repairs would not effect the performance of the vehicle. He also urged VW to consider offering customers a full refund for their vehicle.

However, if the committee was frustrated with Horn's explanation with VWs' plan to fix the affected cars, it was nothing compared to their incredulity at his answer about who fitted the defeat devices that allowed vehicles to cheat emissions tests.

Horn regurgitated the official VW answer that it was "not a corporate decision" and that "a couple of software engineers" put the device into the vehicles. Three people have been suspended by the company according to Horn, whose official title is president and chief executive of Volkswagen Group of America.

"Do you know how that defies credulity?" Michael Burgess from Texas said.

Chris Collins went even further. The representative from New York said he "categorically rejects" VW's version of events and that either the carmaker is incompetent or guilty of a "massive cover-up".

Did the company not wonder how its engineers had managed to lower the emissions on a car that was 40 times over the legal limit, he asked? If they had actually done this it would have been "massive breakthrough technology" and surely VW would have looked to patent the device that did it.

"It goes way, way higher than that," Collins said of the explanation that rogue engineers are to blame.

Perhaps as a defensive strategy aimed at winning over the committee or perhaps because he genuinely does doubt the company's official version of events, Horn said he also struggled to believe this story.

"I agree too, it is very hard to believe, and personally I struggle as well," Horn said.

Horn described how the defeat device was actually a line of code "hidden in millions of software code", meaning it was possible it was missed by others in VW.

However, he also criticised his own company, urging VW to "bloody learn and use the opportunity to get its act together". The way the carmaker manages its 600,000 staff needs to change, he added.

The scandal was ultimately caused by "pressure in the system to get resolutions and cost pressures", according to Horn. "It is dead wrong if you put corporate profits before people."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 4:03 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

NY Times:

http://www.nytimes.com/2015/10/09/opinion/vw-and-michael-horn-need-to-come-clean-now.html

VW Needs to Come Clean, Now

By THE EDITORIAL BOARD

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage.

Since they were forced to admit one the biggest frauds in auto industry history last month, the executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars. But none of that has explained who ordered, approved and designed the software that enabled the cars to cheat on emissions tests while belching pollutants when they were on the road. Nor has VW explained how and when it plans to fix the cars, which many customers bought in the belief that they were fuel efficient and clean.

These and many more questions were angrily hurled at Michael Horn, the head of the Volkswagen Group of America, when he appeared before a congressional hearing on Thursday. Yet beyond more apologies and an admission that he did hear of "possible emissions noncompliance" back in the spring of 2014, Mr. Horn had few answers. In May 2014, a nonprofit environmental research group alerted government regulators that Volkswagen and Audi cars with certain diesel engines in the United States were spewing far more emissions on the road than in tests. That was also when Volkswagen began misleading regulators with claims that the study was flawed, and then with a recall that failed to fix the problem.

Given the huge emphasis Mr. Horn's American operation was putting on "clean diesel" to boost VW's flagging American sales at the time, it is hard to believe that he did not follow up those initial reports with corporate leaders at Volkswagen headquarters in Wolfsburg, Germany. Instead on Thursday, he offered the standard defense — so often used by corporate executives in the face of misconduct — that no one of any importance knew anything of a fraud that has now caused the company's share price to decline by a third in value. Mr. Horn would only say that this deception was the work of "a couple of software engineers," and not a corporate decision.

On Thursday, German prosecutors raided the corporate offices as part of their investigation. Meanwhile, Matthias Müller, the newly appointed Volkswagen chief executive, continued to insist that his predecessor, Martin Winterkorn, who resigned shortly after the scandal broke in September, knew nothing. "Do you really think that a chief executive had time for the inner functioning of engine software?" he said in an interview with Frankfurter Allgemeine Zeitung, as if the problem was some minor malfunction and not an elaborate effort to deceive regulators and customers around the world.

If Mr. Winterkorn was not responsible, who is? Nobody believes that the handful of senior managers suspended so far, three of them involved in engine development, could have carried out this scheme without any support. Hans-Dieter Pötsch, newly appointed as supervisory board chairman, issued a statement on Wednesday saying it would take time before Volkswagen could made public the findings of its internal inquiries. "We must overcome the current crisis," he explained, "but we must also ensure that Volkswagen continues to grow." That seems to miss the point that Volkswagen will neither overcome the crisis nor grow unless it can produce some credible answers and explanations in short order.

Even if they manage to fix millions of cars, Volkswagen executives will still face a monstrous challenge from lawsuits, potential prosecutions, lost sales and the blow to VW's reputation for quality engineering. There is no defeat device to deflect the angry and urgent questions that lawmakers hurled at Mr. Horn. Apologizing is the easy part.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 3:04 PM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Newser):

http://www.newser.com/article/31a73182e02c4290bd5c8ca25179b8d2/the-latest-rep-griffith-says-west-virginia-university-should-get-share-of-us-fines-to-vw.html

The Latest: Rep. Griffith says West Virginia University should get share of US fines to VW

By The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

—

2:30 p.m.

A Virginia congressman thinks neighboring West Virginia University should benefit from its discovery of Volkswagen's emissions-rigging scandal.

Republican Rep. Morgan Griffith said the university should receive part of any settlement or fine imposed on VW by the U.S. Environmental Protection Agency.

The university and the nonprofit pollution control advocate International Council on Clean Transportation reported last year that VW cars had significantly higher emissions than allowed by the EPA. The council and WVU reported their findings to the EPA and the California Air Resources Board in May 2014, but VW blamed the problem on technical issues and unexpected conditions. The automaker finally admitted last month it was using a so-called "defeat device" to bypass EPA emission standards for clean air.

TWEETS

Jim Puzzanghera @JimPuzzanghera

EPA official says "we can't go back in time and take that pollution out of the air" but could make VW reduce future pollution.

Patrick Ambrosio @Pat_Ambrosio

.@EPA's Christopher Grundler: "I'm not going to blame our budget" for not discovering VW cheating

Lauren Gardner @Gardner_LM

.@michaelcburgess suggests firing @EPA regulators and hiring WVU researchers who discovered @VW cheating in 2013-14.

Nathan Bomey @NathanBomey

Rep. Michael Burgess, R-TX, notes $100 million EPA division missed VW cheating, but West Virginia University caught it with a $50,000 study.

Jim Puzzanghera @JimPuzzanghera

EPA's Brooks says VW has not committed to share results of its internal investigations and has "outstanding document requests"

Ryan Beene @RyanBeeneAN

.@EPA's Grundler says he is not concerned about diesel technology in general as a result of @VW emissions issues.

Ryan Beene @RyanBeeneAN

.@epa's Grundler says it is agency's understanding that @vw defeat devices will also defeat state emissions inspections

Jim Puzzanghera @JimPuzzanghera

Consumers won't have problems getting emission tests for VW diesels because the defeat device still allows them to pass, EPA says.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:32 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Huffington Post:

http://www.huffingtonpost.com/entry/house-hearing-volkswagen_5616ab63e4b0e66ad4c6dd1d

Volkswagen's U.S. Chief Meets Skeptical House Subcommittee

"Either your organization is incompetent, or they are complicit."

Kate Sheppard

WASHINGTON -- The chief executive of Volkswagen Group of America faced a skeptical House panel on Thursday, despite his promises that the company is doing its best to get to the bottom of an emissions scandal that has rocked the world's biggest automaker.

CEO Michael Horn appeared before the House Energy and Commerce Committee's Oversight and Investigations Subcommittee, where he told members that the company became aware of "possible emissions noncompliance" issues in the spring of 2014. But he said he was not aware until early September that a "defeat device" had been installed in nearly 500,000 VW diesel vehicles in the U.S.

The devices, which were actually code contained within the vehicles' software, allowed the cars to meet emission requirements while they were being tested but far exceed them in regular use.

Horn said that while the company offers its "sincere apology" for the use of the defeat devices, corporate leadership in Germany believes that the installation of these devices was the work of a few rogue engineers. The company is "conducting a worldwide investigation," said Horn, and "responsible parties will be identified and held accountable."

"To my understanding, this was not a corporate decision, this is something individuals did," said Horn. He also said that to his "best knowledge today," no one in company's U.S. operations knew about the defeat device until last month, after a group of scientists at West Virginia University brought the issue to light.

Subcommittee Chair Timothy Murphy (R-Pa.) told Horn he found it "amazing" that the university's testers discovered the defeat device while VW's "army of brilliant engineers and mechanics didn't know something was amiss."

Rep. Joe Barton (R-Texas), pointed out that the company is known for being well-run.

"I agree, it's very hard to believe, and personally I struggle as well," said Horn. Earlier in the hearing, Horn said the revelations "do not reflect the company that I know and to which I have dedicated 25 years of my life."

Rep. Chris Collins (R-N.Y.) told Horn he was also highly skeptical of this claim. "Either your organization is incompetent, or they are complicit," he said.

Members also expressed concern about how long the company expects it to take to fix the problematic automobiles. Horn's best estimate was that it would take more than a year to develop and install fixes for all the affected vehicles.

Dallas Business Journal:

http://www.bizjournals.com/bizjournals/washingtonbureau/2015/10/congress-doesnt-buy-vw-executives-story-that-rogue.html

Congress doesn't buy VW executive's story that rogue engineers were behind emissions test cheating (Video)

Kent Hoover

Washington Bureau Chief

The top U.S. executive for Volkswagen said a lot of the right things at a House hearing Thursday about how the auto maker cheated on emissions tests — he was apologetic, pledged cooperation with authorities, and vowed to take care of the company's customers and dealers.

But he failed on the critical question of who at Volkswagen decided to install software in its diesel vehicles that would enable the cars to produce lower emissions of nitrogen oxides during laboratory testing than they would during actual road use.

Michael Horn, president and CEO of Volkswagen Group of America, apologized for the company's emissions testing cheating scandal at a House hearing on Thursday.

"To my understanding this was not a corporate decision," said Michael Horn, president and CEO of Volkswagen Group of America in Herndon, Va.

Instead, it was "a couple of software engineers who put this in for whatever reasons," Horn said.

Members of Congress found that explanation unbelievable.

It "defies credulity" that upper management at Volkswagen didn't know about this software, said Rep. Michael Burgess, R-Texas.

"There had to be a team of people working on this," he said.

Rep. Chris Collins, R-N.Y., agreed.

"It goes way, way higher" than a "couple of rogue software engineers," Collins said.

If Volkswagen was struggling in 2009 to meet emissions standards for its diesel vehicles, and then two engineers suddenly came up with a solution — "like they found pixie dust" — then management surely would have asked what this "breakthrough technology" was, Collins said. Patenting it would give it Volkswagen "a true advantage in clean diesel technology," he said.

Collins' conclusion is that Volkswagen's entire organization is either incompetent or "they are complicit at the highest levels."

Horn acknowledged that it's "very hard to believe" that only a couple of software engineers installed a "defeat device" for emissions testing on their own.

"I personally struggle as well," he said.

Volkswagen has hired the law firm of Jones Day to conduct an investigation of what happened, Horn noted.

"Responsible parties will be identified and held accountable," he promised.

Horn may not have had anything to do with this decision to cheat on emissions testing, but he's dealing with the fallout in the U.S. The company will have to recall more than 500,000 vehicles in America to bring them in compliance with emissions standards. Its 650 dealers in the U.S. are stuck with cars they can't sell — diesel cars account for 25 percent of their inventory on average.

Workers at the company's auto plant in Chattanooga, Tenn., are worried about what the damage to VW's brand means for their future. Lawmakers in Tennessee plan to hold their own hearing on the emissions scandal, because VW has been provided with $900 million in state and local government incentives to make cars at that location.

"Tennesseans have made a significant investment in Volkswagen, and any action that threatens the stability and sustainability of the investment should be reviewed," said state Sen. Bo Watson, R-Hixon, according to the Chattanooga Times Free Press.

Members of Congress told Horn that Volkswagen needs to do more to compensate buyers who purchased vehicles that weren't as environmentally friendly as they were led to believe. Several suggested that VW should offer to buy back the cars, at pre-scandal prices.

At first, Horn rejected that remedy, saying "our plan is to fix the cars."

Later, however, he said how to compensate the company's customers is one of the areas the company is looking at.

"We are determined to make things right," Horn said. "This includes the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than 2 million people worldwide, including dealers and suppliers, rely upon for their livelihood."

Thursday's hearing made clear, however, that restoring that reputation depends on VW coming clean about who make the decision to cheat on emissions testing. Blaming it on a couple of rogue engineers isn't passing the smell test, at least on Capitol Hill.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 2:13 PM

To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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ABC News:

http://abcnews.go.com/Business/volkswagens-us-chief-apologizes-lawmakers-deeply-troubling-events/story?id=34338817

Volkswagen's US Chief Apologizes to Lawmakers About 'Deeply Troubling' Events

By SUSANNA KIM Oct 8, 2015, 2:00 PM ET

Michael Horn, Volkswagen Group of America CEO and president, was in the hot seat on Capitol Hill today, answering questions about the company's 11 million diesel cars that may have cheated emissions standards around the world.

Rep. Peter Welch, D-Vermont, relaying questions from his constituents, asked Horn at the House Energy and Commerce subcommittee hearing how he can consider himself a member of the human race, or how he sleeps at night, and compared Horn to convicted fraudster Bernie Madoff.

"My answer to myself is that I do everything -- and I don't sleep at night -- to help our dealers, to help our customers and to be there for my company and our employees to get us through this crisis here in the U.S.," Horn said.

In prepared remarks, Horn said he was first informed about "possible emissions non-compliance" in the spring of 2014, but he was told that the issue would be "remedied." It was only last month, however, when the company told regulators a number of its diesel car models had been installed with "defeat device" software that causes 482,000 cars to cheat on U.S. emissions standards tests. Regulators say Volkswagen's diesel cars emit nitrogen oxides, or NOx, at 10 to 40 times the

federal limit. Several lawsuits have been filed against Volkswagen and former Volkswagen Group CEO Martin Winterkorn resigned from the company last month.

Horn also said that the defeat device was intentionally installed to cheat emissions testing. He said Volkswagen has withdrawn its application for certification by U.S. regulators to sell 2016 model-year diesel-powered vehicles though the company is working with the EPA and other agencies to continue the certification process. Because the EPA has said the cars are legal and safe to drive, Horn said the company would most likely not provide loaner cars to customers who choose not to drive the affected cars. Horn said the company has not determined potential financial compensation to customers who bought the affected cars.

Horn noted that the oldest generation of the affected vehicles, with 430,000 of these cars in the U.S., would most likely need both a hardware and software fix. Horn said it could take more than one year to complete the repairs in all of these cars in question. Repairs could last five to 10 hours per car, he said.

The affected second-generation Passat diesel models will "most probably" only require a software solution, which Horn said may begin in the middle of next year because of its "technical complexity."

Volkswagen could begin repairs on the newest, or third generation models, in January, according to Horn.

Horn explained that Volkswagen has provided financial relief to its dealers who are fielding angry calls from customers, including paying maximum bonuses to dealers for each car sold, which is more than $1,500 per car.

Some lawmakers questioned whether Volkswagen's proposed fixes were enough to solve the emissions problem.

"Mr. Horn your statements don't give me much confidence that these cars are going to be fixed," Rep. Frank Pallone, D-New Jersey, told Horn.

Earlier this week, Matthias Mueller, Winterkorn's replacement, told a German newspaper the company will launch a recall of affected cars in January with a goal to fix all the vehicles by the end of 2016.

Volkswagen told dealers to halt sales of both new vehicles and certified pre-owned cars equipped with the 4-cylinder 2.0 TDI engine. Audi, which is owned by Volkswagen, also implemented a stop-sale for its model with that same engine, the A3 2.0 TDI.

On Tuesday, the Senate Finance Committee began investigating whether the company received tax subsidies for fuel-efficient vehicles under false pretenses. The committee said some of the hundreds of thousands of Volkswagen vehicles sold in the U.S. that included defeat devices could have been purchased using the Alternative Motor Vehicle Credit, which was created for qualifying fuel-efficient vehicles. Four Volkswagen models were deemed eligible for the credit, which amounted to $1,300 per vehicle purchase. Lawmakers are asking the IRS, EPA and Justice Department to consider whether they should levy fines or enforcement actions against Volkswagen to recoup the value of the tax credits that were provided to taxpayers who bought the affected cars.

A spokesman for Sen. Ron Wyden, D-Oregon, who wrote a letter to Treasury Secretary Jack Lew about the matter this week, said that Volkswagen car buyers shouldn't suffer financially for the company's "misdeeds."

ABC News' Benjamin Siegel and Ali Weinberg contributed to this report.

TWEETS

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Jim Puzzanghera @JimPuzzanghera

EPA official explains how VW defeat devices work: a switch senses if vehicle is being tested

based on steering wheel position, speed etc.

Kellie Mejdrich @kelmej

.@EPA testifies:"after the high emissions were discovered, #VW concealed the facts from EPA, the State of California, and consumers." @CQnow

Jim Puzzanghera @JimPuzzanghera

CA took lead in VW emissions investigation. EPA said VW provided "multiple different stories" about why road emissions were higher.

KrishnanAnantharaman @anantharaman

.@EPA's Grundler: California took lead in 2014 discussions w/ VW over excess emissions. @Automotive_News

Jim Puzzanghera @JimPuzzanghera

EPA reiterates that VW diesel vehicles don't comply with federal or CA emissions regulations right now.

Kellie Mejdrich @kelmej

.@EPA's Grundler -agency believes 3rd generation engines #VW w/ defeat software "will be much easier to fix than the older versions." @CQnow

Jim Puzzanghera @JimPuzzanghera

EPA says older VW diesels "will require a more substantial engineering solution" than newer vehicles who might only need software fix.

Isaac Epstein @iepstein

It is a little ridiculous for these GOP Congressman who rail against EPA regulations to rail against #VW for ignoring EPA regulations.

David Shepardson @davidshepardson

.@EPA's Grundler says it expects to receive fix proposal from @VW for some diesel vehicles as early as next week

Jim Puzzanghera @JimPuzzanghera

EPA and CA officials want VW to provide more than one option for fixing diesel vehicles so regulators can see which works best.

Nathan Bomey @NathanBomey

EPA's Grundler on VW fix: "We hope to get a proposal very, very soon but we want to make sure it's effective. There's some risk in rushing."

Jason Hanold @JasonHanold1

#VW recovery starts with buying back cars. #EPA penalty should enforce buy-back before fines.

Gus Bilirakis @RepGusBilirakis

Glad to see my @HouseCommerce colleagues asking the tough questions in this hearing w/ @VW. We need to get to the bottom of this.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:44 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Financial Times:

http://www.ft.com/intl/cms/s/0/41ce18ec-6dd2-11e5-8171-ba1968cf791a.html#axzz3nzznMguM

VW hearing displays anger on both sides

Robert Wright in New York and Jeevan Vasagar in Berlin

Volkswagen's most senior US executive revealed on Thursday how the carmaker first cheated on emissions tests to get around problems in meeting tough new standards, at a Washington hearing marked by point-scoring and flashes of emotion.

Michael Horn, chief executive of Volkswagen Group of America, was the first senior VW executive to give sworn, public evidence about the scandal over a "defeat device" it installed in the software controlling 11m diesel vehicles worldwide. The device detects when a vehicle is undergoing an emissions test and turns on emissions controls then, and at no other time.

Members of the investigations subcommittee of the House committee on energy and commerce expressed astonishment at VW's behaviour as they strove to outdo each other in their condemnation.

Mr Horn seemed to struggle to contain his own anger over the deceit, which he said he had discovered only days before VW formally admitted its behaviour to US regulators on September 3.

"This company has to bloody learn and use this process to get its act together," Mr Horn said, in response to a question from Joseph Kennedy of Massachusetts about the scandal's organisational implications.

Mr Horn — who asked for several questions to be repeated because of the noise from the cameras clicking and the volume of people behind him — stuck throughout to blaming the introduction of the defeat device on a handful of engineers in Volkswagen's German headquarters.

"To my understanding, this was not a corporate decision," Mr Horn said.

He was speaking shortly after German prosecutors carried out raids at VW's headquarters in Wolfsburg and other locations in connection with their investigation.

This company has to bloody learn and use this process to get its act together

- Michael Horn

However, even Mr Horn acknowledged that his explanation that the deceit stemmed from the actions of a small group of engineers was problematic.

"I agree it's very hard to believe," he said. "Personally, I struggle too."

The main revelation in his testimony came during questioning about the process of fixing the affected vehicles, when he gave the clearest confirmation so far that the deception started because VW's distinctive emissions-cleaning technology for smaller diesel vehicles would not work.

VW devised a system — known as a Lean NOx Trap (LNT) — meant to break down dangerous Nitrogen Oxides without using the chemical urea. The technology is fitted to 430,000 of the 482,000 US vehicles which included the defeat device in the control software.

Other carmakers have said they could never understand how VW hoped to meet strict US emissions standards with the technology.

Mr Horn told members that it would take far longer to repair LNT vehicles because they would require not only software updates but also work to install urea tanks.

"For those cars, we believe that a software-only solution will not be possible because, frankly, if it were possible they would have done it in the first place," Mr Horn said.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 1:34 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via Seattle Times):

http://www.seattletimes.com/business/the-latest-crowd-gathering-to-hear-vw-executives-testimony/

The Latest: Congressman harmed by VW cheat

The Associated Press

WASHINGTON (AP) — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

12:15 p.m.

Of the several members of Congress who recounted love affairs with their trusty VWs during the hearing, Rep. Morgan Griffith may be the one most directly harmed by the company's emissions cheat.

The Virginia Republican recounts that when his mother could afford her first new car, she bought a Volkswagen Squareback with a manual transmission, the car on which he learned to drive. He inherited his grandmother's 1972 Super Beetle, which he still has. In the 1980s, he says he bought a Rabbit, and in the 1990s he bought a gas-powered Jetta.

"When it got close to 200,000 miles, my mother convinced me that even Volkswagens couldn't go on forever," the congressman says.

So he sold the Jetta and bought a 2003 gasoline-powered Passat, which he drove until this summer and racked up 376,225 miles.

Griffith then bought a 2012 diesel Passat, one of the cars caught up in the scandal.

LA Times:

http://www.latimes.com/business/la-fi-hy-vw-horn-congress-html-20151007-htmlstory.html

Follow live: VW's U.S. chief faces Congress on diesel scandal

By JIM PUZZANGHERA AND JERRY HIRSCH

A top Volkswagen executive on Thursday blamed a handful of rogue software engineers for the company's emissions cheating scandal and told outraged lawmakers that it would take years to fix all of the nearly 500,000 vehicles affected in the U.S.

"This was a couple of software engineers who put this in for whatever reason," Michael Horn, VW's U.S. chief, told a House subcommittee hearing. "To my understanding this was not a corporate decision. This was something individuals did."

Horn, chief executive of Volkswagen Group of America, apologized for the scandal and said he only learned of the problem a couple of days before the company admitted it to regulators on Sept. 3.

"On behalf of our company and my colleagues in Germany and me personally, I would like to offer a sincere apology, sincere apology for Volkswagen's use of software program that served to defeat the emissions testing regime," Horn told the House Energy and Commerce Committee's oversight and investigations panel.

He revealed that three VW employees have been suspended in connection to the so-called defeat devices in the automakers diesel vehicles, which lowered emissions during testing. When the cars were on the road, regulators said they spewed up to 40 times the legal amount of nitrogen oxide.

VW admitted to the cheating last month after being confronted by federal and California regulators. The company's chief executive, Martin Winterkorn, resigned a few days later in the wake of the scandal, which effects about 11 million vehicles worldwide.

On Thursday, Horn was first top executive to face public questioning on the controversy. Several subcommittee members reminisced about the VW cars they had owned and expressed anger about the company's acknowledged cheating.

"I'm your Volkswagen driver whose always trusted your company and I'm very disappointed," said Rep. Morgan Griffith (R-Va.), who owns a 2012 VW Passat diesel car among those with the illegal software code.

Rep. Chris Collins (R-N.Y.) said it "defies credulity" that a couple of employees were responsible for the scandal.

"I cannot accept VW's portrayal of this as something by a couple of rogue software engineers," Collins said. "Suspending three folks, it goes way, way higher than that."

Horn said he was optimistic the company could fix all the vehicles so they would pass emissions test without losing performance. He noted the Environmental Protection Agency said the vehicles are legal and safe to drive.

But Horn said fixes would not start until at least next year and it would take multiple years to make the retrofits, which would take 5 to 10 hours per vehicle. The problem affects models from 2009-15.

Several lawmakers told Horn VW should buy back the vehicles from owners or provide them rebates for lost value. He said the company was considering such steps but does not yet have a plan.

Retrofitting about 430,000 older diesel VWs to meet U.S. emissions regulations would be a complex and time-consuming problem.

These vehicle use what known as a "lean NOx trap." The system collects nitrogen oxide in a device resembling a catalytic converter. Software instructs the car to shoot fuel-rich exhaust into the trap every few minutes, creating a chemical reaction that reduces the nitrogen oxide to plain nitrogen.

But the lean NOx trap that came with the vehicles isn't big enough to reduce their emissions to within U.S. limits.

VW is pondering replacing them with bigger, traps. But that also presents a problem. Such

systems tend to lose their effectiveness over time, said Addy Majewski, a chemical engineer and the editor of DieselNet.com, an emissions information service. They also use up more fuel, which would change the fuel economy of the vehicles.

That's why other automakers have gone with a method called "selective catalytic reduction," which injects an ammonia-rich urea solution into the exhaust system. The ammonia and exhaust mixture flow into a catalytic converter where nitrogen oxide emissions are converted into harmless nitrogen and oxygen

It's expensive — and a key reason diesel vehicles cost more than those powered by gasoline. The system also takes valuable interior space and the urea fluid tank has to be refueled periodically, adding an extra service expense for drivers.

VW switched to the SCR system in its 2015 models, which is why they can be fixed with a software upgrade. It's also in the 2012-2014 VW Passats, but Horn said the automaker is still evaluating how to bring those cars up to the standard.

Horn said the company also is considering retrofitting the older models with the SCR system. But that would be an especially complicated and expensive fix, diesel experts cautioned.

"You have to put in the feedback systems, the computer controls, the plumbing, the SCR catalyst – the vehicles were not designed to incorporate all that stuff," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The expense could turn out to be more than the value of the car, he said.

TWEETS

Yvette D. Clarke @YvetteClarke

"I believe it was an intentional deception...to bring something on the market that did not meet standards." #VW http://1.usa.gov/1Mf5hIQ

Green Car Reports @GreenCarReports

How much inventive do EPA and CARB have to help #VW get its 2016 TDI diesels certified? http://bit.ly/1P0ej2I

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:54 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

WSJ:

http://www.wsj.com/articles/volkswagen-u-s-ceo-says-he-didnt-know-in-2014-of-emissions-defeat-devices-1444316371

Volkswagen U.S. CEO Says He Didn't Know in 2014 of Emissions Defeat Devices

Michael Horn tells lawmakers he was only told at the time about problems with emissions compliance in diesel cars

By MIKE SPECTOR And AMY HARDER

Updated Oct. 8, 2015 12:42 p.m. ET

WASHINGTON— Volkswagen AG's top U.S. executive told Capitol Hill lawmakers he didn't know or suspect in 2014 that the German auto maker was using defeat-device software to evade emissions tests on nearly a half million diesel-powered cars.

Michael Horn, head of Volkswagen Group of America, expanded on prepared testimony at the start of a congressional hearing Thursday to emphasize he wasn't aware of the company's purposeful cheating on U.S. regulatory tests despite hearing about issues with emissions compliance as early as spring 2014.

Stressing he was speculating, Mr. Horn at one point offered his thoughts on what drove the emissions-test cheating. "From my personal feeling, this was pressure in the system to get resolutions and also in conjunction with cost pressure as well," he said. "It's…wrong if you put corporate profits before people. I think we have to get to the point that we put people first and not the pressure and corporate profits."

He said he was told about problems with emissions compliance in early 2014 and that U.S. regulators, including those at the Environmental Protection Agency, could on their own check for defeat devices. He said he was told Volkswagen engineers were working with regulators to solve the problem.

"Let me be very clear about this: While I was told about the EPA process, I was not then told, nor did I have any reason to suspect, that our vehicles included such a device," Mr. Horn said in opening remarks before the House Energy and Commerce subcommittee on oversight and investigations.

A West Virginia University research team in spring 2014 found higher nitrogen oxides emissions in two Volkswagen cars. "At that time, I had no understanding of what a defeat device was," Mr. Horn said.

Mr. Horn said he didn't learn that defeat devices were used in Volkswagen cars until a couple of days before a Sept. 3 meeting where Volkswagen officials gave a presentation to EPA and California Air Resources Board officials detailing the use of the defeat devices.

Mr. Horn in response to questioning from Rep. Joe Barton (R., Texas) said he believed "a couple of software engineers" were responsible for the emissions deception, as opposed to Volkswagen's board or senior management. "To my understanding this was not a corporate decision," he said. "This was something individuals did."

Mr. Barton wasn't convinced. "Do you really believe as good, as well run as Volkswagen has always been reputed to be, that senior-level corporate managers and administrators had no knowledge for years and years?"

"I agree, it's very hard to believe," Mr. Horn replied. Mr. Barton said he wasn't sure how Volkswagen should be penalized but "it should be more than a slap on the wrist."

Volkswagen suspended three employees over the scandal in recent weeks, people familiar with the matter have said. They are Ulrich Hackenberg, Audi's chief engineer; Wolfgang Hatz, a developer of racing engines; and Heinz-Jakob Neusser, head of development at the Volkswagen brand. Mr. Horn on Thursday confirmed three employees were suspended but said he couldn't reveal their names due to German law.

Volkswagen installed defeat devices in nearly 500,000 diesel-powered cars sold in the U.S. since 2008 that made the vehicles appear cleaner during testing than they actually were when driving on the road. The scandal cost former Chief Executive Martin Winterkorn his job and the company has tapped law firm Jones Day to conduct an investigation into the matter.

In January the company plans to start recalling nearly 11 million vehicles world-wide that contain the software, with plans to fix them by the end of 2016. A timetable for a recall in the U.S. isn't yet set. Volkswagen has so far set aside $7.3 billion to address the problem. Current Chief Executive Matthias Müller has said the cost will likely rise.

Lawmakers from both sides of the aisle opened the hearing by decrying Volkswagen's yearslong deception, demanding quick fixes for dealers and consumers, and questioning the integrity of the auto industry more broadly.

"We're here because Volkswagen lied," said Rep. Frank Pallone (D., N.J.). He said the scandal made him question "how much we should trust the auto industry in general" in the wake of Toyota Motor Corp., General Motors Co. and Takata Corp. appearing before lawmakers in recent years to answer for deadly safety problems that weren't quickly fixed. "This seems to be a pervasive culture of deception in the auto industry and it needs to stop now."

Rep. Fred Upton, (R., Mich.,), chairman of the full Energy and Commerce committee, said Volkswagen "betrayed a nation." He added: "Ultimately, cheaters never prosper, and that's why we're here today."

Rep. Jan Schakowsky (D., Ill.) said all U.S. owners of affected diesel models should receive full refunds if requested.

Mr. Horn agreed with a characterization from Rep. Kathy Castor (D., Fla.) that he was "personally deceived" by the scandal. "Integrity, quality and not cheating was always for me a given for this company," Mr. Horn said, citing his 25 years working for Volkswagen. He said he was "as touched and moved" as others finding out about the emission cheating in recent weeks.

Mr. Horn said Volkswagen was committed to eventually fixing vehicles and helping car dealers with the fallout since the company ordered them to stop selling the affected diesel models. The auto maker has provided dealers with significant discretionary funds to help, he said, though he declined to offer details. He said Volkswagen didn't have specific timelines for bringing vehicles into regulatory compliance.

"I apologize for not having a full-fledged plan for Volkswagen in my pocket," Mr. Horn said. The repairs could take between five and 10 hours a vehicle, and cleaning up the mess could take years, he said.

Mr. Pallone, the top Democrat on the full Energy and Commerce Committee, asked Mr. Horn about Volkswagen's plans for addressing excess pollution from the affected diesel models.

Mr. Horn cited EPA data that shows light-duty diesel cars like Volkswagen's account for a tiny fraction of the overall nitrogen oxides emitted on U.S., roads—less than two-tenths of 1%.

"Which is not belittling this and it is clearly unacceptable," Mr. Horn said after citing the

numbers, “but within this context it needs to be addressed.”

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 12:03 PM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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AP (via WPXI):

http://www.wpxi.com/news/ap/top-news/the-latest-crowd-gathering-to-hear-vw-executives-t/nnxxZ/

The Latest: VW is looking at compensating car owners

The Associated Press

WASHINGTON — The latest on the congressional hearing on Volkswagen's emissions-rigging (all times local):

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11:47 a.m.

Volkswagen is looking at compensating owners of diesel-powered cars that have devices set up to cheat on U.S. emissions tests.

U.S. CEO Michael Horn tells lawmakers that the company may pay customers for a loss in resale values because of the scandal.

He says the company doesn't know how much the cheating will cost Volkswagen. The cost depends on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

VW has set aside $7.3 billion to pay for the scandal, but Horn says he's not sure that will be enough.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn says the company isn't considering loaner cars because the U.S. government says the cheating diesels are safe to drive.

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11:20 a.m.

Volkswagen of America CEO Michael Horn denies that top corporate officials, either in Germany or the U.S., knew about the software on the company's diesel cars designed to cheat on emissions test.

Horn says there was no discussion or decision by the company's board to install the defeat devices software.

"To my understanding this was not a corporate decision, this was something individuals did," Horn said.

He says "a couple" software developers in Germany were responsible for the cheat.

Rep. Joe Barton, R-Texas, asked Horn if he really believed that senior level corporate managers had no knowledge of the software, which was first installed on cars for the 2009 model year.

"I agree it's very hard to believe," Horn said.

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11:11 a.m.

Volkswagen says most of the 500,000 U.S. cars with diesel engines that cheat on emissions tests will need complex hardware and software fixes that will take several years.

U.S. CEO Michael Horn is telling a U.S. House subcommittee that the cars will still get the window sticker fuel mileage when they are repaired. But the fixes might affect performance, including a one-or-two mile-per-hour drop in top speed.

Horn says software changes alone will work for newer models, but 430,000 cars dating to 2009 will need mechanical fixes that are still being developed.

Horn says software will repair about 90,000 newer Passat models, but they may need an additional sensor.

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10:43 a.m.

Volkswagen of America CEO Michael Horn is apologizing to lawmakers investigating his company's emissions cheat.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that serves to defeat the regular emissions testing regime."

Horn says he first learned VW's diesel cars had problems with dirty emissions in 2014, but says he was not told about the cheating software until the day before the scheme was revealed to U.S. regulators last month.

Horn, a German who has worked at VW 25 years, says he did not think something like that would be possible at his company.

"These events are deeply troubling," he says.

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10:34 a.m.

Lawmakers pressing Volkswagen's top executive on an emissions cheating scandal are fondly recalling owning vintage VW Beetles early in their lives.

Reps. Diana DeGette, D-Colo., and Tim Murphy, R-Pa., spoke about their cars with affection.

Murphy says he owned a Beetle in the 1970s and was able to take it apart and put it back together.

DeGette says her first car was a 1960 Beetle with a fabric sunroof that she inherited from her grandmother. She says she still misses the car and that it didn't need computer software to run.

Lawmakers are holding the hearing to investigate Volkswagen software that allowed its four-cylinder diesel engines to cheat on federal and California emissions tests.

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10:16 a.m.

Rep. Fred Upton of Michigan wants Volkswagen's top executive to answer what he calls the most famous question in Congress: "What did you know and when did you know it?"

Upton is chairman of the House Energy and Commerce Committee. He says he has host of other questions, including why one of the world's largest automakers go to such lengths to avoid emissions requirements? Who was responsible for these decisions? How will VW fix the flaw

and when? Will the fix affect vehicle performance?

Upton says unraveling these questions will take time, but Volkswagen has a long way to go in rebuilding the public's trust.

"VW will inevitably pay a steep price for its dirty little secret," Upton says.

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9:15 a.m.

It's early and the line is growing. By 8 a.m. — two hours before the start of the House hearing — a crowd already is waiting to get into the room where Volkswagen's top U.S. executive awaits tough question from lawmakers in the aftermath of the emissions-rigging scandal that's hit the world's largest automaker.

A House Energy and Commerce subcommittee is set to hear from Volkswagen of America CEO Michael Horn and officials from the Environmental Protection Agency.

Lawmakers are investigating after Volkswagen admitted it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to an advance copy of Horn's prepared remarks, VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That's raising questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

TWEETS

TeamUSA @InaMaziarcz

Republican House Rep asks VW Rep why they didnt tell the EPA about the illegal defeat device when they submitted paperwork to the EPA.. 0.o

Brandon Bell @iambrandonbell

It wouldn't b right 2 not renew registrations 4 affected VW customers, they r victims of poor

EPA enforcement and corporate greed @Glen4ONT

Danielle Ivory @danielle_ivory

VW's Horn said he emailed an executive in Germany in July after finding out the EPA was withholding certification for 2016 diesel 2.0L cars

David Shepardson @davidshepardson

.@VW says he emailed executive at Wolfsburg on July 20 after learning that @EPA was withholding 2016 diesel 2.0L car certification

H Nicole Young @hnicoleyoung3

Volkswagen U.S. CEO: 'I did not think ... this was possible' http://usat.ly/1RvML3F @usatoday Lol! Loving VW for scamming the EPA scammers.

KrishnanAnantharaman @anantharaman

.@VW's Horn: His understanding of fix is it will not affect EPA mpg rating, but top speed may be affected 1 or 2 mph. @Automotive_News

Ratchet Strategy @RatchetStrategy

U.S. CEO Horn has poor choice of words in #VW 'sincere' apology: calls Federal EPA "emissions testing regime." http://ow.ly/TaMmf

Flimflam @9jmfleming

The EPA says the # vw scandal are safe and "legal" to drive, how can the be legal when emissions are 40 times the limit. How is that legal

VW Southtowne Utah @VWSouthtowne

VW of America CEO Horn: Yes, EPA says these cars are safe to drive.

ModerateEdge @ModerateEdge

#VW had to know, differences between lab tests on exhaust and #EPA tests had to be surprising at the least. #DOJ #USCongress #POTUS

Minksy @Minksy4

@CNN someone tell the EPA that in addition to the VW scandal, autos have been tricking them for decades on the avg mpg.

Rep. Frank Pallone @FrankPallone

Joined @SquawkCNBC to discuss #VW rigged emissions test & hearing that's going on right now. My @CNBC interview: http://cnb.cx/1FZJHv5

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:46 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Denver Post):

http://www.denverpost.com/business/ci_28939843/volkswagens-top-u-s-exec-apologizes-at-congressional

Volkswagen's top U.S. exec apologizes at congressional hearing

Michael Horn admits VW has "broken trust" with customers, dealerships, public

By Michael Biesecker and Matthew Daly

WASHINGTON — Volkswagen's top U.S. executive apologized Thursday as the emissions-rigging scandal engulfing the world's largest automaker deepened and members of Congress said the company violated the public's trust.

"On behalf of our company, my colleagues in Germany and myself, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Volkswagen of America CEO Michael Horn told a House subcommittee.

Calling the company's admission "deeply troubling," Horn said, "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

As Horn began his testimony, lawmakers from both parties fondly recalled their first VWs and then laced into the company for betraying the public's trust.

The German automaker admitted last month that it installed on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars starting with the 2009 model year.

Rep. Fred Rep. Fred Upton, R-Mich., chairman of the House Energy and Commerce Committee, said Volkswagen "has long enjoyed an almost cultish following dating back to the Beetle. But through the years something apparently became rotten in Wolfsburg and cheating and betrayal became part of the VW game plan."

Rep. Tim Murphy, R-Pa., chairman of the subcommittee on oversight and investigations, said "the behavior to which VW admitted represents a fundamental violation of public trust."

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's

American subsidiary last year, told Congress that VW plans to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines.

That raised questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

By withdrawing the applications for the 2016 models, VW is leaving thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application.

Horn said the company does not yet have an approved recall plan for cars that have the defeat device and that any fix for customers could take "one or two years" to carry out. Each of the nearly half million cars will require five hours to 10 hours of work, a potentially significant burden on dealers.

"We know we can fix these vehicles to meet emissions standards," Horn said, adding that a potential fix would likely have a "slight impact on performance. One or two miles of top speed might be missing."

In Germany, prosecutors searched VW headquarters and other locations Thursday for material that would help clarify who was responsible for the cheating. The searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said.

It was unclear what the newly disclosed device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

VW said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers who hoped to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, N.Y., said his dealership had lost three deals with potential buyers because he could not get the new cars.

"It's definitely a stain on the brand's image," he said.

VW acknowledged the deception to U.S. regulators on Sept. 3. More than year earlier, researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and didn't use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

RTE News:

http://www.rte.ie/news/business/2015/1008/733207-volkswagen-us/

VW US chief says did not know of defeat device until September

Volkswagen's US chief has said he was aware of an emissions problem on diesel VWs in 2014 but did not know until last month about the "defeat device" that makes the cars appear less polluting.

Michael Horn, president and chief executive of Volkswagen Group of America, told a US Congress panel that he only understood the existence of the cheating software on the cars "a couple days" before 3 September, when the company admitted it existed.

Mr Horn said that although he found out that the emissions of VW diesel cars did not meet US regulations in early 2014, "I was not then told nor did I have any reason to suspect or to believe that our vehicles included such a device."

"At that point of time, I had no understanding what a defeat device was. And I had no indication whatsoever that a defeat device could have been in our cars."

Instead, he said, he only learned of the software, which masks actual emissions in regulator inspections, "around the September 3rd meeting. A couple of days before."

Mr Horn is the first executive of the German carmaker to appear before Congress to explain the scandal, which threatens Volkswagen with billions of dollars in fines in the United States and possibly criminal charges.

The company was blasted by politicians as the hearing of the House Energy Committee's subcommittee on oversight and investigations opened.

"Trust helped build Volkswagen because we believed the company put customers first," said committee chair Tim Murphy.

He said the company needs to answer: "What happened, who was involved, why were these actions taken?... Was it done to deliberately deceive government regulators?"

"VW has betrayed a nation... It's time to clean it up or get off the road," said Representative Fred Upton.

Earlier, Mr Horn apologised to Congress and said Volkswagen takes "full responsibility" for an emissions cheating scandal.

He said it was "deeply troubling" that the company installed a "defeat device" on several diesel models for years to hide from regulators the cars' actual gas emissions when in use.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software programme that served to defeat the regular emissions testing regime," he said.

His comments were included in the testimony prepared for the Capitol Hill hearing today.

"These events are deeply troubling. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," Mr Horn said.

The House Committee on Energy and Commerce Subcommittee on Oversight and Investigations hearing will also include testimony from the Environmental Protection Agency, which sets the emissions standards for cars in the US.

Mr Horn also announced that VW had withdrawn its application for EPA certification of its new 2016 four-cylinder diesel cars because they also included a software device governing emissions that needed to be disclosed and assessed.

He added that Volkswagen was working with regulators "to continue the certification process."

"We are determined to make things right," he stated.

Meanwhile, German prosecutors have raided Volkswagen's headquarters and other offices today as part of their investigation into the car maker's rigging of diesel emissions tests.

German prosecutors said they were targeting documents and data storage devices that might help with their inquiries.

Volkswagen said it was supporting the investigation and had handed over a "comprehensive" range of documents.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:26 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

CLIPS

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NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

VW's U.S. Chief Apologizes at Congressional Hearing

By DANIELLE IVORY OCT. 8, 2015

The president of Volkswagen's American unit came under withering criticism on Thursday at a congressional hearing looking into the automaker's admission that for years it knowingly skirted federal emissions standards.

Michael Horn, the automaker's top American official, expressed remorse over the company's decision, but lawmakers were looking for more than an apology.

"You haven't revealed how the defeat device affects the engine, why it was installed and how it was able to evade emissions tests," said Diana DeGette of Colorado, the top Democrat on the subcommittee. "You haven't revealed when and how the engines equipped with this defeat device will be fixed. And you haven't told us whether that fix will affect the fuel economy or performance of the vehicles."

Volkswagen U.S. Chief Knew of Potential Emissions Problems in 2014OCT. 7, 2015

She added that Volkswagen had not disclosed what it told regulators over the last year as the Environmental Protection Agency and California regulators were pressing it for answers, whether the voluntary recall set in motion in 2014 was a ruse, and, finally, who is responsible for the scheme.

"We don't know who knew about it in Germany and who knew about it in the United States," she said.

More than 11 million cars worldwide, including about 480,000 in the United States, were outfitted with engine software designed to fool testers into thinking that certain diesel vehicles met pollution standards.

"I did not think that something like this was possible at the Volkswagen Group," Mr. Horn said. "We have broken the trust of our customers, dealerships and employees, as well as the public and regulators."

Volkswagen, he said, took responsibility for its actions and will work with investigators.

But lawmakers were not mollified by his comments.

"VW will inevitably pay a steep price for its dirty little secret," said Representative Fred Upton, a Republican from Michigan, who is chairman of the full committee on Energy and Commerce. "We will get some additional insight today, but the committee's investigation is just beginning."

He expressed doubt that this was Volkswagen's only secret. "If they were willing to cut corners here, what else have they done?" he asked.

Representative Frank Pallone, a Democrat of New Jersey, asked whether the American people should trust the auto industry at all, lamenting recent automotive safety scandals involving General Motors' faulty ignition switches, Takata's exploding airbags and Toyota's problems with unintended acceleration.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Volkswagen has admitted that it programmed the cars to sense when emissions were being tested and to switch on equipment to reduce them. But during normal driving conditions, when the vehicles had better performance, they produced as much as 40 times the acceptable amount of a pollutant, nitrogen oxide, which can contribute to respiratory problems.

The hearing was held on the same day that German investigators searched Volkswagen's Wolfsburg headquarters and elsewhere. State prosecutors in Braunschweig said in a release that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Acting on complaints filed by several citizens, as well as officials at Volkswagen, prosecutors have begun a preliminary investigation against employees, who have not been identified, on suspicion of fraud.

At the hearing Mr. Horn described Volkswagen's plans to fix the cars. There are three groups of vehicles involved, Mr. Horn said, each containing one of the three generations of the 2-liter diesel engine. Each will require a different remedy. The company is also examining its practices to assure that this sort of cheating does not occur again, he said in his prepared testimony.

The big questions from lawmakers focused on who conceived the idea for the defeat device and put it in place, and how far back the plan stretched. Volkswagen's new chief executive, Matthias Müller, said this week that only a few employees at the company were aware of the emissions cheating.

For his part, Mr. Horn noted that he was told that "there was a possible emissions noncompliance" in spring 2014, earlier than previously acknowledged by top management in the United States, but added that he had been informed that the company's engineers would work with the E.P.A. to resolve the issue. Later that year, he said, he was told that Volkswagen's technical teams had a specific plan for remedies to bring the vehicles into compliance.

Mr. Horn's timeline of events then jumped ahead to this September, when Volkswagen officials, after months of dismissing regulators' concerns, disclosed that the automaker had indeed been cheating the system.

Two officials from the E.P.A. will also face questions on Thursday, separately from Mr. Horn. In the United States, automakers conduct their own emissions tests and submit the results to the government. On Sept. 25, the E.P.A. sent a letter to all auto manufacturers, notifying them that it would strengthen its testing activities in response to the Volkswagen scandal.

"We take seriously our responsibility to oversee the implementation and enforcement of our clean air regulations," said Christopher Grundler, director of the Office of Transportation and Air Quality at the E.P.A., and Phillip Brooks, a director at the agency's Office of Enforcement

and Compliance Assurance, in joint written testimony provided to Congress before the hearing. Both men are scheduled to testify.

They continued, "It is this oversight that ensures the benefits of clear air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for."

Volkswagen is facing scrutiny beyond Thursday's hearing. Mr. Grundler and Mr. Brooks said in the testimony that the E.P.A. would be working closely with the Justice Department, which has opened an investigation into the company's deception that could result in criminal or civil charges, or both.

And this week, the two top senators on the Senate Finance Committee sent a letter to Volkswagen officials, asking for information about subsidies the company might have received after telling the Internal Revenue Service that its diesel vehicles qualified for tax credits for fuel-efficient cars. The senators, Orrin G. Hatch, Republican of Utah, and Ron Wyden, Democrat of Oregon, gave the company an Oct. 30 deadline to answer questions and provide documents.

Attorneys general from at least 40 states and the District of Columbia are starting a bipartisan coalition to investigate possible consumer fraud and environmental violations by Volkswagen, according to people familiar with the inquiry who spoke only on the condition of anonymity. Additionally, attorneys general in California and Texas are pursuing their own investigations. Criminal investigations have also begun in Europe.

Melissa Eddy contributed reporting.

TWEETS

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Nick Bunkley @nickbunkley

Approximately 90% of House VW hearing is members of Congress repeatedly asking Michael Horn when he knew about defeat devices.

Callie Starnes @calliestarnes

VW of America CEO Michael Horn just told subcmte. VW will not buy back inventory from dealerships. #vwscandal #vwhearing

Kara Oko @KaraOko

.@USRepKCastor asks Horn why investigation is in preliminary stages if top officials reportedly knew abt rigging software in 2014 #VWhearing

MattSTKC @MattSTKC

Really weird hearing the head of #VW America being really frank about how bad this is #Congress #cspanchat

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:09 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

The Hill:

http://thehill.com/policy/transportation/256337-volkswagen-exec-offers-sincere-apology-for-emissions-scandal

Volkswagen exec offers 'sincere apology' for emissions scandal

By Keith Laing - 10/08/15 10:04 AM EDT

The head of Volkswagen's U.S. division offered a "sincere apology" to lawmakers on Thursday for his company's efforts to circumvent federal air pollution emission standards.

Volkswagen's U.S. CEO, Michael Horn, testifying before Congress for the first time since the Environmental Protection Agency (EPA) accused the German automaker of selling cars that violate the Clean Air Act, expressed remorse for cheating the pollution standards during a Thursday morning hearing of the House Energy and Commerce Committee's oversight panel.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said.

"These events are deeply troubling," he added. "I did not think that something like this was possible at the VolkswagenGroup. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

The EPA has accused Volkswagen of selling about 482,000 vehicles since 2008 that violate the Clean Air Act due to software installed on the vehicles that activates required air pollution protections only during emissions tests.

The company programmed vehicles to trick emissions testers into believing that its diesel cars released a much lower volume of nitrogen oxide than they actually do. In regular driving, the vehicles emitted up to 40 times more pollution.

Volkswagen has admitted to the accusations, and Horn said on Thursday that the company is committed to re-earning the trust of drivers and federal regulators.

"Let me be clear, we at Volkswagen take full responsibility for our actions and we are working with all relevant authorities in a cooperative way," he said. "I am here to offer the commitment of Volkswagen AG to work with this committee to understand what happened, and how we will move forward. EPA, CARB, the U.S. Department of Justice, State Attorneys General, as well as

other authorities, are fulfilling their duties to investigate this matter."

"We are determined to make things right," Horn added. "This includes accepting the consequences of our acts, providing a remedy, and beginning to restore the trust of our customers, dealerships, employees, the regulators, and the American public. We will rebuild the reputation of a company that more than two million people worldwide, including dealers and suppliers, rely upon for their livelihoods."

Lawmakers on the panel were in an unforgiving mood, despite Horn's apology.

“The very notion of a carmaker intentionally violating our environmental laws is beyond belief," Rep. Fred Upton (R-Mich.), chairman of the full Energy and Commerce Committee, said in a statement ahead of Thursday's hearing.

"Those of us from Michigan take great pride in having a hand in many of the cars on the road today and we appreciate the challenges automakers face to meet consumer demands year after year,” Upton continued. “But reports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal.”

Volkswagen could face up to an $18 billion fine for its pollution violations.

--This report was updated at 10:50 a.m.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:07 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

AP (via Fox Rio 2):

https://www.foxrio2.com/volkswagen-executive-at-congressional-hearing/

Tough questions await Volkswagen Executive at congressional hearing amidst scandal

Published October 8, 2015

WASHINGTON (AP) — Tough questions awaited Volkswagen's top U.S. executive at a congressional hearing Thursday as the emissions-rigging scandal enveloping the world's largest automaker deepened.

Volkswagen of America CEO Michael Horn was to testify before a House subcommittee investigating the company's use of on-board computer software designed to cheat on government emissions tests in nearly 500,000 of its four-cylinder "clean diesel" cars, starting with the 2009 model year.

According to Horn's prepared remarks, VW intends to withdraw applications seeking U.S. emissions certifications for its 2016 model Jettas, Golfs, Passats and Beetles with diesel engines. That raises questions about whether a "defeat device" similar to that in earlier models is also in the new cars.

As a result, VW will leave thousands of diesel vehicles stranded at ports nationwide, giving dealers no new diesel-powered vehicles to sell. It wasn't immediately clear when VW would refile its application, but Horn's testimony said the company was working with regulators to get certification.

The chairman of the House Energy and Commerce Committee, Republican Rep. Fred Upton of Michigan, said "the American public deserves answers. VW needs to come clean."

Separately, German prosecutors searched VW headquarters in Wolfsburg and other locations Thursday seeking material that would help clarify who was responsible for the cheating. The

searches were intended to "secure documents and data storage devices" that could identify those involved in the alleged manipulation and explain how it was carried out, prosecutors said in a statement.

It was unclear what the device found in some VW models does. Liz Purchia, a spokeswoman for the Environmental Protection Agency, said VW recently gave the agency information on an "auxiliary emissions control device." The EPA and California Air Resources Board are investigating "the nature and purpose" of the device, she said.

The company said such devices can sense engine performance, road speed "and any other parameter for activating, modulating, delaying or deactivating" emissions controls.

The lack of certification is bad news for American VW dealers, who were hoping to put the new models on sale soon. For some dealerships, the diesel models accounted for about one-third of sales.

Tom Backer, general manager of Lash Volkswagen in White Plains, New York, said his dealership already had lost three deals with potential buyers because he could not get the new cars. "It's definitely a stain on the brand's image," he said.

Horn, a 51-year-old German and veteran VW manager who took the reins of the brand's American subsidiary last year, intended to tell lawmakers that he learned about the cheating software "over the past several weeks," VW spokeswoman Jeannine Ginivan said.

'I did not think that something like this was possible at the Volkswagen Group," Horn said in his prepared remarks. "We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

Also scheduled to testify were EPA officials who oversee emissions testing and compliance with clean air rules.

VW first acknowledged the deception to U.S. regulators on Sept. 3. That was more than a year after researchers at West Virginia University published a study showing the real-world emissions of the company's Jetta and Passat models were far higher than allowed. The same cars had met emissions standards when tested in the lab.

VW was able to fool the EPA because the agency only tested the cars on treadmill-like devices called dynamometers and did not use portable test equipment on real roads. The software in the cars' engine-control computers determined when dynamometer tests were under way. It then turned on pollution controls that reduced the output of nitrogen oxides that contribute to smog and other pollution, the EPA has said.

Only when the EPA and California regulators refused to approve VW's 2016 diesel models for sale did the company admit earlier what it had done.

Though VW and U.S. regulators have not yet announced a fix for illegal emissions under a nationwide recall, Horn was prepared to the company was "determined to make things right."

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:03 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: RE: VW Hearing Clips/Tweets 10/8/2015

Detroit News:

http://www.detroitnews.com/story/business/autos/foreign/2015/10/08/vw-hearing/73575802/

Congress: VW has 'betrayed' trust of nation

David Shepardson, Detroit News Washington Bureau 10:33 a.m. EDT October 8, 2015

Washington — Members of Congress harshly criticized Volkswagen at a hearing Thursday for intentionally evading software to allow its diesel cars to emit up to 40 times legally allowable pollution, saying the German automaker has "betrayed" the nation.

"Regardless of intent, they have betrayed the trust of regulators, dealers and most importantly, the driving public," said Rep. Fred Upton, R-St. Joseph, chairman of the House Energy and Commerce Committee. "Volkswagen has betrayed a nation — a nation of regulators, loyalists and innocent customers. Either clean it up, or get off the road."

VW has admitted to using software in 11 million 2009-2015 vehicles worldwide — including 482,000 in the United States — and has set aside $7.3 billion to pay damages. The company's CEO abruptly resigned and the automaker has suspended several high ranking officials. The Justice Department, at least 45 states and environmental regulators around the world are investigating,

VW U.S. CEO Michael Horn is appearing before a House Energy and Commerce subcommittee. He will apologize but not offer any new timetable for when the vehicles will be recalled and fixed. He disclosed the company has withdrawn its request for approval to sell the 2016 diesel cars with the same engines in the cars in the scandal.

"The behavior to which VW admitted represented a fundamental violation of public trust," said Tim Murphy, R-Pa., who chairs the subcommittee holding the first VW hearing.

U.S. law firm Jones Day is conducting an investigation at VW's request.

Upton and Democrats said they want to know who was responsible, why did they do it and, Upton said, "if they were willing to cut corners here, what else have they done?" How will you fix this flaw and when?"

Rep. Diana DeGette, D-Colorado, agreed. "Volkswagen made a series of terrible decisions and has broken the public trust," DeGette said. "Something is rotten in the state of Lower Saxony," she added referring to where VW is headquartered.

The Senate Finance Committee is also investigating VW's use of tax credits worth about $50 million for the sale of some diesel vehicles. The Justice Department is investigating the use of those tax credits. Sen. Ron Wyden, D-Oregon, urged the U.S. Treasury not to try to recoup the credits from consumers who didn't know about the cheating.

From: Gong, Kristiene
Sent: Thursday, October 08, 2015 11:01 AM
To: Purchia, Liz; Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay
Subject: VW Hearing Clips/Tweets 10/8/2015

CLIPS

-

KAZU (NPR):

http://kazu.org/post/volkswagens-us-ceo-faces-house-panels-questions-about-emissions-cheating#stream/0

'It Was Installed For This Purpose," VW's U.S. CEO Tells Congress About Defeat Device

By BILL CHAPPELL • 5 MINUTES AGO

Originally published on October 8, 2015 7:40 am

Michael Horn, the CEO of Volkswagen's U.S. business, is appearing in Congress Thursday morning to answer lawmakers' questions about the German automaker's use of software in its diesel vehicles to fool emissions tests. VW has said some 11 million vehicles worldwide have the software.

Volkswagen has "withdrawn the application for certification of our model year 2016 vehicles," Horn says, adding that the company is still working with U.S. agencies on the certification

process.

That apology is part of Horn's prepared testimony for the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations. He also acknowledged hearing of possible problems in spring of 2014.

U.S. lawmakers are looking for answers about a scandal that has resulted in the Environmental Protection Agency ordering a recall of 482,000 vehicles — and concerns that for years, the cars have been putting out up to 40 times the legal limit of pollution.

"On behalf of our company, and my colleagues in Germany," Horn says in his prepared text, "I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime."

We'll update this post with more news from Horn's appearance.

Update at 10:35 a.m. ET: 'It Was Installed For This Purpose'

Responding to a question from panel chairman Rep. Tim Murphy, R-Pa., about whether the software was installed "for the express purpose of beating tests," Horn responds that to his knowledge, "It was installed for this purpose, yes."

Horn said that the move was evidently made because of tightened emissions standards.

Responding to another question, Horn says he only knew that the vehicles contained the defeat devices shortly before a Sept. 3 meeting with federal regulators.

He adds that only after the West Virginia University study of diesel cars did he begin to learn

about what a defeat device is.

Update at 10:3 a.m. ET: Promise To Cooperate

"We will find remedies for our customers, and we will work to ensure that this will never happen again," Horn says.

Update at 10:26 a.m. ET: Horn Is Sworn In

After being offered legal counsel, Horn is sworn in. He then delivers his prepared testimony, saying that his company is still in the early stages of its investigation.

Update at 10:20 a.m. ET: Volkswagens Were Several Members' First Cars

Opening today's meeting, both the leading Republican and Democrat on the committee said that their first cars had been Volkswagens.

After Rep. Tim Murphy, R-Pa., spoke of his fondness and trust in the Volkswagen he drove as a young man, Rep. Diana DeGette said she had a 1960 ragtop convertible that she inherited from her grandmother. "I still miss that car," she added.

Later, Rep. David McKinley, R-W.Va., said that he also drove a VW as his first car — a 1957 model.

Our original post continues:

Horn says that he's known about "possible emissions non-compliance" in Volkswagen's cars in the U.S. for more than a year, dating back to a West Virginia University study on diesel vehicle emissions in road tests, which was published in May of 2014.

"I was also informed that the company engineers would work with the agencies to resolve the issue," Horn says in his prepared testimony before the House Committee on Energy and Commerce Subcommittee on Oversight and Investigations.

Volkswagen is said to have been warned against using software to get around emissions tests on its diesel cars as early as 2007, as we've reported.

Horn's testimony includes a summary of the carmaker's admission to cheating on emissions tests, nearly two weeks before the EPA publicly accused the company of skirting the rules:

"On September 3, 2015, Volkswagen AG disclosed at a meeting with the California Air Resources Board ('CARB') and the U.S. Environmental Protection Agency ('EPA') that emissions software in four cylinder diesel vehicles from model years 2009-2015 contained a 'defeat device' in the form of hidden software that could recognize whether a vehicle was being operated in a test laboratory or on the road. The software made those emit higher levels of nitrogen oxides when the vehicles were driven in actual road use than during laboratory testing."

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CNN (via WGAL News 8):

http://www.wgal.com/money/volkswagen-faces-tough-questions-on-capitol-hill/35722356

Volkswagen faces tough questions on Capitol Hill

Head of Volkswagen in the US: 'These events are deeply troubling'

UPDATED 10:32 AM EDT Oct 08, 2015

NEW YORK (CNNMoney) —Volkswagen's U.S. boss will be on Capitol Hill Thursday morning facing questions about the software in its diesel cars that cheats emission tests.

The German automaker has already admitted that its diesel cars were programmed to limit emissions when they were tested. But on the road in the real world they would dump up to 40 times the allowed level of pollutants such as nitrogen oxide, or NOx, into the air. NOx is a major source of smog.

"These events are deeply troubling," said Michael Horn, the head of Volkswagen in the U.S., in his prepared opening remarks. "I did not think that something like this was possible at the Volkswagen Group. We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators."

But Horn's prepared remarks did not have any details about how many in Volkswagen's executive ranks knew about the deceptive software, known as a "defeat device" installed its cars. He is certain to face questioning on that.

An official from the Environmental Protection Agency will also appear at the hearing. The agency will likely also face harsh questioning about how VW's deception went unnoticed for so many years. VW models with the emissions-cheating software date back to the 2009 model year. But it wasn't the EPA that eventually caught VW. Instead it was discovered through tests performed by a West Virginia laboratory that was commissioned by a clean energy advocacy group.

EPA officials will defend their testing, as well as the importance of the Clean Air Act that VW is charged with violating. They will testify that NOx, can lead to increased asthma attacks and other respiratory illnesses that can be serious enough to send people to the hospital.

"It is this oversight that ensures the benefits of clean air emissions standards are realized, that the industry is competing on a level playing field, and that consumers are getting what they pay for," said Chris Grundler, he head of the EPA's office of transportation and air quality, in his prepared remarks.

TWEETS

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ReutersBreakingviews @Breakingviews

#Dieselgate: catch up on all you need to know ahead of today's congressional hearing http://flip.it/Xr0UK #VW @EPA

Steve Milloy @JunkScience

Congress (incl. GOP) teeing off on VW at hearing. Have yet to see such 'outrage' at lying, economy-killing EPA. https://youtu.be/zOl_dtrfi7g

Steve Milloy @JunkScience

House hearing on VW: CEO now under oath & subject to perjury. Congress never does this to lying EPA. https://youtu.be/zOl_dtrfi7g

AlexTD @AlexanderTD

@HouseCommerce hearing w/ VW and EPA *right now*. http://energycommerce.house.gov/hearing/volkswagens-emissions-cheating-allegations-initial-questions Too many press to get into the room in person!

Patrick Ambrosio @Pat_Ambrosio

Horn said he didn't learn that defeat devices were being used by Volkswagen until a "couple of days" before company admitted it to @EPA

David Shepardson @davidshepardson

Horn says it appears that @VW installed the software because they could not meet the @EPA emissions standards

Michael P. Ralsky @GlobalGR

Is anyone on @HouseCommerce going to address the elephant in room ==> @EPA regs that only protect the #environment on paper?

Old One @Yosef621

will @EPA put @VW out of business. Are they really protecting us?

Ryan McKinley @Crying_Ryan

Fine #VW and move on. Why wasn't the #EPA conducting its own independent testing to verify its own standards? That's the real #VWGate

Rep. Yvette D. Clarke @YvetteClarke

LIVE NOW: #VW testifying to O&I subcommittee on emissions defeat devices: http://1.usa.gov/1Mf5hIQ

Steve Milloy @JunkScience

House hearing on VW: EPA says affected VWs are legal & safe to drive. So let's fine VW & move on to actual problems -- like EPA itself.

Steve Milloy @JunkScience

House hearing on VW: So 'clean diesel' was just another green scam. https://goo.gl/HSDaKT

was just another green scam. https://goo.gl/HSDaKT

-

To: Bunker, Byron[bunker.byron@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
Cc: Allen, Laura[Allen.Laura@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Belser, Evan
Sent: Thur 10/8/2015 9:03:46 PM
Subject: RE: I don't know if Mr. Grundler will address this at the hearing

Ex. 5, 7

Thanks,
Evan

From: Bunker, Byron
Sent: Thursday, October 08, 2015 4:59 PM
To: Conger, Nick; Grundler, Christopher; Birgfeld, Erin; Belser, Evan
Cc: Allen, Laura; Purchia, Liz
Subject: RE: I don't know if Mr. Grundler will address this at the hearing

Ex. 5, 7

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

****

From: Conger, Nick
Sent: Thursday, October 08, 2015 4:52 PM
To: Grundler, Christopher; Bunker, Byron; Birgfeld, Erin; Belser, Evan
Cc: Allen, Laura; Purchia, Liz
Subject: FW: I don't know if Mr. Grundler will address this at the hearing

Ex. 5, 7

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: danielle.ivory@nytimes.com [mailto:danielle.ivory@nytimes.com]
Sent: Thursday, October 08, 2015 4:46 PM
To: Conger, Nick
Subject: Re: I don't know if Mr. Grundler will address this at the hearing

Is there any chance Mr. Grundler would be available tonight to talk about this in greater depth?

Thanks so much,

Danielle

Sent from my iPhone

On Oct 8, 2015, at 2:18 PM, Conger, Nick <Conger.Nick@epa.gov> wrote:

Proper term is "auxiliary emissions control device" sorry.

Sent from my Windows Phone

From: Conger, Nick
Sent: 10/8/2015 2:02 PM
To: Ivory, Danielle
Subject: RE: I don't know if Mr. Grundler will address this at the hearing

Hi Danielle:

VW did very recently provide EPA with very preliminary information on an emissions control device that VW said was included in one or more model years. The US EPA and CARB are investigating the nature and purpose of this recently identified device.

Sent from my Windows Phone

From: Ivory, Danielle
Sent: 10/8/2015 1:55 PM
To: Conger, Nick
Subject: I don't know if Mr. Grundler will address this at the hearing

But we are told that VW has disclosed another defeat device to the EPA and this is why VW withdrew is certification application for the 2016 models. Do you (or someone else at the EPA) know if this is true? even a confirmation on background would be very helpful.

Thanks,

Danielle

--

Danielle Ivory
The New York Times

Office: 212-556-1596

Cell: 917-280-2607

To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Thur 10/8/2015 9:31:31 PM
Subject: Lawmakers slam VW for emissions scandal, suggest 'cover up'

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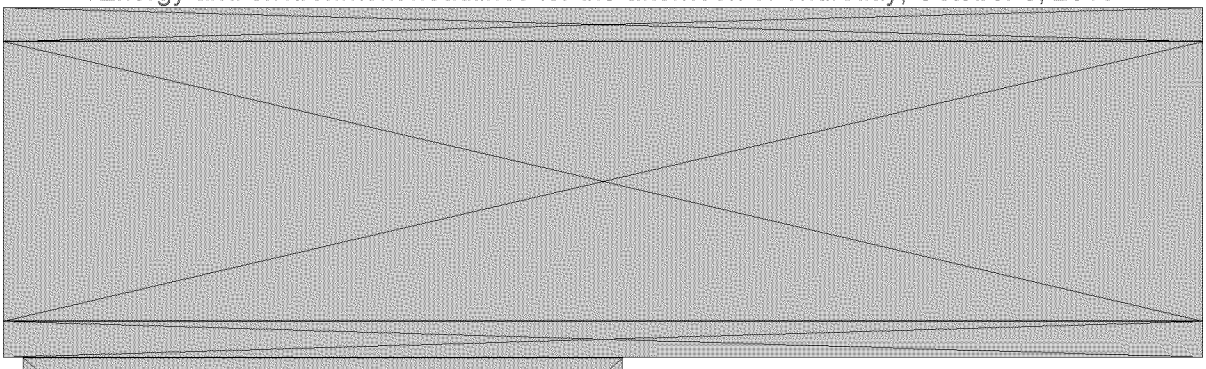
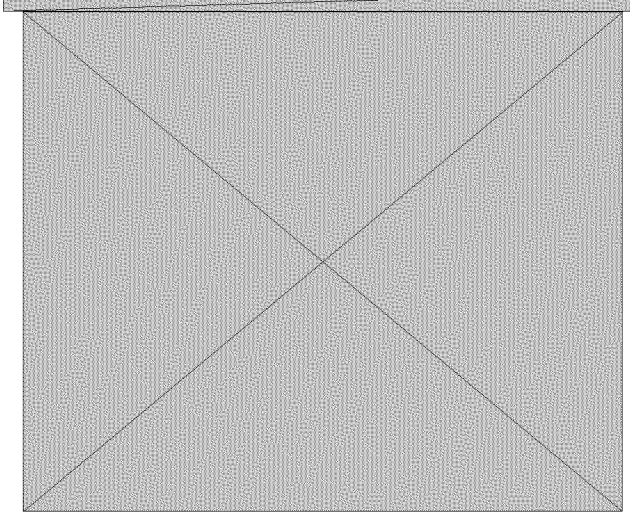
Energy and environment headlines for the afternoon of Thursday, October 8, 2015





Lawmakers slam VW for emissions scandal, suggest 'cover up'

By Kevin Rogers

House lawmakers on Thursday excoriated Volkswagen's top American official over the company's emissions testing scandal, with one suggesting the company's explanation was a 'cover up.' They also slammed the company's mitigation plan, which could take years to implement, as insufficient for consumers and vehicle dealers.

Michael Horn, president and CEO of Volkswagen Group of America, testifying voluntarily

and under oath before the House Energy and Commerce Subcommittee on Oversight and Investigations, apologized and said the company was working to make amends.

"We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," he said. "We are determined to make things right."

In a hearing that was often tense, committee members — while acknowledging that Horn was there voluntarily — aggressively questioned his story of how the cheating came to pass and how the company will repair the damage.

At issue is the use of so-called defeat devices, software that allowed cars to meet standards in testing environments even though they emit up to 40 times the legal amount of nitrogen oxide during normal driving. The company estimates that up to 500,000 diesel vehicles sold in the U.S. since 2009 are affected.

Horn said that the decision to install the software wasn't made by corporate leaders. He instead pinned the blame on engineers and said the company was investigating the roots of the decision.

"What I have learned is that some people have made the wrong decision to get away with something," he said. "That will be found out."

Rep. Chris Collins, R-N.Y., said the excuse was "inadequate" and "arrogant." He said that if company leaders thought the software was legal, they would have moved to patent it because it was so effective.

"I can not accept VW's portrayal of this as something done by a couple of rogue software engineers," he said. "I categorically reject that. Either your entire organization is incompetent when it comes to trying to come up with intellectual property, and I don't believe that for a second, or they are complicit in a massive cover up that continues to this very day."

He also criticized the company's $6.8 billion fund for repairs, suggesting it should more realistically be set at $68 billion.

Horn said that the repairs would decrease overall fuel economy by "one or two" miles per gallon. He said a software fix for 70,000 newer-generation vehicles would be ready in early 2016 and a fix for 95,000 vehicles from the previous generation would be ready by mid-2016.

He was unable to give a timetable for the oldest generation of affected cars, which totals 125,000. Repairs for older vehicles, which would include "major" hardware updates, would take about five to ten hours per vehicle, he said.

Rep. Jan Schakowsky, D-Ill., wasn't convinced by Horn's testimony, nor by the company's assertion that the affected cars are safe. The Environmental Protection Agency has said the cars are legal and safe to drive until a fix is available.

"As a consumer advocate all of my life, this is pretty shocking for people to find out that a company has deliberately cheated," she said. "It seems to me that asking customers for patience is really not sufficient."

She called on the company to offer a program to pay back customers the full value of the vehicles as soon as possible, and Horn said the company was 'open' to discussing that idea. Schakowsky said that, in the interim, the company should offer to compensate drivers who don't want to use the polluting vehicles, so they can obtain temporary replacement vehicles. Horn said that option wasn't on the table.

Other lawmakers put pressure on Horn over the company's treatment of its dealers, who are prohibited from selling affected vehicles until the fixes are implemented. Horn said the company was providing financial support to dealers who are saddled with inventory they can't sell.

"Dealer profitability in this country is first objective," he said.

But Rep. Marsha Blackburn, R-Tenn., used that comment to knock the Volkswagen's corporate mindset.

"I would hope that safety, quality and integrity are top priorities, and profitability comes along as part of that picture," she said.

EPA Director of Transportation and Air Quality Christopher Grundler said the agency continues to investigate the defeat device and will consider proper punishment once it has more information from Volkswagen.

"We still have many questions for Volkswagen to answer," he said.

Some Republicans used the opportunity to jab EPA for not initially identifying the problem. A 2014 West Virginia University study initially noted an emissions issue with the Volkswagens. A subsequent investigation by EPA and California uncovered the use of defeat devices.

"I think it's important to change your testing methods," Rep. Morgan Griffith, R-Va., told the officials. "WVU discovered the problem. You all didn't."

"I do think we do a very good job of setting priorities at EPA," Grundler said. "Once we learned of these excess emissions, we focused it and we didn't ignore it."

Griffith suggested that part of any criminal or civil fines collected from Volkswagen should go to the school to continue its research.

Quick Links

Democrats stop energy and water funding bill

McCarthy abruptly withdraws candidacy for House speaker

$338M fund in deadly oil train derailment close to approval

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Scientists: Major coral bleaching crisis spreads worldwide

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Flint to return to using water from Detroit

Upcoming Events

Democrats stop energy and water funding bill

By Kevin Rogers

Senate Democrats and a trio of Republicans on Thursday blocked a $35.4 billion appropriations bill to fund the Energy Department, the Army Corps of Engineers and nuclear security programs, denying full floor debate and a final vote on the measure.

By a 49-47 vote, the Senate rejected cloture on the bill.

Democrats found fault with its adherence to Budget Control Act spending caps. Georgia Republican Sens. Johnny Isaakson and David Perdue objected to provisions they said would insert the federal government into a water dispute between Georgia and Alabama. Sen. Dean Heller, R-Nev., also voted against cloture, though he did not say why.

Ahead of the vote, the bill's chief author, Sen. Lamar Alexander, R-Tenn., criticized the Democratic effort to block debate on the bill, which, he noted, authorized just 3 percent less than the president's request.

“They're saying we don't want to talk about it. They say we have a difference of opinion over spending,” he said. “This is a very bad precedent that really insults the Senate.”

The White House Office of Management and Budget on Thursday issued a veto threat against the measure, saying it “drastically underfunds critical investments” in clean energy technology.

McCarthy abruptly withdraws candidacy for House speaker

By Erica Werner

WASHINGTON (AP) — With no warning, Majority Leader Kevin McCarthy withdrew Thursday from the contest for speaker of the U.S. House, shocking fellow Republicans just before voting was to begin and plunging Congress into chaos.

Lawmakers said they were thunderstruck and in disbelief following McCarthy's announcement, which came moments after they had shown up for an election nearly certain to end with McCarthy as their pick. A mere two weeks ago outgoing Speaker John Boehner announced his plans to resign under conservative pressure, also without warning and stunning to all.

Boehner, who planned to leave Oct. 30, said in a statement that he would stay on "until the

House votes to elect a new speaker."

McCarthy said, "Over the last week it has become clear to me that our conference is deeply divided and needs to unite behind one leader. I have always put this conference ahead of myself. Therefore I am withdrawing my candidacy for speaker of the House."

More

$338M fund in deadly oil train derailment close to approval

By David Sharp

PORTLAND, Maine (AP) — A Canadian railroad is withdrawing its objection to a $338 million fund for victims of an oil train derailment that killed 47 people in a small town in Quebec, removing the final obstacle to the settlement's final approval.

A Canadian judge gave conditional approval Thursday to changes to the settlement agreement that grant some legal protections to Canadian Pacific, allowing it to lift its objection.

The judge gave lawyers for victims and the province of Quebec until Tuesday to confirm their support of the changes, but that wasn't expected to delay final approval by a U.S. bankruptcy judge Friday in Portland, said Robert Keach, the U.S. bankruptcy trustee in the case.

Barring any eleventh-hour surprises, final approval would allow payments to be made to victims of the disaster by year's end, Keach said Thursday. About $83 million is being set aside to settle wrongful death claims.

More

Lawsuit wants plans mandated for dealing with big oil spills

By John Flesher

TRAVERSE CITY, Mich. (AP) — An environmental group sued the federal government Thursday, contending it gives pipeline owners and operators a free pass on developing legally required plans for dealing with oil spills into lakes, rivers and other inland waterways.

The National Wildlife Federation lawsuit accuses the U.S. Department of Transportation of failing for 20 years to issue regulations on crafting the spill strategies and of allowing companies to operate without them. The plans were ordered under the Oil Pollution Act,

which was enacted in 1990 following the Exxon Valdez disaster, and were supposed to be finished by 1995.

"The Department of Transportation's failure to review or approve spill response plans is a huge oversight that has left communities and wildlife vulnerable to catastrophic spills," said Neil Kagan, senior counsel for the federation.

Neither the department's Pipeline and Hazardous Materials Safety Administration nor the U.S. Department of Justice responded immediately to requests for comment.

More

ArcelorMittal sued over soot from Pennsylvania coke plant

By Joe Mandak

PITTSBURGH (AP) — An environmental activist group sued ArcelorMittal USA on Thursday for allegedly violating the Clean Air Act by showering nearby residents with soot and other pollutants from a western Pennsylvania coke plant more than 200 times since it reopened in April 2014.

PennEnvironment sent a 60-day notice letter to the Chicago-based steelmaker in August. The advance notice is required under federal law, which gives citizens the right to sue if regulatory agencies have not.

The Pennsylvania Department of Environmental Protection continues to work with the federal Environmental Protection Agency "with regard to operations at the plant and is evaluating appropriate enforcement actions," DEP spokesman John Poister said Thursday.

PennEnvironment executive director David Masur said the company only recently offered to discuss the violations.

More

A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

New Jersey goes to court to seize beach lots for

dunes

By Wayne Parry, The Associated Press

New Jersey has gone to court to seize 87 publicly owned beach parcels through eminent domain to be used for a protective dune system the South Jersey shore town and its residents bitterly oppose.

The state attorney general's office and the Department of Environmental Protection acted Thursday, less than a week after Gov. Chris Christie called Margate "among the most selfish people in the state of New Jersey" for refusing to allow the dunes to be built.

The town, just south of Atlantic City, says its wooden bulkheads are sufficient to protect against ocean flooding, and that most of the damage from Superstorm Sandy in 2012 came from the bay on the other side of town.

Ten private lots still need to be acquired in Margate - which aren't part of Thursday's court action.

S.C. flooding: Governor urges evacuations along the coast

By The Associated Press

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"We are having an issue getting those people to leave because they have been in hurricane situations," she said. "This is, as the general said, 'a different kind of bad,'" referring to the flooding that has followed a historic storm that dumped nearly two feet of rain onto the state last weekend.

Haley said flooding is expected in Georgetown first, followed by Jamestown and the Givens Ferry area in the next 72 hours.

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worldwide

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The spread of sickly white started more than a year ago in Guam, then devastated Hawaii, infected the rest of the tropical Pacific and the Indian oceans and has now infested Florida and the Caribbean. On Thursday, the National Oceanic and Atmospheric Administration and international reef scientists pronounced it a global coral bleaching event, only the third in recorded history.

No place with coral has been spared, though some regions — such as Hawaii — have been hit harder than others, experts said. Excessive heat stresses the living coral, which turns white and then becomes vulnerable to disease.

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FAA tests show that even a small number of overheating batteries emit gases that can cause explosions and fires that can't be prevented by current fire suppression systems. Airlines flying to and from the U.S. that accept lithium battery shipments carry 26 million passengers a year, Stubblefield said.

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By Keith Ridler

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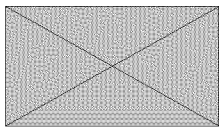

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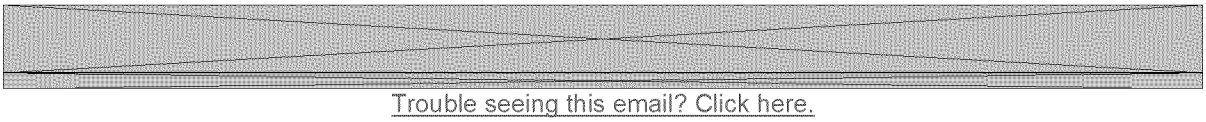

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From: EnergyGuardian
Sent: Thur 10/8/2015 9:31:31 PM
Subject: Lawmakers slam VW for emissions scandal, suggest 'cover up'

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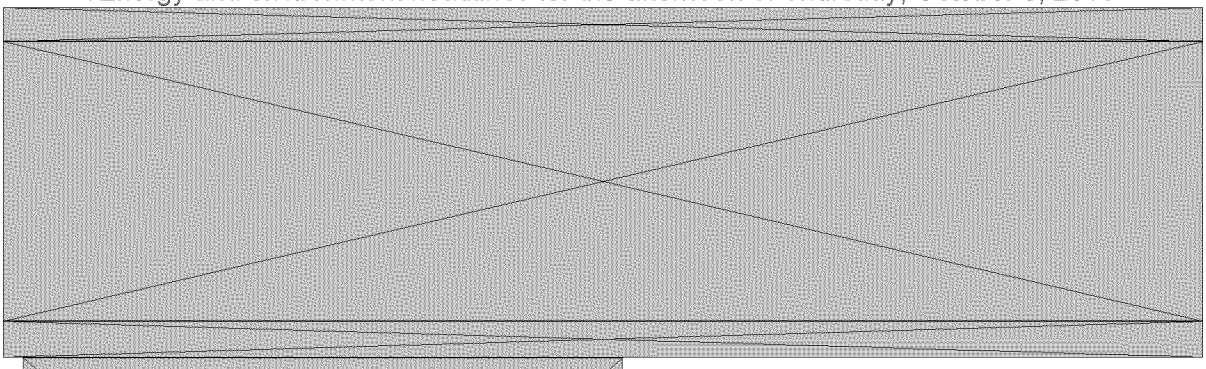
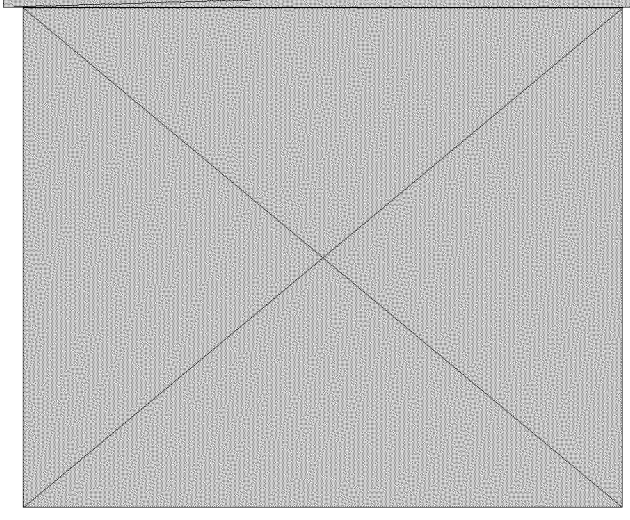
Energy and environment headlines for the afternoon of Thursday, October 8, 2015





Lawmakers slam VW for emissions scandal, suggest 'cover up'

By Kevin Rogers

House lawmakers on Thursday excoriated Volkswagen's top American official over the company's emissions testing scandal, with one suggesting the company's explanation was a 'cover up.' They also slammed the company's mitigation plan, which could take years to implement, as insufficient for consumers and vehicle dealers.

Michael Horn, president and CEO of Volkswagen Group of America, testifying voluntarily

and under oath before the House Energy and Commerce Subcommittee on Oversight and Investigations, apologized and said the company was working to make amends.

"We have broken the trust of our customers, dealerships, and employees, as well as the public and regulators," he said. "We are determined to make things right."

In a hearing that was often tense, committee members — while acknowledging that Horn was there voluntarily — aggressively questioned his story of how the cheating came to pass and how the company will repair the damage.

At issue is the use of so-called defeat devices, software that allowed cars to meet standards in testing environments even though they emit up to 40 times the legal amount of nitrogen oxide during normal driving. The company estimates that up to 500,000 diesel vehicles sold in the U.S. since 2009 are affected.

Horn said that the decision to install the software wasn't made by corporate leaders. He instead pinned the blame on engineers and said the company was investigating the roots of the decision.

"What I have learned is that some people have made the wrong decision to get away with something," he said. "That will be found out."

Rep. Chris Collins, R-N.Y., said the excuse was "inadequate" and "arrogant." He said that if company leaders thought the software was legal, they would have moved to patent it because it was so effective.

"I can not accept VW's portrayal of this as something done by a couple of rogue software engineers," he said. "I categorically reject that. Either your entire organization is incompetent when it comes to trying to come up with intellectual property, and I don't believe that for a second, or they are complicit in a massive cover up that continues to this very day."

He also criticized the company's $6.8 billion fund for repairs, suggesting it should more realistically be set at $68 billion.

Horn said that the repairs would decrease overall fuel economy by "one or two" miles per gallon. He said a software fix for 70,000 newer-generation vehicles would be ready in early 2016 and a fix for 95,000 vehicles from the previous generation would be ready by mid-2016.

He was unable to give a timetable for the oldest generation of affected cars, which totals 125,000. Repairs for older vehicles, which would include "major" hardware updates, would take about five to ten hours per vehicle, he said.

Rep. Jan Schakowsky, D-Ill., wasn't convinced by Horn's testimony, nor by the company's assertion that the affected cars are safe. The Environmental Protection Agency has said the cars are legal and safe to drive until a fix is available.

"As a consumer advocate all of my life, this is pretty shocking for people to find out that a company has deliberately cheated," she said. "It seems to me that asking customers for patience is really not sufficient."

She called on the company to offer a program to pay back customers the full value of the vehicles as soon as possible, and Horn said the company was 'open' to discussing that idea. Schakowsky said that, in the interim, the company should offer to compensate drivers who don't want to use the polluting vehicles, so they can obtain temporary replacement vehicles. Horn said that option wasn't on the table.

Other lawmakers put pressure on Horn over the company's treatment of its dealers, who are prohibited from selling affected vehicles until the fixes are implemented. Horn said the company was providing financial support to dealers who are saddled with inventory they can't sell.

"Dealer profitability in this country is first objective," he said.

But Rep. Marsha Blackburn, R-Tenn., used that comment to knock the Volkswagen's corporate mindset.

"I would hope that safety, quality and integrity are top priorities, and profitability comes along as part of that picture," she said.

EPA Director of Transportation and Air Quality Christopher Grundler said the agency continues to investigate the defeat device and will consider proper punishment once it has more information from Volkswagen.

"We still have many questions for Volkswagen to answer," he said.

Some Republicans used the opportunity to jab EPA for not initially identifying the problem. A 2014 West Virginia University study initially noted an emissions issue with the Volkswagens. A subsequent investigation by EPA and California uncovered the use of defeat devices.

"I think it's important to change your testing methods," Rep. Morgan Griffith, R-Va., told the officials. "WVU discovered the problem. You all didn't."

"I do think we do a very good job of setting priorities at EPA," Grundler said. "Once we learned of these excess emissions, we focused it and we didn't ignore it."

Griffith suggested that part of any criminal or civil fines collected from Volkswagen should go to the school to continue its research.

Quick Links

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By Kevin Rogers

Senate Democrats and a trio of Republicans on Thursday blocked a $35.4 billion appropriations bill to fund the Energy Department, the Army Corps of Engineers and nuclear security programs, denying full floor debate and a final vote on the measure.

By a 49-47 vote, the Senate rejected cloture on the bill.

Democrats found fault with its adherence to Budget Control Act spending caps. Georgia Republican Sens. Johnny Isaakson and David Perdue objected to provisions they said would insert the federal government into a water dispute between Georgia and Alabama. Sen. Dean Heller, R-Nev., also voted against cloture, though he did not say why.

Ahead of the vote, the bill's chief author, Sen. Lamar Alexander, R-Tenn., criticized the Democratic effort to block debate on the bill, which, he noted, authorized just 3 percent less than the president's request.

“They're saying we don't want to talk about it. They say we have a difference of opinion over spending,” he said. “This is a very bad precedent that really insults the Senate.”

The White House Office of Management and Budget on Thursday issued a veto threat against the measure, saying it “drastically underfunds critical investments” in clean energy technology.

McCarthy abruptly withdraws candidacy for House speaker

By Erica Werner

WASHINGTON (AP) — With no warning, Majority Leader Kevin McCarthy withdrew Thursday from the contest for speaker of the U.S. House, shocking fellow Republicans just before voting was to begin and plunging Congress into chaos.

Lawmakers said they were thunderstruck and in disbelief following McCarthy's announcement, which came moments after they had shown up for an election nearly certain to end with McCarthy as their pick. A mere two weeks ago outgoing Speaker John Boehner announced his plans to resign under conservative pressure, also without warning and stunning to all.

Boehner, who planned to leave Oct. 30, said in a statement that he would stay on "until the

House votes to elect a new speaker."

McCarthy said, "Over the last week it has become clear to me that our conference is deeply divided and needs to unite behind one leader. I have always put this conference ahead of myself. Therefore I am withdrawing my candidacy for speaker of the House."

More

$338M fund in deadly oil train derailment close to approval

By David Sharp

PORTLAND, Maine (AP) — A Canadian railroad is withdrawing its objection to a $338 million fund for victims of an oil train derailment that killed 47 people in a small town in Quebec, removing the final obstacle to the settlement's final approval.

A Canadian judge gave conditional approval Thursday to changes to the settlement agreement that grant some legal protections to Canadian Pacific, allowing it to lift its objection.

The judge gave lawyers for victims and the province of Quebec until Tuesday to confirm their support of the changes, but that wasn't expected to delay final approval by a U.S. bankruptcy judge Friday in Portland, said Robert Keach, the U.S. bankruptcy trustee in the case.

Barring any eleventh-hour surprises, final approval would allow payments to be made to victims of the disaster by year's end, Keach said Thursday. About $83 million is being set aside to settle wrongful death claims.

More

Lawsuit wants plans mandated for dealing with big oil spills

By John Flesher

TRAVERSE CITY, Mich. (AP) — An environmental group sued the federal government Thursday, contending it gives pipeline owners and operators a free pass on developing legally required plans for dealing with oil spills into lakes, rivers and other inland waterways.

The National Wildlife Federation lawsuit accuses the U.S. Department of Transportation of failing for 20 years to issue regulations on crafting the spill strategies and of allowing companies to operate without them. The plans were ordered under the Oil Pollution Act,

which was enacted in 1990 following the Exxon Valdez disaster, and were supposed to be finished by 1995.

"The Department of Transportation's failure to review or approve spill response plans is a huge oversight that has left communities and wildlife vulnerable to catastrophic spills," said Neil Kagan, senior counsel for the federation.

Neither the department's Pipeline and Hazardous Materials Safety Administration nor the U.S. Department of Justice responded immediately to requests for comment.

More

ArcelorMittal sued over soot from Pennsylvania coke plant

By Joe Mandak

PITTSBURGH (AP) — An environmental activist group sued ArcelorMittal USA on Thursday for allegedly violating the Clean Air Act by showering nearby residents with soot and other pollutants from a western Pennsylvania coke plant more than 200 times since it reopened in April 2014.

PennEnvironment sent a 60-day notice letter to the Chicago-based steelmaker in August. The advance notice is required under federal law, which gives citizens the right to sue if regulatory agencies have not.

The Pennsylvania Department of Environmental Protection continues to work with the federal Environmental Protection Agency "with regard to operations at the plant and is evaluating appropriate enforcement actions," DEP spokesman John Poister said Thursday.

PennEnvironment executive director David Masur said the company only recently offered to discuss the violations.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

New Jersey goes to court to seize beach lots for

dunes

By Wayne Parry, The Associated Press

New Jersey has gone to court to seize 87 publicly owned beach parcels through eminent domain to be used for a protective dune system the South Jersey shore town and its residents bitterly oppose.

The state attorney general's office and the Department of Environmental Protection acted Thursday, less than a week after Gov. Chris Christie called Margate "among the most selfish people in the state of New Jersey" for refusing to allow the dunes to be built.

The town, just south of Atlantic City, says its wooden bulkheads are sufficient to protect against ocean flooding, and that most of the damage from Superstorm Sandy in 2012 came from the bay on the other side of town.

Ten private lots still need to be acquired in Margate, which aren't part of Thursday's court action.

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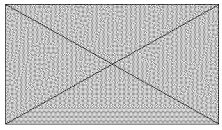

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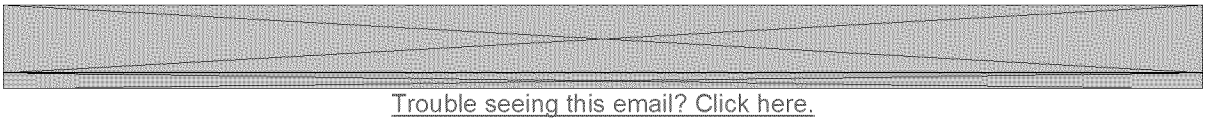
- Oct. 8, Washington: The Senate Energy and Natural Resources Committee to hold a legislative hearing on six bills dealing with water issues. Interior Deputy Secretary Michael Connor to testify. 9:30 am , Dirksen 366.
- Oct. 9, Washington: The House to vote on a bill from Rep. Joe Barton, R-Texas, that would lift the Commerce Department ban on crude oil exports. 9:00 am , U.S. Capitol Building



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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Ex. 6
Sent: Thur 10/8/2015 10:15:17 PM
Subject: Great Lakes and air emissions

Hello Chris,

You may not remember me, but I remember you from GLNPO and IJC work. I hope you are well and the work rewarding.

I am writing simply to say, "don't let them grind you down". I am encouraged to see your name on the VW issue and to know you are there in front of congressional questions. I know you and your group are sincere in your efforts even without the support or understanding of the politicians who are such a barrier to sound management.

Ex. 6

Keep up the good fight buddy!

Ex. 6

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Kerley, David
Sent: Thur 10/8/2015 10:29:18 PM
Subject: Re: Good luck

Should be on air in about 7 minutes.

David Kerley
Correspondent
ABC News Washington, DC
202-222-7254

On Oct 8, 2015, at 5:19 PM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:

> Lemme know when your piece posts
>
> **From:** Kerley, David [mailto:David.Kerley@abc.com]
> **Sent:** Thursday, October 08, 2015 4:30 PM
> **To:** Grundler, Christopher
> **Subject:** RE: Good luck
>
> I was surprised you weren't asked several questions.
>
> ---
>
> **David Kerley** | Correspondent | **ABC News**
>
> 1717 DeSales St NW | Washington, DC 20036
>
> 202-222-7254
>
> @David_Kerley
>
> **From:** Grundler, Christopher [mailto:grundler.christopher@epa.gov]

Sent: Thursday, October 08, 2015 3:59 PM
To: Kerley, David
Subject: RE: Good luck

I was hoping to be asked my opinion about that

From: Kerley, David [mailto:David.Kerley@abc.com]
Sent: Thursday, October 08, 2015 3:58 PM
To: Grundler, Christopher
Subject: RE: Good luck

Oh… watch my piece.

David Kerley | Correspondent | **ABC News**

1717 DeSales St NW | Washington, DC 20036

202-222-7254

@David_Kerley

From: Grundler, Christopher [mailto:grundler.christopher@epa.gov]
Sent: Thursday, October 08, 2015 3:52 PM
To: Kerley, David
Subject: Re: Good luck

I also think he will get more grief about the "couple of rogue software engineers" bit

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. EPA

202-564-1682 (DC)

734-214-4207 (Ann Arbor)

On Oct 8, 2015, at 3:47 PM, Kerley, David <David.Kerley@abc.com> wrote:

> True…
>
> And the members worried about dealers…I mean contributors.

David Kerley | Correspondent | **ABC News**

1717 DeSales St NW | Washington, DC 20036

202-222-7254

@David_Kerley

From: Grundler, Christopher [mailto:grundler.christopher@epa.gov]
Sent: Thursday, October 08, 2015 3:46 PM
To: Kerley, David
Subject: Re: Good luck

I thought he should've said his customers (not dealers) were his highest priority

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. EPA

202-564-1682 (DC)

734-214-4207 (Ann Arbor)

On Oct 8, 2015, at 3:23 PM, Kerley, David <David.Kerley@abc.com> wrote:

> Well…
>
> Since he only sells cars and doesn't build cars.. it may have been smart for VW to send him. Investigation…investigation…investigation. No real answers.
>
> But there were hints..which members didn't pick up on….about the certification of 2016.
>
> So… overall he did fine….but so many questions hanging out there.

David Kerley | Correspondent | **ABC News**

1717 DeSales St NW | Washington, DC 20036

202-222-7254

@David_Kerley

From: Grundler, Christopher [mailto:grundler.christopher@epa.gov]
Sent: Thursday, October 08, 2015 3:18 PM
To: Kerley, David
Subject: RE: Good luck

How did you think the VW boss did?

From: Kerley, David [mailto:David.Kerley@abc.com]
Sent: Thursday, October 08, 2015 1:34 PM
To: Grundler, Christopher
Subject: Good luck

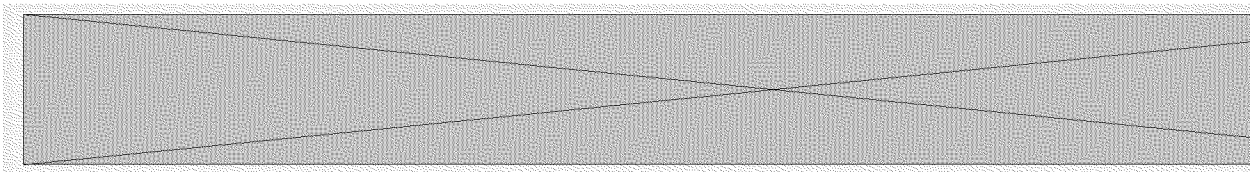
Interested in how deep you go..

David Kerley | Correspondent

1717 DeSales St NW | Washington, DC 20036

':202-222-7254 | @David_Kerley

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: The Hill
Sent: Thur 10/8/2015 11:22:11 PM
Subject: Overnight Energy & Environment: Volkswagen exec apologizes to lawmakers



VW FACES CONGRESS: Volkswagen Group's top United States official offered a "sincere apology" to lawmakers for his company cheating on Environmental Protection Agency (EPA) emissions tests.

But that didn't protect Michael Horn from a strong, bipartisan tongue-lashing in the Energy and Commerce Committee's oversight subcommittee.

"On behalf of our company, and my colleagues in Germany, I would like to offer a sincere apology for Volkswagen's use of a software program that served to defeat the regular emissions testing regime," Horn said at the Thursday hearing.

"We have broken the trust of our customers, dealerships and employees, as well as the public and regulators," he said.

Rep. Fred Upton (R-Mich.), the committee's chairman, said the idea of deliberately skirting emissions tests was "beyond belief."

"Attempting to deceive regulators and customers is a double whammy of betrayal," he said.

Rep. Frank Pallone (D-N.J.), the top Democrat, said Volkswagen's actions are part of a pattern of carmakers cheating the system.

"There seems to be a pervasive culture of deception in this industry, and it has to stop now," he said.

Read more here.

TRIBAL ENERGY BILL PASSES HOUSE: A bill from Rep. Don Young (R-Alaska) streamlining the permitting process for energy projects on American Indian land passed the House on Thursday.

The Interior Department needs to approve any lease deals tribes strike with energy developers, but Young and other Republicans say the process is burdensome and costly.

The bill they passed Thursday looks to cut down on the federal government's role in the process.

"We are doing an indirect thing to allow them to ... expand their self-worth and keep their identity," Young said during floor debate.

The White House opposes the bill, though, saying it removes the feds' role in the energy permitting process. Officials said this week that they were working on reforming the rules on their own.

"The administration has been taking meaningful action to update the leasing process for lands held in trust for Indian tribes, and is actively working to expedite appraisals, leasing, and permitting on Indian lands, and to provide resources to ensure safe and responsible development," an Office of Management and Budget statement Wednesday said.

Read more here.

ON TAP FRIDAY: The House is scheduled to vote on a bill from Rep. Joe Barton (R-Texas) lifting the ban on crude oil exports. The bill has a handful of Democratic co-sponsors, but the White House has already come out against. Supporters of lifting the ban have been working toward an as-of-yet elusive compromise on the measure. Our preview here.

AROUND THE WEB:

Conditions are now "more favorable" for a strong El Nino in Northern California, helping its drought, the Sacramento Bee reports.

Warm ocean temperatures are causing a "massive worldwide coral bleaching event," the Washington Post reports.

International Monetary Fund chief Christine Lagarde says that if the world doesn't work to address climate change, "we'll all be fried, grilled, toasted and roasted." The Associated Press has the story.

IN CASE YOU MISSED IT:

Check out Thursday's stories ...

-House votes to speed up tribal energy projects
-Watchdog report faults Park Service cabin where Biden stayed
-Senate Dems block energy spending bill
-Interest groups appeal to Congress on oil exports
-Dems ask EPA to go beyond UN on aircraft emissions
-Volkswagen exec offers 'sincere apology' for emissions scandal
-Supporters of ending the oil-export ban eye a deal

Please send tips and comments to Timothy Cama, tcama@thehill.com; and Devin Henry, dhenry@thehill.com. Follow us on Twitter: @Timothy_Cama, @dhenry, @thehill

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To: jack.moore@aramcoservices.com[jack.moore@aramcoservices.com]; Julius.Basler-Meier@bmw.de[Julius.Basler-Meier@bmw.de]; uwe.higgen@bmw.de[uwe.higgen@bmw.de]; Claudia.Kolbinger@bmw.de[Claudia.Kolbinger@bmw.de]; janea.scott@energy.ca.gov[janea.scott@energy.ca.gov]; steven.cliff@dot.ca.gov[steven.cliff@dot.ca.gov]; Ex. 7 bdghosh@cht.in[bdghosh@cht.in]; jeffrey.jacobs@chevron.com[jeffrey.jacobs@chevron.com]; michael.hartrick@fcagroup.com[michael.hartrick@fcagroup.com]; reginald.modlin@fcagroup.com[reginald.modlin@fcagroup.com]; jennifer.rumsey@cummins.com[jennifer.rumsey@cummins.com]; john.c.wall@cummins.com[john.c.wall@cummins.com]; sean.waters@daimler.com[sean.waters@daimler.com]; s.watson@fiafoundation.org[s.watson@fiafoundation.org]; jviera@ford.com[jviera@ford.com]; britta.gross@gm.com[britta.gross@gm.com]; robert_bienenfeld@ahm.honda.com[robert_bienenfeld@ahm.honda.com]; dbakker@hatci.com[dbakker@hatci.com]; serge.passolunghi@renault.com[serge.passolunghi@renault.com]; jerome.perrin@renault.com[jerome.perrin@renault.com]; philippe.schulz@renault.com[philippe.schulz@renault.com]; mmiyasato@aqmd.gov[mmiyasato@aqmd.gov]; LBrowy@SempraUtilities.com[LBrowy@semprautilities.com]; jgreed@semprautilities.com[jgreed@semprautilities.com]; Greg.Kamla@shell.com[Greg.Kamla@shell.com]; chencm@sinopec.com[chencm@sinopec.com]; robert_wimmer@toyota.com[robert_wimmer@toyota.com]; fred.joseck@ee.doe.gov[fred.joseck@ee.doe.gov]; kevin.womack@dot.gov[kevin.womack@dot.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; frank.seyfried@volkswagen.de[frank.seyfried@volkswagen.de]; khamberg@westport.com[khamberg@westport.com]
Cc: Joan Ogden[jmogden@ucdavis.edu]; Lewis M Fulton[lmfulton@ucdavis.edu]; Daniel Sperling[dsperling@ucdavis.edu]; Amy Jaffe[abmjaffe@ucdavis.edu]; Sonia Yeh[slyeh@ucdavis.edu]; Beth Y Bourne[bybourne@ucdavis.edu]; Thomas Mackey[tcmackey@ucdavis.edu]; Joe Krovoza[jfkrovoza@ucdavis.edu]
From: Paul W Gruber
Sent: Thur 10/8/2015 11:47:25 PM
Subject: invitation: STEPS advisory board meeting - Dec. 11 (following Dec. 10 symposium) at UC Davis
Draft Agenda-STEPS Fall Symposium & Board Meeting Dec 10-11 2015.docx

Dear STEPS advisory board members,

Following up on excellent feedback we received from our August board meeting, we will host a more intimate and formal STEPS advisory board meeting on Dec. 11, from 8:30am to 11:00am, at UC Davis. This meeting will be for board members and STEPS leadership only, to discuss STEPS 2015 research progress and STEPS 2016 proposed projects. Also, based on your expert feedback, we plan to distribute a list of proposed STEPS 2016 projects at least two weeks ahead of this Dec. 11 meeting, which should enable a productive discussion.

The day before, on Dec. 10, we will host our STEPS research symposium and an evening reception. I hope you will be able to attend both events. If you cannot make the board meeting, we ask that you designate an alternate.

The draft agendas are attached, and as usual we seek your input ahead of time to make these events insightful dialogues.

Best regards,

Paul

Paul W. Gruber

Executive Director

NextSTEPS (Sustainable Transportation Energy Pathways)

Institute of Transportation Studies

University of California, Davis

www.steps.ucdavis.edu

office: (530) 752-1934

mobile: (703) 772-4053

UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

STEPS FALL 2015 SYMPOSIUM & ADVISORY BOARD MEETING

STEPS Fall 2015 Symposium: Thursday, December 10, 2015
8:45am – 5:30pm with reception to follow
The ARC (Activities and Recreation Center) Ballroom, UC Davis
STEPS team will present insights from 2015 projects via presentations and posters
and introduce proposed 2016 projects.

STEPS Advisory Board Meeting *(board members only)*: Friday, December 11, 2015
8:30am – 11:00am
Walter A. Buehler Alumni Center, Founder's Board Room, UC Davis
STEPS advisory board members and STEPS leadership will discuss
STEPS 2016 projects and research direction.

Thank you to our STEPS 2015-2018 program sponsors:

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UCDAVIS

SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

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Day 1: Thursday, December 10, 2015

The ARC (Activities and Recreation Center) Ballroom, UC Davis

8:15 a.m.	*Continental Breakfast*
8:45 a.m.	**Welcome and Introductory Remarks** Joan Ogden, Director, STEPS Program; Professor, Env. Science and Policy, UC Davis
9:00 a.m.	**Keynote: Summary of COP21, Relevance for STEPS and US and California Regulations** Speaker invited
9:45 a.m.	**Session 1:** Current Markets and Consumer Trends • GEN-Y: Results from the STEPS California travel survey (Lew Fulton, Giovanni Circella) • EV-related consumer behavior work (Ken Kurani) • New Mobility Center (Regina Clewlow and team) • *Discussion*
10:45 a.m.	*Coffee Break*
11:00 a.m.	**Session 2: Transitions to 2030 and Beyond** • Initial insights and views from new 2030 scenarios (Joan Ogden, Lew Fulton, Chris Yang) • eVMT Analysis (Gil Tal, Mike Nicholas) • International EV Project (Lew Fulton, Gil Tal) • *Discussion*
12:30 p.m.	*Lunch is served*
1:30 p.m.	**Session 3: Insights from STEPS 2015 (potential topics listed)** • Alternative fuels in trucks (Chris Yang, Marshall Miller, Rosa Dominguez) • Range of hybridization configurations (Andy Burke) • Low oil prices and economic crises in context (Amy Jaffe) • Policy design and robust decision making (Rich Plevin) • STEPS lookback analysis (Julie Witcover) • *Discussion*
3:00 p.m.	**Poster Session** STEPS team members present their research
5:00 p.m.	**Wrap Up and Key Insights**
5:30 p.m.	Adjourn
6:00 p.m.– 9:00 p.m.	Reception & Dinner in downtown Davis

VW FOIA, EPA 06/20/2017 2017-FFP_030556

Day 2: Friday, December 11, 2015

STEPS Advisory Board Members, or designees, only

Founder's Board Room
Walter A. Buehler Alumni Center
530 Alumni Lane; Davis, CA 95616

8:30 a.m.	Arrival and Coffee
8:45 a.m.	**Present STEPS Program update and 2015 achievements (Joan Ogden)**
9:00 a.m.	**Discuss Proposed STEPS 2016 projects – to be sent to board members in advance**
10:45 a.m.	**Wrap Up**
11:00 a.m.	Adjourn

VW FOIA, EPA 06/20/2017 2017-FFP_030557

Sustainable Transportation Energy Pathways Program (STEPS)
www.steps.ucdavis.edu

STEPS is the major multidisciplinary research consortium within the Institute of Transportation Studies at the University of California, Davis. The consortium is comprised of 40+ PhD-level faculty and researchers and graduate students from UC Davis, 20+ industry and governmental partners, and 20+ outside expert organizations. Our mission encompasses research, outreach, and education:

- generate new insights and tools to understand the transitions to a sustainable transportation energy future for California, the US and the world,
- disseminate valued knowledge and tools to industry, government, the environmental NGO community, and the general public to enhance societal, investment, and policy decision making,
- train the next generation of transportation and energy leaders and experts.

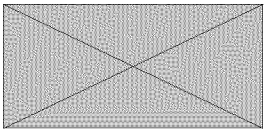
The STEPS 2015-2018 program is generously supported by these sponsors (incl. pledges and commitments):

- Auto: BMW, Cummins, Daimler, Ford, Fiat Chrysler, GM, Honda, Renault, Toyota, Volkswagen, Westport
- Energy: Aramco, Chevron, Centre for High Technology (India), Shell, San Diego Gas & Electric/SoCal Gas Co., Sinopec
- Government: California Air Resources Board, Caltrans, South Coast AQMD, U.S. DOE, U.S. DOT, U.S. EPA

STEPS has initiated a 2015-2018 research program. The main program areas and overarching research questions are:

- **Initiating Transitions 2015-2030:** What is required for early alternative fuel/vehicle transitions to succeed?
- **The Future of the Fuels and the Oil & Gas Industry:** How will changing geopolitical landscapes and disruptive technology in the oil and gas and clean technology industry impact future business models and the competition of fuels?
- **Global Urban Sustainable Transport (GUSTo):** How will a rapidly urbanizing world affect demand for transport and energy? How can we transition to sustainable transportation in a rapidly urbanizing world with ever-growing need for mobility?
- **Modeling Analysis, Verification, Regulatory and International Comparisons (MAVRIC):** What do improved and cross-compared economic/environmental/transportation/energy models tell us about the future of sustainable transportation?

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Environmental Law360
Sent: Fri 10/9/2015 7:34:26 AM
Subject: CERCLA Deals Face Tough Road After High Court Snub



ENVIRONMENTAL

Friday, October 9, 2015

TOP NEWS

CERCLA Deals Face Tough Road After High Court Snub

States may have a harder time executing early Superfund settlements with parties that bear little responsibility for contamination following the U.S. Supreme Court's decision not to review a Ninth Circuit holding that district courts must more closely analyze such deals.

EPA Issues First-Ever Action Over Calif. Truck Regs

The U.S. Environmental Protection Agency announced on Thursday its first-ever enforcement action under California's Truck and Bus Regulation, inking a settlement with commercial trucking group Estes Express Lines over its failure to install particulate filters on dozens of heavy-duty diesel trucks.

Calif. Gov. Approves Microbead Ban Starting In 2020

California Gov. Jerry Brown approved a ban starting in 2020 on the sale of microbeads — the small plastic particles in facial scrubs, soaps and toothpaste — aimed at curtailing pollution in the Pacific Ocean and the Los Angeles River, according to an announcement from his office Thursday.

Enviros Sue EPA Over Enforcement Of Air Quality Standards

Three environmental groups sued the U.S. Environmental Protection Agency on Thursday for not enforcing air quality standards that limit pollution from coal-fired power plants, cars and other sources in five Western states, according to a complaint filed in California federal court.

Trump Takes $350M Wind Farm Fight To UK Supreme Court

A Scottish golf course owned by U.S. presidential hopeful Donald Trump on Thursday asked the United Kingdom's Supreme Court to overturn a June decision by a Scottish court rejecting Trump's bid to disallow a $350 million offshore wind project near the property, which he has deemed as unsightly.

Patriot Coal's Ch.11 Plan Gets Nod From Judge

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Cole Schotz

Cooley LLP

A Virginia bankruptcy judge on Thursday approved Patriot Coal Corp.'s Chapter 11 plan, which is centered on a deal to sell the majority of its operating mines to Blackhawk Mining LLC as part of a complex transaction announced last month.

ANALYSIS

Tax-Credit Probe Likely The Least Of VW's Problems

The Senate Finance Committee on Wednesday launched a probe into whether Volkswagen AG lied to the government in certifying that its cars qualified for fuel efficient vehicle tax credits, but experts said such allegations of fraud are likely to be a minor focus in any U.S. prosecution against the company.

Yieldco Bubble Set To Pop For Clean Energy Cos.

Once the project finance darling of the renewable energy industry, yieldcos are losing favor with investors who were promised high returns from these publicly traded companies. Now, clean energy developers may have to tap other funding sources for their projects.

POLICY & REGULATION

Lawmakers Doubt VW Didn't Know About Emissions Cheats

Volkswagen AG's top U.S. executive on Thursday repeatedly denied knowing before September that the automaker's vehicles were fitted with software to cheat emissions standards, a stance met with incredulity by U.S. lawmakers probing the CEO on the emissions scandal.

Sens. Seek Permanent West Coast Offshore Drilling Ban

The six senators representing the West Coast states on Wednesday reintroduced a bill to place a permanent ban on offshore drilling on the Outer Continental Shelf of their states.

ENFORCEMENT

Texas Sues VW, Audi Over Consumer, Enviro Violations

The state of Texas is going after Volkswagen and Audi for allegedly rigging some of their cars to pass diesel emissions tests, with the state's attorney general on Thursday slapping the automakers with two lawsuits claiming violations of consumer protection laws and clean air standards.

LITIGATION

5th Circ. Bars Some Fishers' Oil Spill Claims Against Barge Co.

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The Fifth Circuit on Thursday partially upheld a ruling that let a group of fishers proceed with their claims against American Commercial Lines LLC over an oil spill that tainted fishing grounds along the Mississippi River, but the appeals court booted some of the plaintiffs for pursuing litigation too soon after filing their Oil Pollution Act claims.

NJ Sues To Take Shoreline Property For Storm Projects

New Jersey filed an eminent domain action against a shore town Thursday to secure an easement the Army Corps of Engineers needs to construct engineered beach and dune projects needed to guard property against storm surges and flooding on Absecon Island.

Jackson Walker Hit With DQ Bid In Energy Contract Spat

Japanese banking giant Sumitomo urged a Texas federal court Wednesday to disqualify Jackson Walker LLP from representing a Texas utility in its contract dispute with a wind farm operator, arguing the law firm's previous representation of the bank created a conflict of interest.

ArcelorMittal Hit With Suit Over Stinky Soot In Pa.

A nonprofit environmental group hit ArcelorMittal Monessen LLC with a Clean Air Act suit on Thursday in Pennsylvania federal court, alleging that the company's coke plant is raining down harmful and smelly air pollutants on nearby residents.

DOT Sued Over Failure To Issue Pipeline Spill Regs

The U.S. Department of Transportation has been shirking its duty to impose oil spill regulations on pipelines crossing under water, the National Wildlife Federation said in a suit filed Thursday in Michigan federal court that seeks to force the department to act.

Railway Co., Insurer Reach $3M Deal Over Derailment

Great American Insurance Company on Wednesday agreed to pay out $3 million in coverage to Montreal Maine & Atlantic Railway Ltd. to settle a liability dispute arising from a fiery 2013 oil train derailment that killed 47 people in the town of Lac-Megantic, Quebec.

Enviros Take Peabody, Arch Coal Lease Fight To 10th Circ.

Environmental groups on Wednesday took their challenges of federally issued coal mining leases for Peabody Energy Corp. and Arch Coal units to the Tenth Circuit, insisting the leasing contradicts the Obama administration's commitment to tackling climate change.

DEALS

Talen Energy Reaps $1.5B From Pa. Power Plant Sales

Talen Energy Corp., the merchant power company created by energy-focused private equity firm Riverstone Holdings LLC and the spunoff merchant unit of utility giant PPL Corp., said

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Thursday that it's selling three Pennsylvania power plants for a combined $1.51 billion in order to satisfy divestment requirements from federal regulators.

EXPERT ANALYSIS

EPA Hazardous Waste Generator Rule Is A Mixed Bag

While aspects of the U.S. Environmental Protection Agency's Hazardous Waste Generator Improvements Rule may provide greater flexibility for some generators to manage their hazardous waste more efficiently, the rule would clearly increase the regulatory burden in other respects, particularly in the area of documentation and notification, says Thomas Hogan of Baker & Hostetler LLP.

LEGAL INDUSTRY

Most Feared Plaintiffs Firm: Robbins Geller

Going the distance in high-risk battles with the nation's top defense firms and their well-heeled clients may seem daunting to some firms, but Robbins Geller Rudman & Dowd LLP has made a name for itself by plunging headfirst into such challenges, landing it among Law360's Most Feared Plaintiffs Firms for the third consecutive year.

Verdict Eludes Dewey Jury As Deliberations Continue

The Manhattan District Attorney's prosecution of three former Dewey & LeBoeuf LLP executives teetered on the edge of mistrial on Thursday as jurors again failed to reach a verdict on the majority of the charges in the case, one day after rejecting allegations of falsifying books and records.

How To Bounce Back From A Revenue Drop

While an unexpected downturn in profitability is no picnic for any law firm, skilled leaders can identify inefficiencies and areas for potential growth to keep the damage at a minimum. Here, industry experts lay out the best course for repairing a broken bottom line.

Lackluster Biz Development Efforts Holding Firms Back

Competition from rival firms and the difficulty in getting attorneys on board with business development initiatives top the list of challenges to law firm growth, according to a survey released Wednesday from LexisNexis.

Ex-Heller Ehrman Client Can't Get Third Shot At $20M Claim

Ex-Heller Ehrman LLP client Paravue Corp. failed on Wednesday to convince a California federal judge to revive a $20 million malpractice suit accusing the defunct firm of negligently advising it on loan agreements, with the judge saying the suit was filed too late.

Nixon Peabody, CWL Partners Join Forces In Hong Kong

Nixon Peabody LLP said this week that it has further expanded its presence in Asia,

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consolidating its Hong Kong operations with CWL Partners, a longtime ally in the region, to create a new firm with 30 lawyers and legal professionals.

Law360's Weekly Verdict: Legal Lions & Lambs

Shearman & Sterling LLP, Morvillo LLP and Paul Weiss Rifkind Wharton & Garrison LLP lawyers easily won the legal lions' battle this week after the U.S. Supreme Court let stand their landmark insider trading victory in the Newman case. Leading this week's legal lambs are BigLaw teams representing DuPont Co., which got off to a bad start in the defense of thousands of claims focused on contaminated drinking water.

NY Courts Take Steps To Streamline Discovery, Cut Costs

The New York Supreme Court's Commercial Division has enacted two administrative orders that aim to make discovery proportional to the amount at stake in a lawsuit and streamline depositions in commercial litigation, objectives that rule-change proponents say were needed to better provide justice to business litigants.

Law360 Closed For Columbus Day

The offices of Law360 will be closed Monday for the Columbus Day holiday. Newsletter service will resume Tuesday, Oct. 13.

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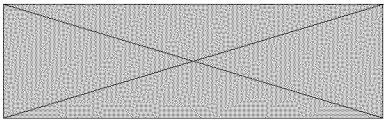

Starting this week, **Greater Expectations: The New Geopolitics of Climate Change exposes the on-the-ground reality of developing countries challenged by a world that will require every nation to cut carbon emissions. Go to the special report.**

E&E DAILY — Fri., October 9, 2015

READ FULL EDITION

1.LEADERSHIP:

Power vacuum leaves fall agenda in limbo

The chaotic turn of events that engulfed Capitol Hill yesterday is casting a pall over the fall agenda, as the clock ticks on big-ticket items such as raising the debt limit and heading off a government shutdown in December.

2.POLITICS:

Chaos on the Hill, but a blip at most at the ballot box

Majority Leader Kevin McCarthy's (R-Calif.) sudden withdrawal yesterday from the race to succeed House Speaker John Boehner (R-Ohio) triggered a scramble among House Republicans, but it could be some time before the effects of a leadership shakeup trickle down into competitive congressional races.

ON THE HILL

3.WESTERN WATER:

Panel seeks to craft foundation for broad drought bill

4.OIL:

House to cast final vote on export bill locked in partisan fight

5.AIR POLLUTION:

Fixes for NOx-pumping VW cars could be far off, exec testifies

6.NATIONAL MONUMENTS:

Feinstein's Calif. desert bill draws mixed reviews

7.CHEMICALS:

Senate punts TSCA vote until after recess

8.ENERGY:

House passes tribal bill despite looming veto

ADMINISTRATION

9.NOMINATIONS:

White House promotes KXL point man at State Department

E&ETV'S THE CUTTING EDGE

10.POLITICS:

***E&E Daily*'s Bush talks impact of leadership uncertainty on energy legislation**

UPCOMING HEARINGS AND MARKUPS

11.CALENDAR:

Activity for October 5 - October 11, 2015

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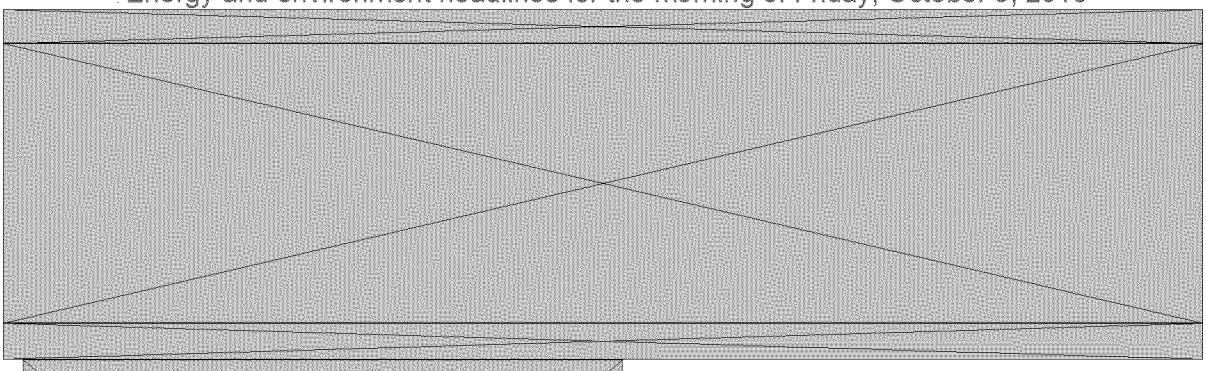
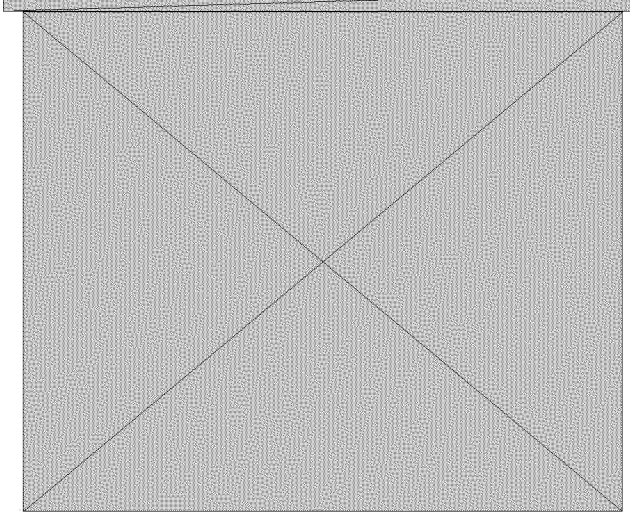
Energy and environment headlines for the morning of Friday, October 9, 2015





House approves Native energy bill over White House protestations

By Kevin Rogers

Overruling complaints from the White House that it would "undermine public participation and transparency," the House on Thursday approved a bill to streamline environmental reviews and block federal hydraulic fracturing rules for energy projects on Native American land.

The Native American Energy Act, authored by Rep. Don Young, R-Alaska, was approved by

a vote of 254 to 173 on a largely party-line vote.

It would seek to encourage tribal energy development by allowing tribes to waive appraisals of lands, limiting comments on environmental reviews to affected tribe members and citizens, putting limits on judicial reviews of projects and allowing the Navajo Nation to enter into contracts with energy and mining companies on their restricted lands without Interior Department approval.

It would also restrict the Bureau of Land Management's regulation on fracking from taking effect on Indian land without tribal consent.

Young said that the provisions would allow tribes to be "self-determined" and address Government Accountability Office-identified flaws in the Interior Department management of Indian lands.

"The bill streamlines federal permitting and increases tribal control the energy and other natural resources development on Indian lands," Young said on the House floor. "This did not come from me. This came from the native tribes themselves. We should let them control their own destiny."

The Office of Management and Budget said Wednesday that the bill "would not ensure diligent development of resources on Indian lands." It also argued that the fracking rule was designed to grant tribes a variance when they have stronger rules in place.

While the administration did not threaten to veto the bill, it said it "does not support" the bill as written.

And Rep. Raul Grijalva, D-Ariz., said that the "irresponsible" bill would only serve energy and mining interests at the expense of the health and safety of Native Americans. He also criticized Republicans for limiting tribal access to health care and education through adhering to sequestration budget cuts.

"Instead of helping tribes develop energy resources on their lands, this approach will lead to less environmental protection on Indian lands and less judicial recourse to those affected," he said. "Picking between tribal sovereignty and responsible energy development is a false choice. We can have both."

Grijalva said the provision limiting public comment on environmental reviews to affected tribe members would needlessly cut other stakeholders out of the process. Young and his supporters, however, said that the language was necessary to prevent environmental groups and other interest groups from interfering with tribal affairs.

House Natural Resources Chairman Rep. Rob Bishop, R-Utah, in a statement released following the vote, accused the Obama administration of favoring those interests over the rights of Native Americans.

"With the passage of the Native American Energy Act, the House of Representatives stands with Indian Country," he said. "Unfortunately, it appears that partisanship and powerful special interests reign supreme as the Obama Administration has opposed this empowering legislation."

The Obama administration said it is working within the Interior Department to improve energy leasing programs on Native American lands.

Quick Links

GOP in tumult after McCarthy's withdrawal from speaker race

Trade deal, Keystone open Clinton to flip-flop charges

California to phase out microbeads used in soaps, toothpaste

Texas sues VW over consumer protection, clean air violations

NY governor: Denying global warming isn't a survival plan

Louisiana gas facility explosion leaves 3 workers dead: Officials

6 workers injured in explosion at dam in Washington state

Compensation closer for deadly Lac Megantic derailment

Homeland Security chief to visit South Carolina floods

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Gas pipeline from Romania to Moldova to be built in 2016

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Petronas not abandoning Canadian LNG project despite delays

UK solar firm splits from SunEdison, shuts doors

N.H. nonprofit marking 20 years of efficiency work

Solar decathlon running with smaller field in 2015

Upcoming Events

GOP in tumult after McCarthy's withdrawal from speaker race

By Alan Fram

WASHINGTON (AP) — Jolted by political lighting for the second time in two weeks, House Republicans are staring at turmoil and uncertainty after Majority Leader Kevin McCarthy's astonishing decision to abandon his campaign to become the chamber's next speaker.

GOP lawmakers, who lately have acted more like feuding relatives than a unified party, were meeting Friday to discuss their next move. On Thursday, Republicans munching barbecue at a closed-door meeting where they seemed ready to coronate McCarthy as their candidate for speaker were aghast when the Californian rose and told them he wouldn't seek the job.

Facing opposition from a band of hard-right conservatives, some McCarthy supporters said he concluded he would have fallen short of the 218 votes needed when the full House formally elects the speaker. Others said he could have won but GOP lawmakers backing him would have infuriated conservative constituents back home, jeopardizing their own careers.

"It was only going to get worse," McCarthy said in an interview published Thursday night by The Wall Street Journal. He added, "This was for the good of the team."

More

Trade deal, Keystone open Clinton to flip-flop charges

By Ken Thomas and Lisa Lerer

WASHINGTON (AP) — Martin O'Malley was blunt when he learned Hillary Rodham

Clinton had announced her opposition to a Pacific Rim trade deal. "Wow, that's a reversal," he told reporters minutes after Clinton announced her shift.

The Trans-Pacific Partnership trade deal is just the latest in a long line of issues that Clinton has shifted her views on in recent weeks, giving Democratic rivals like O'Malley, the former Maryland governor, and Vermont Sen. Bernie Sanders, an opportunity to brand her as a flip-flopper on the eve of the first Democratic presidential debate.

Leading up to the Oct. 13 primetime encounter in Las Vegas, Clinton has announced her opposition to the Keystone XL pipeline, a project she said she was "inclined" to support back in 2010 as President Barack Obama's secretary of state. She touted her support for gay marriage during a weekend appearance before the Human Rights Campaign — yet she opposed same-sex marriage for more than two decades in public life.

And her opposition to the Asian trade deal, which was finalized last week, came nearly three years after she traveled to Australia as secretary of state and lauded the proposed pact as the "gold standard" of trade deals. Video clips of Clinton talking about the trade deal are stored on YouTube, giving her opponents made-for-TV footage that could be used in television ads to highlight her shifting positions.

More

California to phase out microbeads used in soaps, toothpaste

By Juliet Williams

SACRAMENTO, Calif. (AP) — Gov. Jerry Brown signed legislation Thursday requiring California to phase out the use of microscopic exfoliating beads in personal care products sold in the state starting in 2020 to protect fish and wildlife.

The tiny plastic beads found in soap, toothpaste and body washes are so small that they are showing up in the bodies of fish and other wildlife after passing through water filtration systems without disintegrating.

Assemblyman Richard Bloom, D-Santa Monica, said his bill, AB888, seeks to drastically restrict all use of the non-biodegradable beads, which can contain various toxins.

"AB888 was carefully crafted to avoid any loopholes that would allow for use of potentially harmful substitutes," Bloom said in a statement Thursday. "This legislation ensures that personal care products will be formulated with environmentally-safe alternatives to protect our waterways and oceans."

More

Texas sues VW over consumer protection, clean air violations

By The Associated Press

AUSTIN, Texas (AP) — Texas has filed suit against Volkswagen, charging that the automaker's emissions rigging violated state consumer protection laws and clean air standards.

Attorney General Ken Paxton said Thursday that his state would seek restitution for consumers, and an injunction and civil penalties to prohibit future violations.

Paxton, who himself has been indicted for securities fraud, said in a statement, "When companies willfully violate the public's trust, a penalty must be paid."

VW says it installed devices designed to defeat emissions testing on many Volkswagen and Audi diesel cars dating to model year 2009.

More

NY governor: Denying global warming isn't a survival plan

By Michael Balsamo

NEW YORK (AP) — New York Gov. Andrew Cuomo on Thursday joined government leaders worldwide in signing an agreement to help combat global warming and keep the Earth's average temperature from rising dangerously.

The Under Two MOU, a memorandum of understanding signed by more than three dozen government leaders, affirmed New York's commitment to helping keep the Earth's average temperature from rising more than 2 degrees Celsius and committed the state to working to reduce greenhouse gas emissions about 40 percent by 2030. Cuomo said he hoped New York would be able to generate 50 percent of its electricity from renewable energy sources by then.

"Climate change is an issue of society's sustainability. To deny that climate change is real is to defy reason ... denial is not a survival strategy," Cuomo told an audience of a few hundred people at Columbia University before signing the agreement.

The memo comes ahead of the United Nations' climate negotiations in Paris in December. Former vice president and environmentalist Al Gore sat next to Cuomo on stage. He said he hoped New York's commitment would send a strong signal to world leaders and encourage

others to make the same pledge.

More

A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

Louisiana gas facility explosion leaves 3 workers dead: Officials

By The Associated Press

GIBSON, La. (AP) — An explosion at a Louisiana natural gas facility Thursday left three workers dead and two seriously injured, police said.

The explosion happened about 11 a.m. at a facility owned by the Transcontinental Gas Pipeline Co., a subsidiary of major natural gas supplier Williams Partners, authorities said. The facility is located on a small highway near the oil and gas city of Houma.

The workers killed and injured were contractors doing maintenance work when the explosion occurred, Williams Partners said in a statement. The names of the victims and the company or companies they worked for were not released immediately. Williams Partners said its 13 workers at the facility were unharmed.

"We are deeply saddened by this tragedy," said Williams operations manager Warren Toups.

More

6 workers injured in explosion at dam in Washington state

By Lisa Baumann

MATTAWA, Wash. (AP) — An explosion at a hydroelectric dam on Washington's Columbia River Thursday injured six workers, but did not compromise the dam's structure and posed no risk to the public, officials said.

The utility workers were hurt in an electrical explosion at about 4:15 p.m. at the Priest Rapids Dam near the central Washington city of Mattawa, Grant Public Utility District

spokesman Thomas Stredwick said.

"The stability of the dam was never compromised," Grant County Sheriff's Office spokesman Kyle Foreman said. "There's no reason for people living around the dam to be worried."

Officials said the blast caused some electrical power and cellphone outages.

More

Compensation closer for deadly Lac Megantic derailment

By David Sharp

PORTLAND, Maine (AP) — A Canadian railroad's withdrawal of opposition to a $338 million fund for victims of an oil train derailment that killed 47 people in Quebec has set the stage for final approval and compensation for victims.

A U.S. bankruptcy trustee and Canadian Pacific agreed to modify the settlement fund to give the railroad some legal protection, prompting the railroad's decision to end its objections. A Canadian judge gave conditional approval on Thursday, and a U.S. bankruptcy judge is to consider the plan Friday.

Victims and the province of Quebec have until Tuesday to confirm their support of the changes in Canada.

Barring any surprises, the timeline would allow payments to be made to victims of the disaster by year's end, said Robert Keach, the bankruptcy trustee. About $83 million is being set aside to settle wrongful death claims.

More

Homeland Security chief to visit South Carolina floods

By The Associated Press

COLUMBIA, S.C. (AP) — Homeland Security Secretary Jeh Johnson plans to get a first-hand look at flooding in South Carolina.

Johnson is scheduled to travel to Columbia and Charleston on Friday to meet with federal, state and local officials and view ongoing response and recovery efforts in areas affected by severe flooding.

While Johnson is in Columbia and Charleston, he is scheduled to participate in joint news conferences with South Carolina Gov. Nikki Haley; Sen. Tim Scott; Reps. Mark Sanford, Joe Wilson, Jim Clyburn, and other federal, state and local officials.

South Carolina National Guard commander Maj. Gen. Robert Livingston, meanwhile, was urging residents in low-lying areas on the coast to heed authorities if they tell them to evacuate.

Any mandatory evacuations would be ordered by local officials, and Livingston says people should listen to them.

More

Tropical storm bearing down on Alaska

By Becky Bohrer

JUNEAU, Alaska (AP) — Parts of the nation's northernmost state are bracing for heavy rains and strong winds from the remnants of Hurricane Oho.

Tropical storm conditions are expected to combine with a low-pressure system to bring potentially 2 to 6 inches of rain to southeast Alaska through Friday, according to weather officials.

The expected tropical system will be the latest unusual weather event to hit Alaska in 2015: sparse snowfall pushed the start of the Iditarod sled-dog race 400 miles to the north; dry conditions fueled one of Alaska's worst fire seasons; but soggy weather in Juneau made for an especially wet summer.

Last year, Juneau, which is in a rainforest, had its wettest summer on record, with more than 24 inches of rain. This summer came in a close second.

More

Gas pipeline from Romania to Moldova to be built in 2016

By The Associated Press

CHISINAU, Moldova (AP) — A Moldovan government official says work on a pipeline that will transport natural gas from Romania to the Moldovan capital will begin next year.

The pipeline, which is expected to become operational in May 2018, will help lessen the former Soviet republic's dependency on Russia. It is an extension of one running from the

northern Romanian city of Iasi to Ungheni, a Moldovan town near the Romanian border.

Valeriu Triboi, Moldova's deputy economy minister said Friday construction of the pipeline from Ungheni to Moldova's capital Chisinau, a city of one million, will begin next spring.

Moldova, which is hoping to join the European Union, hopes to get financial help from the EU. The pipeline is expected to cost at least 83 million euros ($94 million).

Refiners step up lobbying against crude exports

Ahead of a key House vote Friday on a measure to lift the ban on crude exports, refiners like Valero Energy Corp. have been pressing hard for its defeat, FuelFix reports.

More

Little interest in energy, environment debates for candidates

A planned debate between Republican presidential candidates on energy and environment issues in New Hampshire this week was cancelled after only two agreed to come, and a similar forum for Democrats has been postponed, The Huffington Post reports.

More

Credit lines cut for oil companies, Wells Fargo exec tells panel

A top Wells Fargo executive on Thursday told a panel in Houston that his bank has lowered its borrowing base for oil companies by an average of about 15 percent because of the drop in crude prices, FuelFix reports. Analysts say the change could mean $15 billion less in capital available to producers.

More

Oil trades over $50 on likelihood of interest rate hold

Oil prices are on track for their biggest weekly gain in six years, rallying again early Friday on expectations that the Federal Reserve will delay raising interest rates. U.S. benchmark crude rose 77 cents to $50.20 a barrel in electronic trading on the Nymex, while in London Brent gained 60 cents to $53.65, Reuters reports.

More

California diesel pollution rules snare Va. trucking firm

Under a settlement with the Environmental Protection Agency, Estes Express Lines will pay a $100,000 fine and spend $290,000 on pollution control equipment for operating its trucks in California without filters required under the state's stringent regulations, the Los Angeles Times reports.

More

El Nino could dent California drought, forecasters say

A revised forecast from the National Weather Service says the El Nino weather pattern in place might help alleviate California's drought this winter by bringing substantial precipitation, The Sacramento Bee reports.

More

Petronas not abandoning Canadian LNG project despite delays

The fall in oil and gas prices may have deferred the decision by Petronas to move ahead on an LNG export project in British Columbia, but the Malaysian company isn't giving up on the idea, Reuters reports.

More

UK solar firm splits from SunEdison, shuts doors

Managers at Mark Group Ltd. – bought by SunEdison in July – have purchased the business back but put it into the British equivalent of Chapter 11 bankruptcy protection, laying off more than 900 employees as they closed down company operations, The Wall Street Journal reports.

More

N.H. nonprofit marking 20 years of efficiency work

The Jordan Institute has been working to promote energy efficiency in buildings since the nonprofit was founded in 1995, the Concord Monitor reports.

More

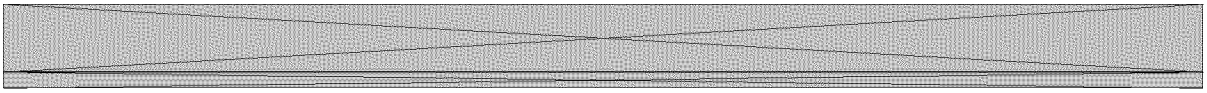
Solar decathlon running with smaller field in 2015

Funding cuts mean the 14 teams competing in the 2015 Solar Decathlon – launched by Energy Secretary Ernest Moniz in California Thursday – represent the smallest field since the Department of Energy started the event in 2002, National Geographic reports.

More

Upcoming Events

- Oct. 9, Washington: The House to vote on a bill from Rep. Joe Barton, R-Texas, that would lift the Commerce Department ban on crude oil exports. 9:00 am , U.S. Capitol Building



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Correspondent
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From: energy@morningconsult.cpro30.com
Sent: Fri 10/9/2015 12:13:32 PM
Subject: Morning Consult Energy: Backers of Lifting Oil Export Ban Looking to Strike a Deal; Goldman Sachs Says Oil Price Rally Won't Last

By Deirdra O'Regan

Today's Washington Brief

- Supporters of a bill that would lift the federal ban on crude oil exports are searching for a compromise measure to win congressional and presidential approval. While most backing for the bill comes from Republicans, several Democrats have expressed interest in extracting some concessions. (The Hill)

- Volkswagen's top U.S. executive offered apologies but few answers to a House Energy and Commerce Committee. Michael Horn told lawmakers that the installation of emissions rigging software was not a "corporate decision," and that rectifying the damage will take years. (Morning Consult)

- A Senate bill to update the 40-year-old Toxic Substance Control Act stalled this week, as senators moved to attach new amendments. The bill has widespread bipartisan support, so it is likely only a matter of time before it gets to the floor. (Morning Consult)

Today's Business Brief

- Oil prices surged this week, with West Texas Intermediate futures breaking above $50 per barrel for the first time since July. But Goldman Sachs says the market remains oversupplied and gains will be short-lived. (Bloomberg News)

- Worldwide investment in renewable energy and energy-smart technologies totaled $70 billion but slid 1 percent in the third quarter of 2015 from the same period last year. The U.S. benefited from the investments, with a 25 percent surge to reach $13.4 billion. (Clean Technica)

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Goldman Sachs: This Oil Rally Is Not Going to Last
Luke Kawa, Bloomberg News

Oil has been surging this week but Goldman Sachs is calling for gains to be short-lived. The front-month West Texas Intermediate futures contract enjoyed a double-digit advance in recent days, breaking above $50 per barrel on Thursday for the first time since July. The problem, according to Goldman, is that the fundamentals have not changed: in spite of the start of a roll-over in U.S. production, the market remains oversupplied.

Oil Investors Gain Over $70 Billion in Best Week Since 2008
Rakteem Katakey, Bloomberg News

European oil companies are heading for the best weekly performance in seven years as they added about $74 billion in value following crude's surge past $50 a barrel. The 23-member Stoxx Europe 600 Oil & Gas index has climbed 13 percent this week, the most since November 2008. Tullow Oil Plc, which operates oilfields in Africa, is the best performer with a 38 percent increase while Royal Dutch Shell Plc's A shares in London have advanced 13 percent, also heading for their biggest weekly

gain in seven years.

Interest groups appeal to Congress on oil exports
Devin Henry, The Hill

Activists on both sides of the crude oil export ban are making their final pitches to lawmakers before the House votes on lifting the restriction later this week. Letters supporting and opposing lifting the ban have poured into Congress ahead of Friday's vote on the matter.

California oversight of oil well injection sites inadequate – state review
Rory Carroll, Reuters

California's oversight of wells where oil companies dispose of wastewater brought to the surface is hindered by inadequate staffing and poorly organized paper records, a state review of the program said Thursday. In a report to the state legislature, California's Department of Conservation (DOC) found that wastewater injection wells also suffer from inconsistent permitting, monitoring and enforcement of their construction and operation, among other problems.

Three Killed in Blast at Natural Gas Plant in Louisiana
Alison Sider, The Wall Street Journal

Three workers were killed in an explosion and fire Thursday at a natural gas plant in Gibson, La., according to Williams Partners LP, the company that owns the facility. The plant, located 70 miles southwest of New Orleans, wasn't operating at the time of the blast, the company said.

Encana to Sell Colorado Oil and Gas Assets for $900 Million
Judy McKinnon, The Wall Street Journal

Encana Corp. said Thursday that it had agreed to sell oil and gas assets in Colorado's Denver Julesburg Basin for $900 million to a new joint venture majority owned by Canada's biggest pension fund. Encana, which has been shedding assets to shore up its balance sheet, will sell 51,000 net acres in the DJ Basin oil and natural-gas play to a new entity owned 95% by Canada Pension Plan Investment Board and 5% by Denver-based private-equity firm Broe Group.

Gazprom to Sell Debt in €1 Billion Deal
Christopher Whitall, The Wall Street Journal

Russian energy giant OAO Gazprom became the latest emerging-market borrower to sell debt to international investors on Thursday, taking advantage of growing expectation that the U.S. Federal Reserve will delay raising interest rates. Gazprom will pay an interest rate of 4.625% on a €1 billion ($1.12 billion), three-year bond, according to a deal notice released today.

Utilities & Infrastructure

Talen Energy to Sell Three Power Plants for $1.51 Billion
Ezequiel Minaya, The Wall Street Journal

Talen Energy Corp. , the spinoff of PPL Corp. 's power-generation businesses, said on Thursday it has reached agreements to sell three Pennsylvania power plants for about $1.51 billion. The sales are part of the regulatory requirements allowing for the creation of Talen earlier this year.

Railroad Agency to Detail New Rail-Track Standards
Jad Mouawad, The New York Times

Federal authorities plan to detail new rail-track standards on Friday after finding that a broken rail caused an oil train to derail this year in West Virginia. The finding highlights a main cause of oil train accidents, according to the Federal Railroad Administration, which concluded an eight-month investigation into the derailment of a CSX train near Mount Carbon.

Renewables

Global Q3 Renewable Energy Tecnology Investment Totals $70 Billion
Joshua S Hill, Clean Technica

Global investment in renewable energy and energy-smart technologies reached $70 billion in the third quarter, according to Bloomberg New Energy Finance. According to new figures published Wednesday by Bloomberg New Energy Finance (BNEF), worldwide investment in renewable energy and energy-smart technologies totaled $70 billion in the third quarter of 2015, sitting just 1% below the same quarter a year earlier.

Coal

US railroad coal delays of two to five days drop in West, rise in East: STB
Jim Levesque, Platts

Coal shipment delays of two to five days dropped in the West but increased in the East, reports filed by the for major US railroads with the Surface Transportation Board show. Data in EP 724 filings released Thursday for the week ending October 2 show combined coal delays of two to five days for BNSF and Union Pacific fell by 57.9% compared with the previous week.

Patriot Coal gets court approval for reorganization plan
Gary Robertson, Reuters

A U.S. bankruptcy court approved Patriot Coal's restructuring plan at a hearing on Thursday, including the sale of a major part of its mines and coal reserves to privately held Blackhawk Mining of Lexington, Kentucky. Patriot Coal, based in Scott Depot, West Virginia, filed for bankruptcy in May, its second in three years, listing assets and liabilities of more than $1 billion each.

Nuclear

New director of Idaho's federal nuclear facility sees opportunities to advance energy security
Keith Ridler, Associated Press

Idaho's federal nuclear facility can become the nation's premier energy security lab while also bolstering the region's economy, the new director says. Mark Peters has been on the job for about a week at the Idaho National Laboratory. The Idaho lab is considered the nation's primary lab for nuclear research, with those efforts using about 70 percent of the lab's budget.

Climate

Dems ask EPA to go beyond UN on aircraft emissions
Timothy Cama, The Hill

A group of House Democrats is pushing the Obama administration to crack down more strongly on airplane emissions than it is planning to do. The Environmental Protection Agency (EPA) is working with the United Nations' International Civil Aviation Organization (ICAO) to establish worldwide standards for greenhouse gas emissions from aircraft.

N.C. may stay 'inside the fence line,' setting up EPA battle
Kristi E. Swartz, E&E

North Carolina may be one of the few states that doesn't ask U.S. EPA for more time to craft an emission-reduction scenario for the agency's Clean Power Plan. But the state may focus solely on improving the efficiency or "heat rate" at coal-fired power plants, which means its plan likely won't meet the federal plan's goal of cutting carbon emissions by 32.1 percent, the director of Duke University's Nicholas Institute for Environmental Policy Solutions said yesterday.

Global Finance For Climate Action In Developing Countries Reaches $62 Billion
Joshua S Hill, Clean Technica

The public and private global financing raised for climate action in developing countries reached $62 billion in 2014, according to the OECD. According to a new study released by the Organisation for Economic Co-operation and Development, and conducted in collaboration with Climate Policy Initiative, public and private finance that was mobilized by developed countries for climate action in developing countries grew from $52 billion in 2013 to an impressive $62 billion in 2014.

Opinions, Editorials & Perspectives

Ingenuity Key to Unlocking America's Energy Potential
Margo Thorning, Morning Consult

The White House recently announced its opposition to a bipartisan-backed bill passed by the House Energy and Commerce Committee that would end the nearly 40-year-old ban on crude oil exports. With the bill expected to pass the full House today, it's important to remember that ingenuity, not ideology, is the path to a prosperous and more self-sustaining America.

Lifting ban on crude oil exports is good for millennials
Megan Toombs, Red Alert Politics

Since the Great Recession, millennials have struggled to find jobs after college. When we do, we're often underemployed, or barely able to make payments on our massive student debt–a combined whopping $1.3 trillion nationwide, growing by $3,055.19 per second. One significant step Congress could take to spur robust job creation would be to end the ban on American oil exports.

VW Needs to Come Clean, Now
The Editorial Board, The New York Times

Corporate scandals, like political scandals, start with shocking revelations and then move inexorably into the who-knew-what-and-when stage. That is where executives can start rehabilitating their reputation — or deepen the damage. Since they were forced to admit one of the biggest frauds in auto industry history last month, the executives at Volkswagen have offered apologies, a few suspensions and promises to fix the devious defeat devices wired into 11 million of their diesel cars.

Why #Dieselgate Is Good For Volkswagen
Joseph Nagle, EverCharge

Diesel was already on the ropes with the advent of powerful electric vehicles, but now with the Volkswagen scandal it all but seals its fate. It's not diesel's fault; it's a cleaner-burning fuel than people realize, capable of powering incredibly large, powerful vehicles. There was only one major downside: pollution.

Passing POWER Act will drive cleaner energy and lower costs
Joshua Reichert, The Hill

What if every time you stopped to buy gas, you spilled two gallons for every one you put in the tank? That's akin to what happens in many power plants and factories, where up to two-thirds of the energy generated escapes, typically as steam sent skyward through smokestacks.

Research Reports, Issue Briefs & Case Studies

World Energy Outlook Special Report on Southeast Asia 2015
International Energy Agency

The ten countries that make up the Association of Southeast Asian Nations (ASEAN) are exerting an increasingly important influence on global energy trends. Underpinned by rapid economic and demographic growth, energy demand in the region has more than doubled in the last 25 years, a trend that is set to continue over the period to 2040.

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Fri 10/9/2015 12:51:53 PM
Subject: A.M. NEWSCAST: VW diesel delay to last 'several months;' Horn: Hardware fixes needed; Texas sues | Musk: Apple 'The Tesla Graveyard' | Lexus fuel-cell car? | NADA's gripe

October 9, 2015

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Ex. 6
Sent: Fri 10/9/2015 1:06:11 PM
Subject: vw TDI diesel & emissions

Christopher Grundler
Director USEPA

Dear Sir,

As the owner of a 2012 Jetta SportWagon TDI I want to express my anger, disgust and great disappointment at VW for flat out lying about the engine's emissions compliance and the USEPA for not performing real road testing of the effected cars, both initially and later on a random basis. (EPA should be testing ALL vehicles this way!)

I expect VW to be required to retrofit the effected cars with the urea injection system to make them comply with the emission standards.

My purchase of this car (and my previous 2009 model) was based on:
1. its fuel economy,
2. its drivability & performance,
3. and its "clean" diesel technology's environmental compliance.

Reprogramming the car to reach compliance will decrease both its fuel economy and its performance and is simply not an acceptable option for me!

A quite Sincerely pissed off owner,

Ex. 6

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Fri 10/9/2015 1:54:00 PM
Subject: Volkswagen Clips 10/9/2015

AP (via Washington Post):

http://www.washingtonpost.com/business/technology/vw-may-compensate-owners-of-diesel-cars-for-loss-of-value/2015/10/09/082a262c-6e8a-11e5-91eb-27ad15c2b723_story.html

VW may compensate owners of diesel cars for loss of value

By Tom Krisher | AP October 9 at 9:31 AM

DETROIT — Volkswagen could compensate owners of diesel-powered cars that emit high levels of pollutants, possibly by paying them for the lost value of their vehicles, the company's top U.S. executive said.

Speaking to lawmakers investigating the emissions cheating, U.S. CEO Michael Horn also said fixing most of the 500,000 affected cars in the U.S. could take one to two years, possibly more. The fix, he said, would not hurt fuel mileage, but it could hinder the cars' performance, knocking one or two miles-per-hour off the top speed.

"There might be a slight impact on performance," Horn said Thursday to a subcommittee of the House Energy and Commerce Committee.

Horn told the committee that VW hasn't calculated how much value the scandal has cost owners of the affected cars. But earlier this week Kelley Blue Book said the value of VWs with 2-liter diesel engines had fallen 13 percent since mid-September. Used car values often drop in the fall,

but the VW diesel drop was unusually large.

VW has admitted to installing so-called defeat devices on Volkswagen and Audi cars with four-cylinder diesel engines dating to the 2009 model year. The devices — actually software code — switch on pollution controls when the cars are being tested, but turn off the controls when the software determines that the cars are back on real roads. Affected models include the Jetta, Golf, Beetle, Passat and Audi A3. VW has said a total of 11 million cars worldwide have the software worldwide.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn said VW isn't considering offering owners loaner cars because the U.S. government says the diesels equipped with the defeat devices are safe to drive. The cars, though, emit 10 to 40 times the nitrogen oxide pollution that's allowed under federal law.

Horn said software changes alone will work to fix newer models, but 430,000 cars dating to 2009 will need mechanical repairs that are still being developed. Horn said engineers are working on either a larger catalytic converter that would treat nitrogen oxide, or a system that injects a chemical called urea into the exhaust.

Rep. Morgan Griffith, R-Va., asked if the urea system would require an extra storage tank that would take space from the cars' trunks. That also could affect the cars' value.

EPA Director of Transportation and Air Quality Christopher Grundler said the answer depends on the remedies VW offers to the agency. "We're going to take a very careful look at what impact this is going to have on owners," Grundler said.

Software alone will repair some newer Passat models, but they may need an additional sensor, Horn said. He didn't have an exact timeline on when the repairs might take place, but said it could take multiple years to develop the fix, get government approval and distribute parts to the company's U.S. dealers. The fixes may take five to 10 hours per car for dealership mechanics to complete, he said.

Horn conceded that the $7.3 billion (6.5 billion euros) VW has set aside so far to pay for the scandal may not be enough. Ultimately, the total cost will depend on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

The Guardian:

http://www.theguardian.com/sustainable-business/2015/oct/09/vw-bp-corporate-scandals-emissions-tests-oil-spill-horsemeat-rana-plaza

VW and the toxic problem of corporate amnesia

Scandals such as the BP oil spill, horsemeat and the recent revelations about VW raise serious questions about how to ensure companies don't repeat wrongdoing

André Spicer Friday 9 October 2015 09.10 EDT Last modified on Friday 9 October 2015 09.12 EDT

When it was revealed that VW had been cheating on emissions tests, people were shocked. The automaker that had styled itself as a champion of corporate social responsibility and clean technology suddenly no longer looked so ethical.

It turns out this is not the first time VW has cheated emissions tests. As far back as 1973, VW had been fitting defeat devices to cars. The company was pursued by the EPA and eventually settled out of court with a fine of $120,000 (£78,500). So why didn't VW learn its lesson?

Many companies readily forget costly lessons they learn following gross acts of irresponsibility. This is what happened in the Bangladeshi textile industry in the run-up to the collapse of Rana Plaza in 2013, despite multiple factory collapses and a factory fire in previous years.

In the past, companies would go to great lengths to avoid taking responsibility for wrongdoing. VW may have paid a fine in 1973, but the company admitted no responsibility. A similar thing happened following the financial crisis. When chiefs of the largest banks were called to explain

themselves to the Treasury select committee, they expressed profound regret at the unfortunate turn of events. None of them accepted responsibility.

Companies more recently have started to admit culpability and ask for forgiveness. The former CEO of VW, Martin Winterkorn, for example, said sorry and outlined steps to put things right. This did not save Winterkorn, but is considered best practice by PR and crisis management experts.

Doing things differently

Saying sorry and claiming you are going to do something is one thing, learning from mistakes and wrongdoing is quite another.

Colleagues and I were puzzled by this corporate amnesia. We wanted to know why companies in so many industries are so bad at learning from their past bad practice. As we started looking deeper into corporate crises, we noticed that when a crisis occurs there is a clear pattern of response.

To begin with, companies go out of their way to play down the crisis. They do this by claiming the harm that the crisis has caused is not so bad. Then they shift the blame on to an individual or a small group of people. Volkswagen is a case in point – the automaker has started heaping blame for a collective failure on to the shoulders of just four people, the CEO and three divisional heads. Finally, they shift attention away from the scandal to another issue.

We also noticed that corporations often forget about deep crises such as the horsemeat scandal and Toshiba overstating its profits at an amazingly rapid rate. Three to six months after a crisis, there is usually almost no public discussion about what were once burning issues. After the initiate public fury passes, companies seemingly forget their own wrongdoing. They get rid of people who might remember what went wrong. If they don't fire people, they try to gag them with legal settlements. A third common tactic is sidelining people who were in the know by placing them in marginal roles.

There is a danger this could happen at VW. Already we have seen "clean skins" who were not attached to the emissions crisis replacing those who had some connection with it. While it's

often vital to remove the CEO, the end result of getting rid of everyone involved is that the people who have learned painful lessons will not be around to remind others not to do it again.

Corporate amnesia

Once the immediate crisis has blown over, companies attempt to ensure it is wiped from people's long-term memory. Material artefacts such as failed technologies and traces of a collapsed building are disposed of, documents are shredded or made hard to access and media stories are drowned out with fresh online content.

Following one of the biggest oil spills in US history at San Luis Obispo in California, Unocal – a now defunct US oil company which was later acquired by Chevron Corporation – covered it up. Employees repeatedly lied in public about it and a culture of silence emerged around the spill within the company. As a result, 20m gallons of gasoline continued to seep into local sand dunes, fouling the groundwater and the beach. Unocal finally began speaking up about the spill after a whistleblower leaked the issue in the 1990s.

Forgetting about corporate scandals is a double-edged sword. On the one hand, putting past wrongdoing behind it helps a company to move on. For instance, BP wanted to move on from the oil spill in the Gulf of Mexico, not just because it is a drain on corporate resources but also because it continues to damage the company's reputation. One BP executive told me that, following the spill, she would not tell people she met who she worked for because she was so ashamed. Now things seem to have changed due to the passing of time and BP employees happily hand out their business cards.

But when companies fail to remember their past wrongdoing, there is a very real danger that they end up repeating the same bad behaviour again. This is what has happened at VW.

Next steps

When faced with a large-scale corporate crisis, firms need to show that they are doing something substantive. Following the explosion of the Piper Alpha oil platform in 1988, companies operating in the oil industry took practical steps to improve worker safety and showed they were taking safety issues seriously.

We're more than mere consumers, and business should remember that

John C. Havens

Companies also need to ensure they preserve the memory of what went wrong. This is hard because people naturally want to distance themselves. But forgetting makes it tough to learn. This means avoiding the knee-jerk reaction of doing a symbolic cleaning out of the company.

Companies also need to hold on to reminders of what went wrong. These might be stories of wrongdoing or even evidence of what went wrong. The US apparel maker Gore-Tex, for example, ritually celebrates failed projects with champagne. The idea is that by raising a glass to failure, it will help people to learn from it.

Other companies ensure that newcomers are told about times when things went disastrously wrong. For instance, there are many reminders of the explosion of the Challenger space shuttle in Nasa. Engineers working with the agency are often drilled in the failure as a case study of what can go wrong. This is a powerful reminder for employees of what not to do in the future.

To: Argyropoulos, Paul[Argyropoulos.Paul@epa.gov]; Berrier, Judi[Berrier.Judi@epa.gov]; Blubaugh, Jim[Blubaugh.Jim@epa.gov]; Bradish, Tracey[bradish.tracey@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Caldwell, Amy[caldwell.amy@epa.gov]; Cook, Leila[cook.leila@epa.gov]; Cooper, Nanette[cooper.nanette@epa.gov]; Curtis, Rhonda[Curtis.Rhonda@epa.gov]; Derksen, Kimberly[derksen.kimberly@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Fearnside, Judy[Fearnside.Judy@epa.gov]; Gonzalez, Gail[Gonzalez.Gail@epa.gov]; Galano, Fidel[Galano.Fidel@epa.gov]; Greuel, Justin[Greuel.Justin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Haley, Mike[Haley.Mike@epa.gov]; Haugen, David[haugen.david@epa.gov]; Iffland, JoNell[Iffland.JoNell@epa.gov]; Jackson, Cleophas[jackson.cleophas@epa.gov]; Johnson, Francene[Johnson.Francene@epa.gov]; Jones, Jacqueline[Jones.Jacqueline@epa.gov]; Kolowich, Bruce[kolowich.bruce@epa.gov]; Larson, Robert[larson.robert@epa.gov]; Le, Madison[Le.Madison@epa.gov]; McQueen, Lyndia[mcqueen.lyndia@epa.gov]; Meekins, Tanya[Meekins.Tanya@epa.gov]; Miller, Debra L.[Miller.DebraL@epa.gov]; Mylan, Christopher[Mylan.Christopher@epa.gov]; Nelson, Suzanne[nelson.suzanne@epa.gov]; Paff, Patricia[paff.patricia@epa.gov]; Patterson, Susan[Patterson.Susan@epa.gov]; Peralta, Maria[Peralta.Maria@epa.gov]; Sabourin, Michael[sabourin.michael@epa.gov]; Sargeant, Kathryn[sargeant.kathryn@epa.gov]; Shaffer, Patricia[Shaffer.Patricia@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Soth, Judith[Soth.Judith@epa.gov]; Stewart, Gwen[Stewart.Gwen@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Moore, Theresa[Moore.Theresa@epa.gov]; Vawters, Katie[Vawters.Katie@epa.gov]; Waite, Sherry[waite.sherry@epa.gov]; Wasenko, Barbara[Wasenko.Barbara@epa.gov]; Watkins, Erica[Watkins.Erica@epa.gov]; Wehrly, Linc[wehrly.linc@epa.gov]; Weihrauch, John[Weihrauch.John@epa.gov]; White, SharonB[White.SharonB@epa.gov]; Zaremski, Sara[zaremski.sara@epa.gov]
From: Shaffer, Patricia
Sent: Fri 10/9/2015 2:41:56 PM
Subject: Grundler, Christopher Calendar
Grundler Christopher Calendar.ics

CHRISTOPHER GRUNDLER

CALENDAR
FRIDAY, OCTOBER 9, 2015

DC OFFICE

10:00 AM –CHRIS GRUNDLER WILL BE ON TRAVEL
12:00 PM
2:45 PM –VW Update Meeting
3:15 PM

Location: Alm Conference Room

Call-in Number: 866-299-3188;

Non-Responsive

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Ludwiszewski, Raymond B.
Sent: Fri 10/9/2015 3:57:16 PM
Subject: As promised.
Bourn v. Volkswagen Complaint (Class Action).pdf

Good to talk to you. Thx, RAY

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CLERK US DISTRICT COURT
ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_030627

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030628

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

---

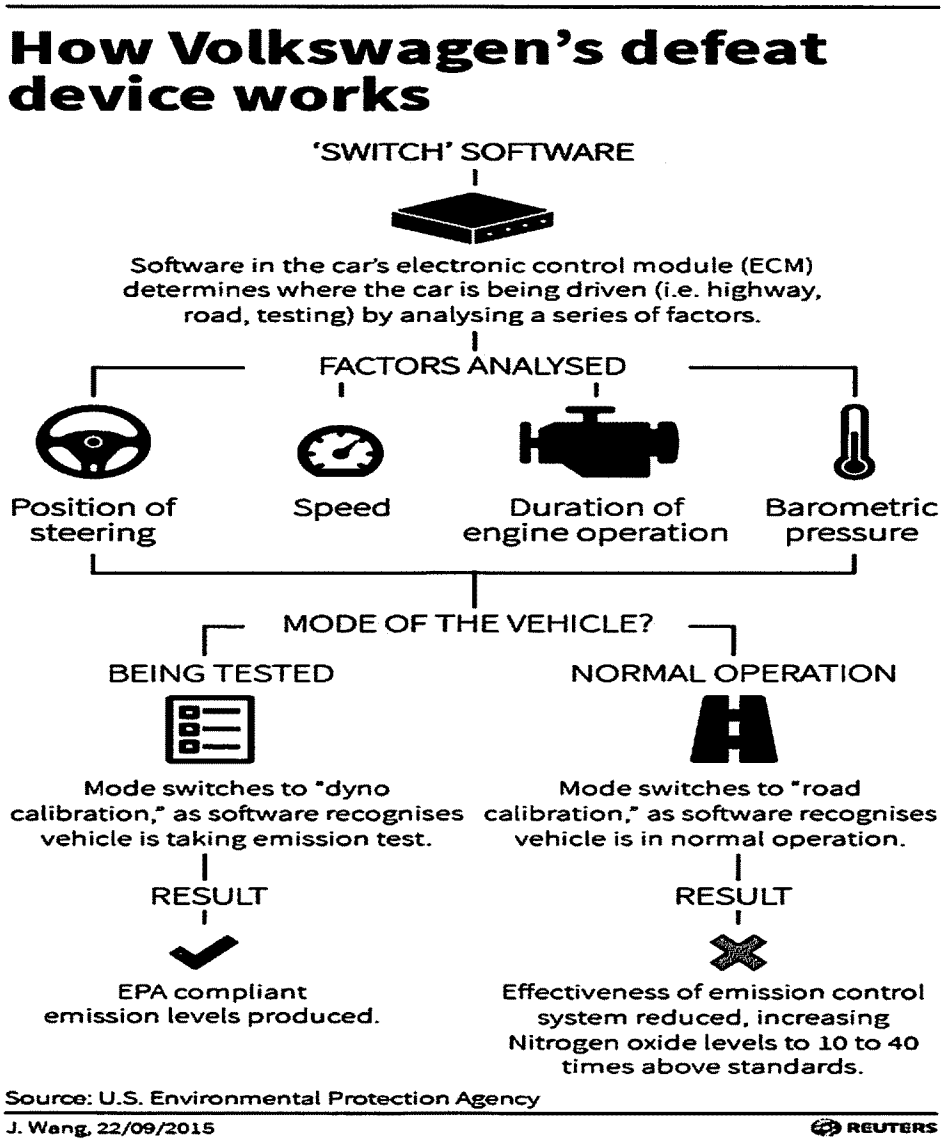
[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

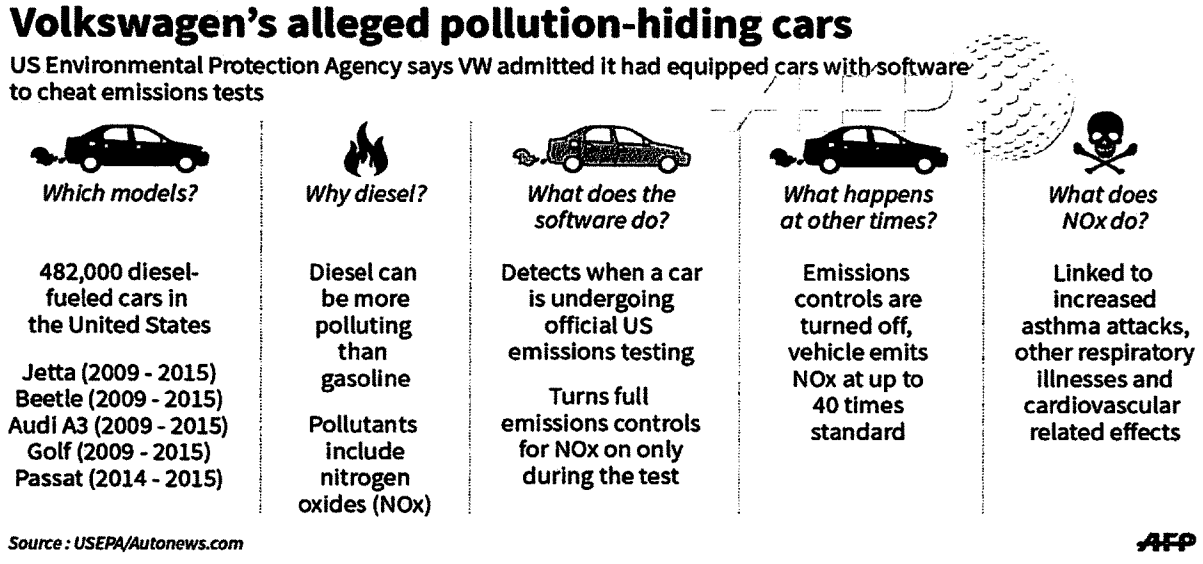
[5] http://media.vw.com/release/1080/.

[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that "**I accept responsibility for the irregularities that have been found in diesel engines.**" (Emphases added). [13] He further observed

[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_030633

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

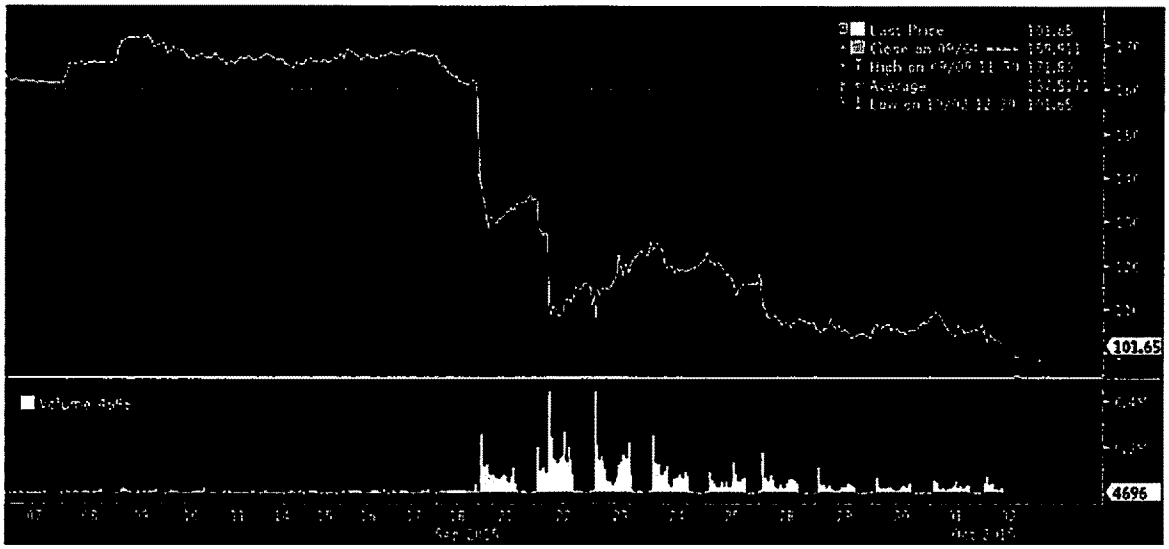
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

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[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

VW FOIA, EPA 06/20/2017 2017-FFP_030636

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_030637

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_030639

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

VW FOIA, EPA 06/20/2017 2017-FFP_030640

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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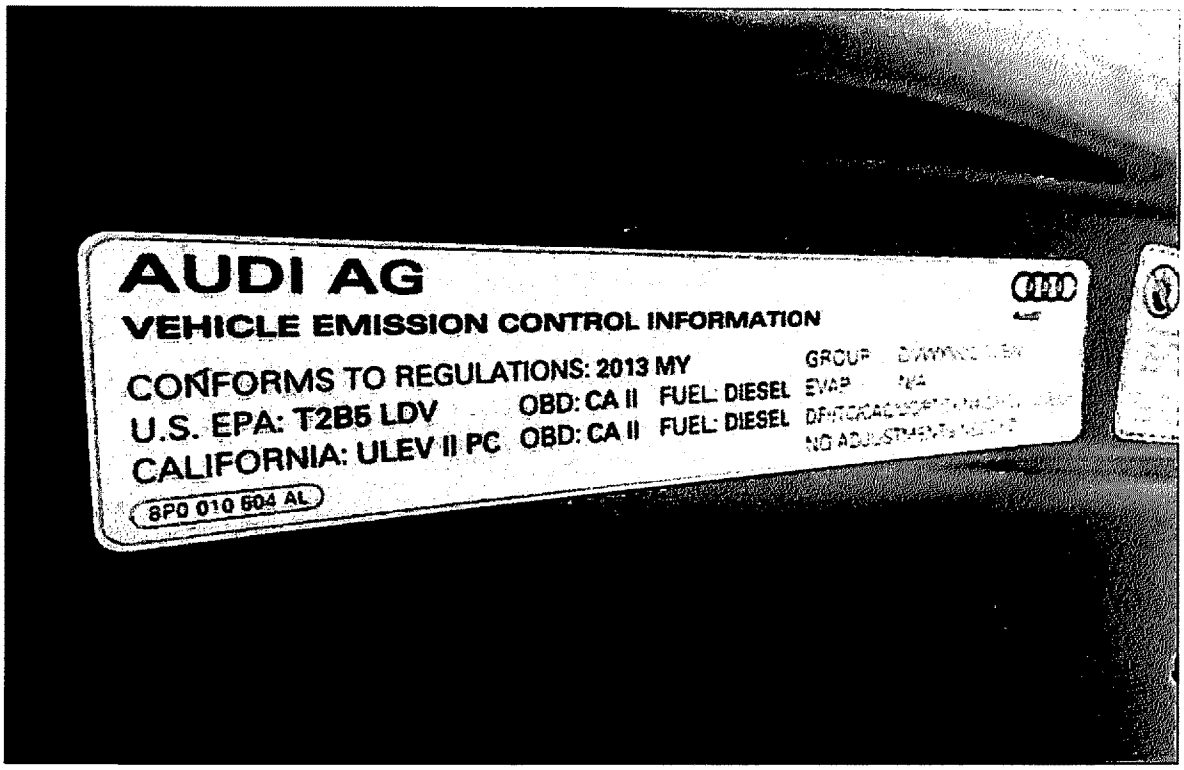
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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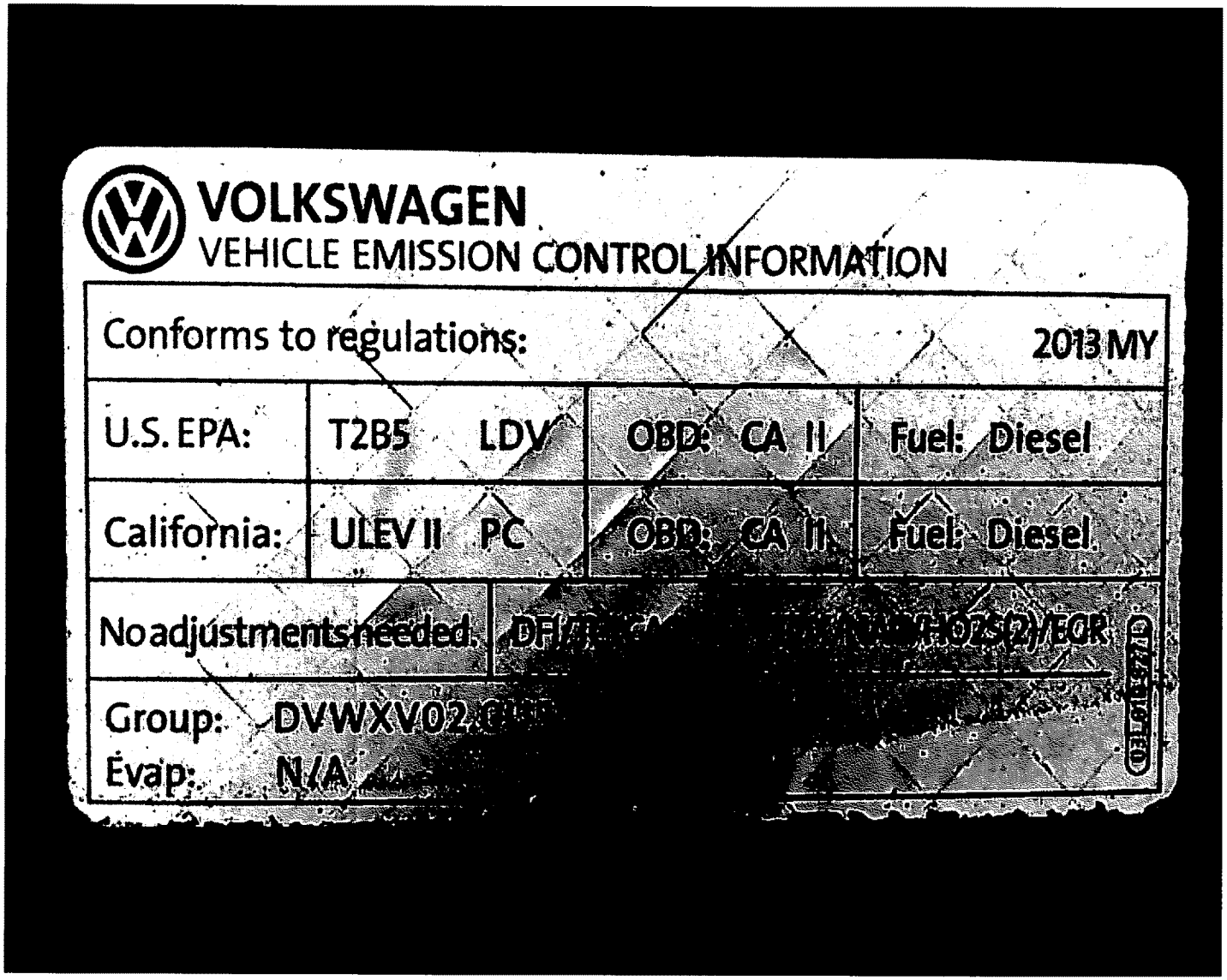

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DPF/[illegible]	[illegible]/EGR	
Group: DVWXV02.[illegible]			
Evap: N/A			

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030644

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030646

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_030648

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

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[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

VW FOIA, EPA 06/20/2017 2017-FFP_030651

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

****

I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

****

The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

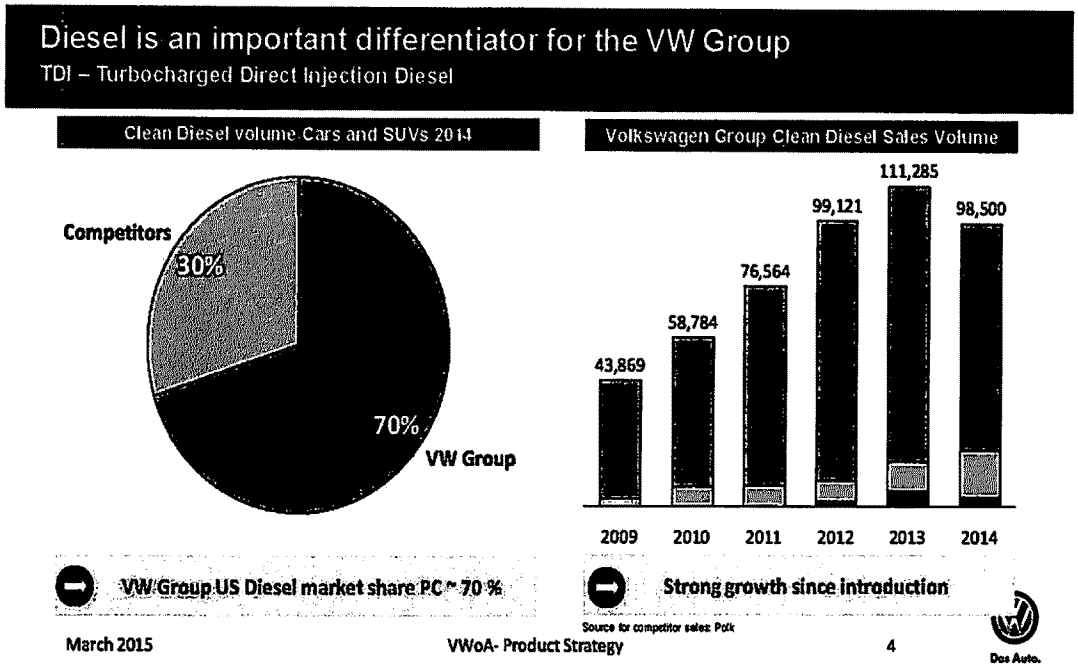
> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

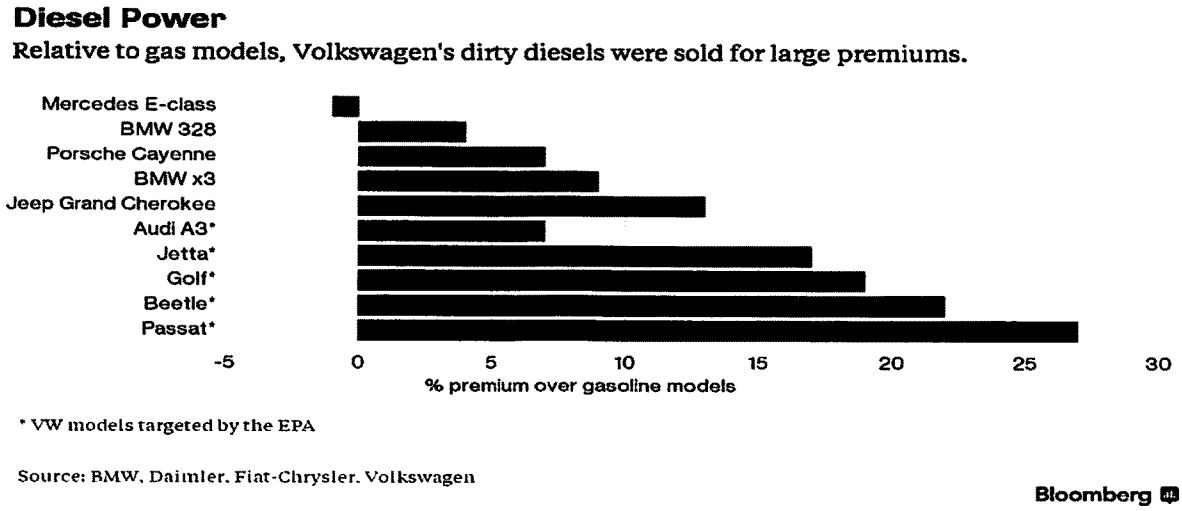
[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

VW FOIA, EPA 06/20/2017 2017-FFP_030656

for Clean Diesel vehicles over those of its competitors.[66]



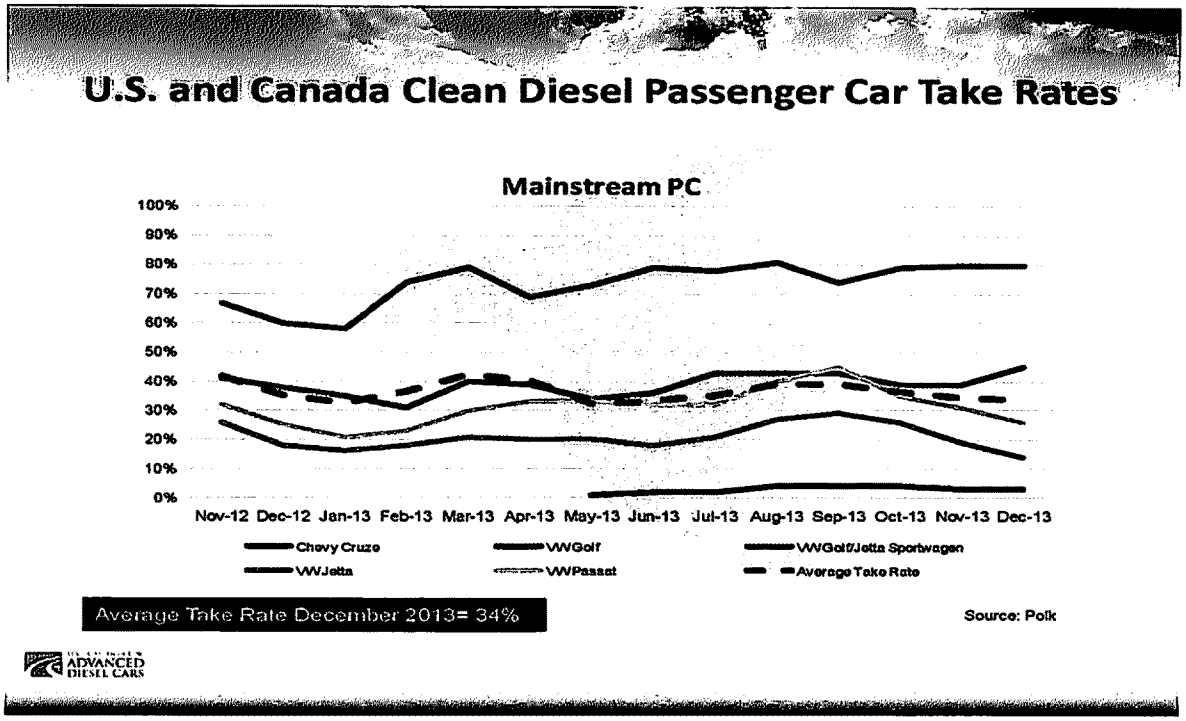
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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[68] https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

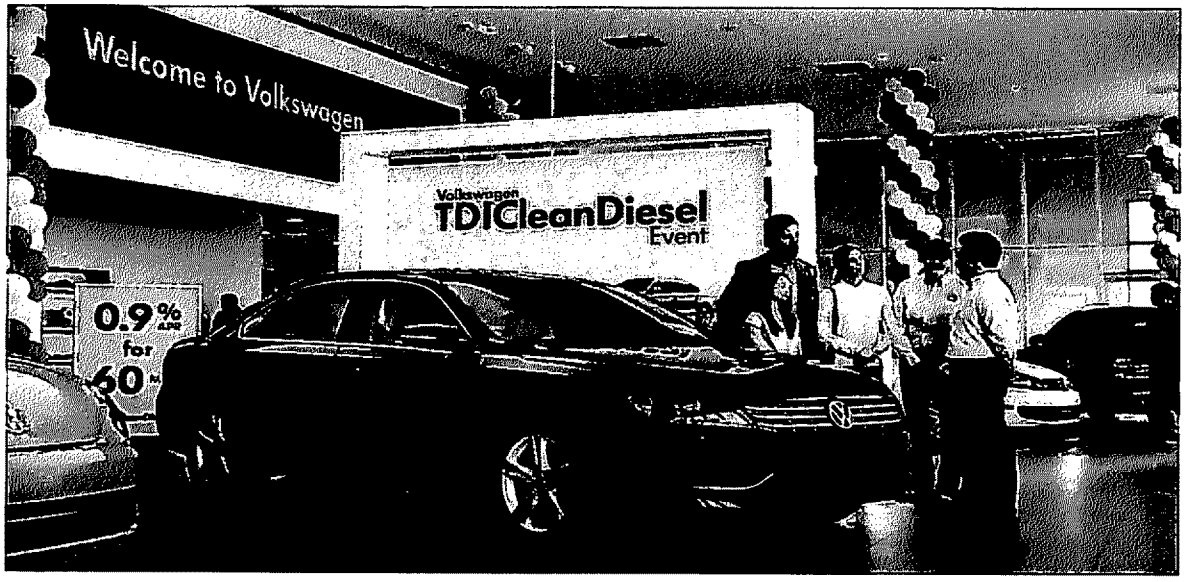
[69] https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

[70] http://abcnews.go.com/Business/story?id=7493781.

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:



[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

VW FOIA, EPA 06/20/2017 2017-FFP_030665

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030666

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

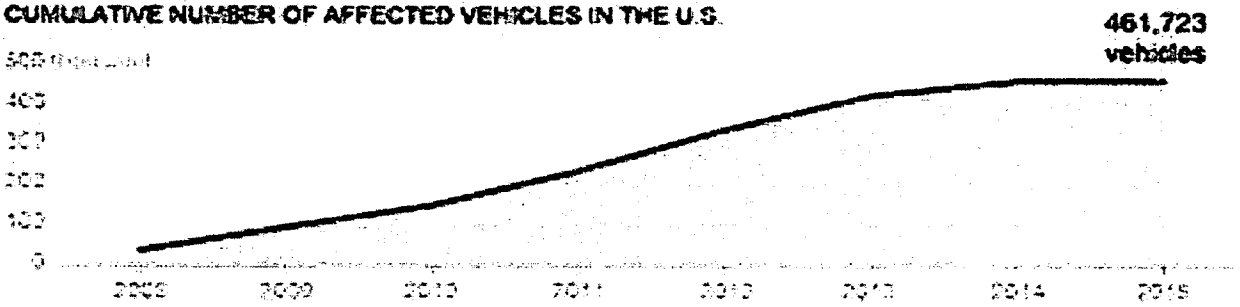
[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

VW FOIA, EPA 06/20/2017 2017-FFP_030668

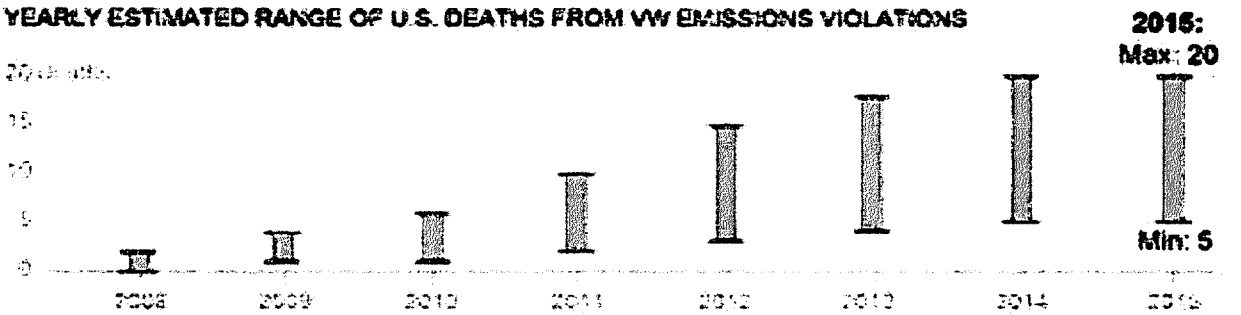
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

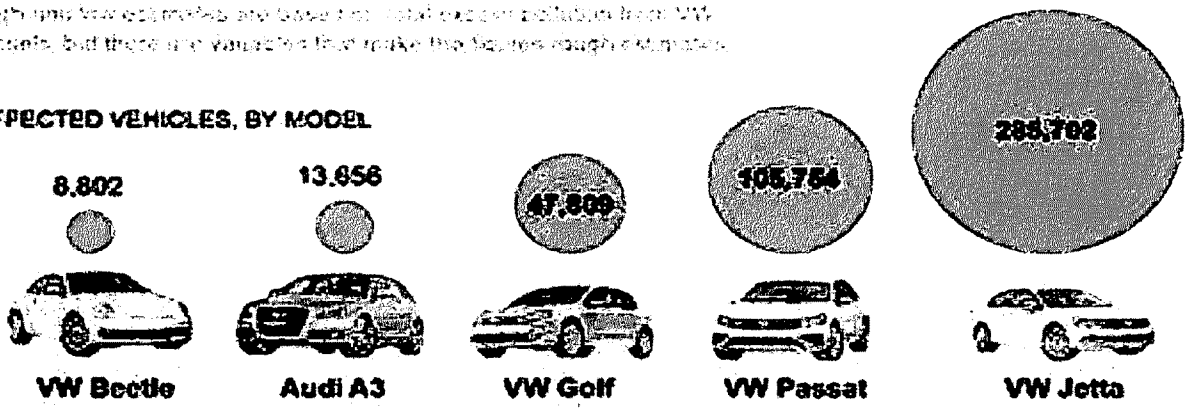
CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.



YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



AFFECTED VEHICLES, BY MODEL



87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

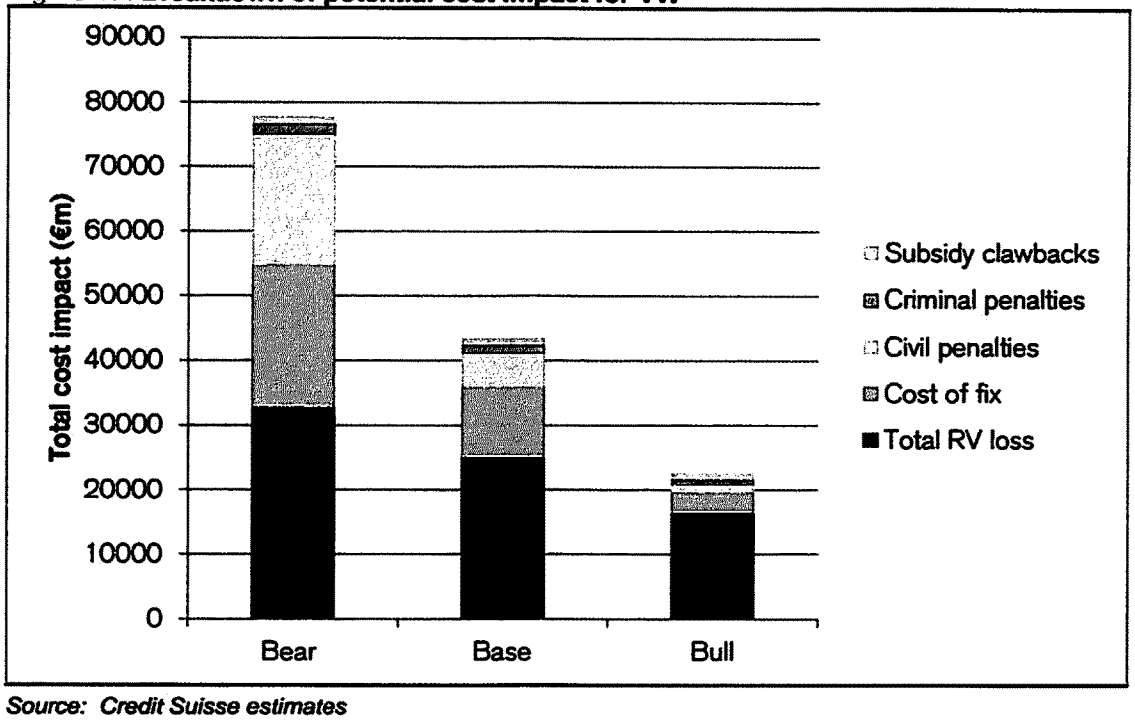
[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

VW FOIA, EPA 06/20/2017 2017-FFP_030672

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_030673

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030675

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_030676

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_030677

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_030679

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_030680

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_030681

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_030682

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_030683

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

VW FOIA, EPA 06/20/2017 2017-FFP_030684

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_030685

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_030686

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_030687

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_030688

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_030689

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_030691

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_030692

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_030693

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_030694

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_030695

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

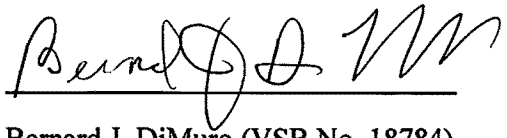
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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Counsel for Plaintiffs and the Putative Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030697

To: Ex. 7
From: Brooks, Phillip
Sent: Fri 10/9/2015 4:02:05 PM
Subject: Fwd: As promised.
Bourn v. Volkswagen Complaint (Class Action).pdf
ATT00001.htm

Sent from my iPhone

Begin forwarded message:

From: "Ludwiszewski, Raymond B." <RLudwiszewski@gibsondunn.com>
To: "Brooks, Phillip" <Brooks.Phillip@epa.gov>
Subject: As promised.

Good to talk to you. Thx, RAY

This message may contain confidential and privileged information. If it has been sent to you in error, please reply to advise the sender of the error and then immediately delete this message.

FILED

2015 OCT -6 P 5:00

CLERK US DISTRICT COURT
ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_030699

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030700

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

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[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

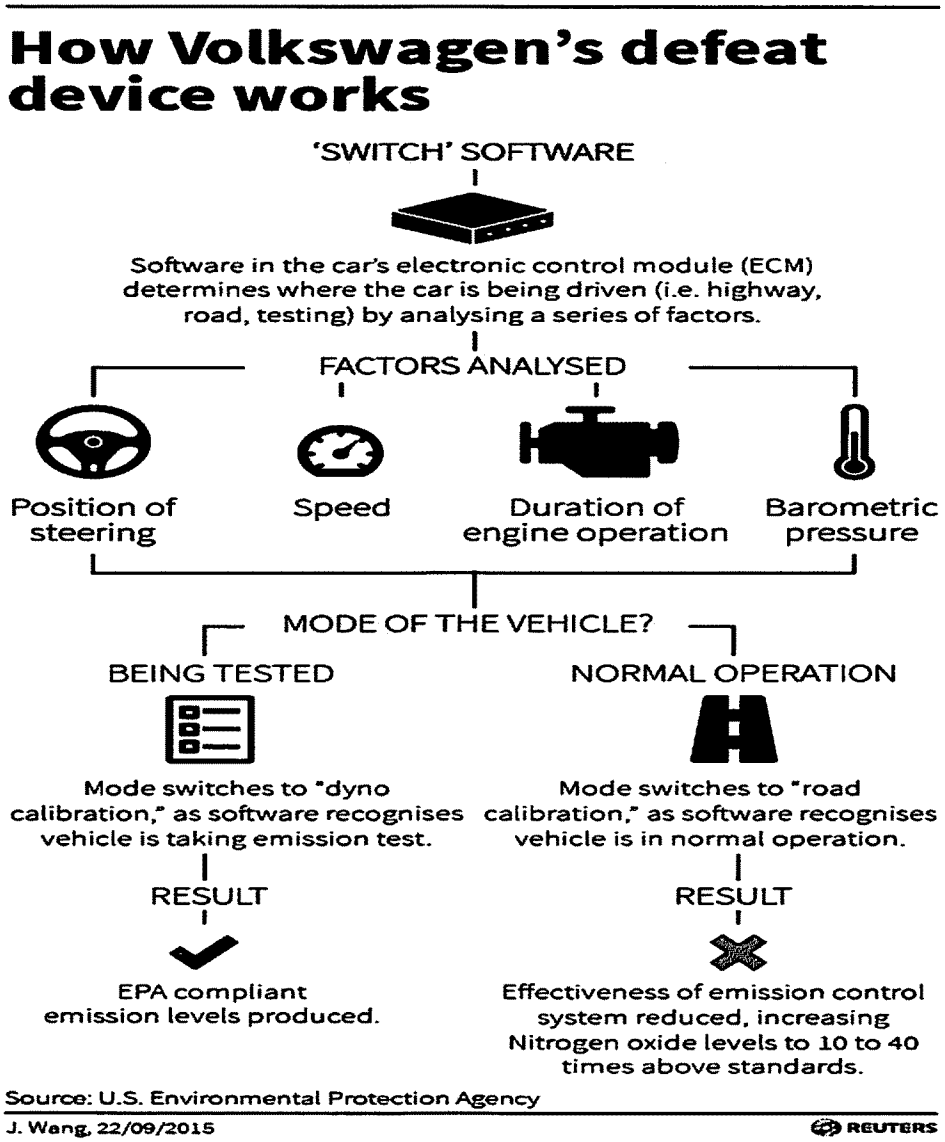
[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

[5] http://media.vw.com/release/1080/.

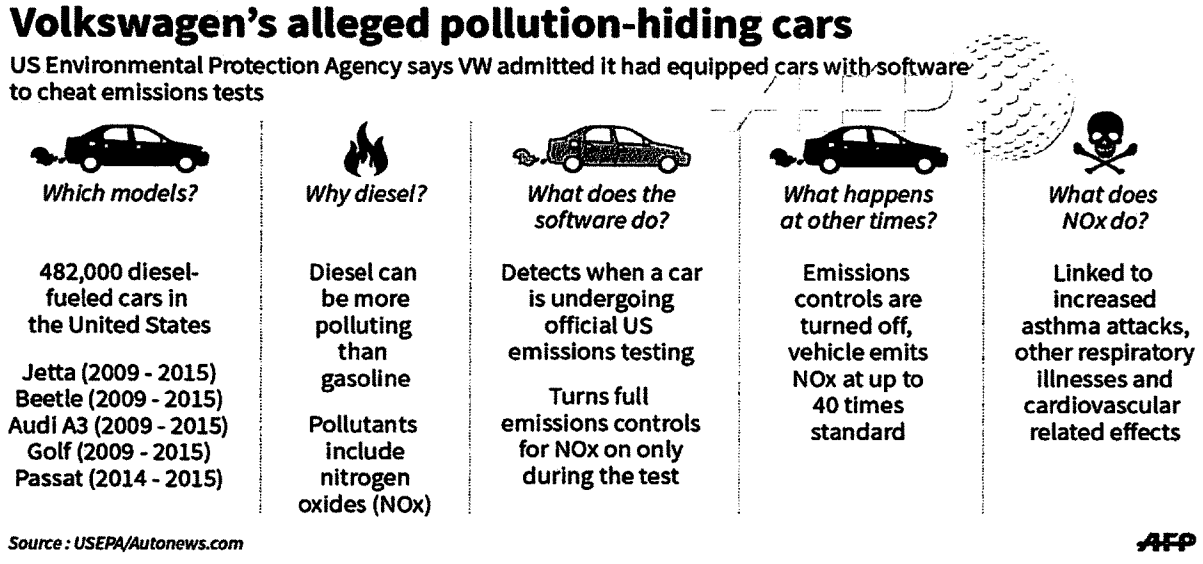
[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

VW FOIA, EPA 06/20/2017 2017-FFP_030701

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that "**I accept responsibility for the irregularities that have been found in diesel engines.**" (Emphases added). [13] He further observed

[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_030705

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

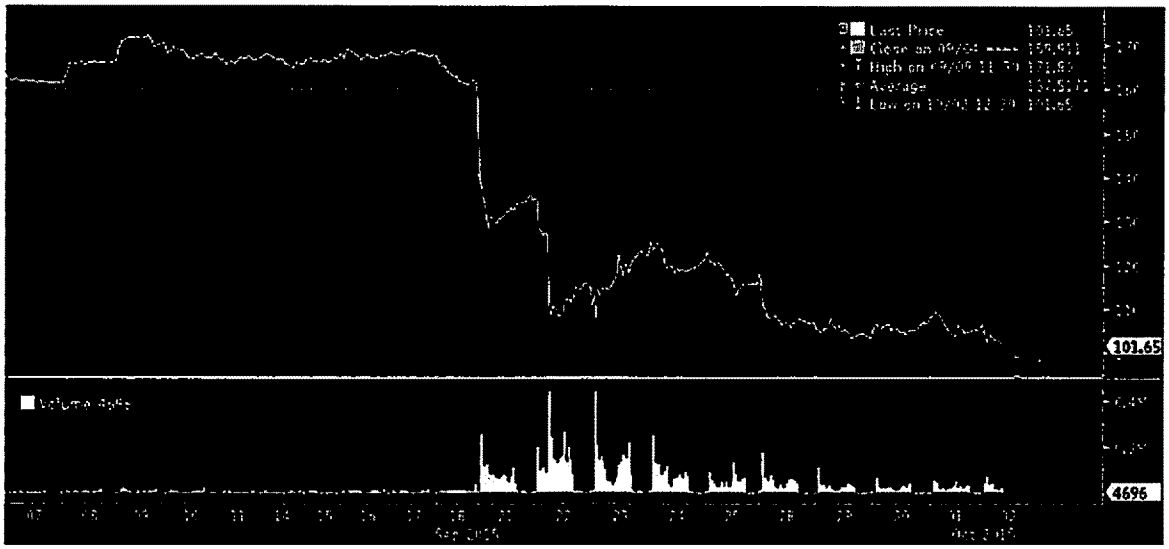
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_030709

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_030711

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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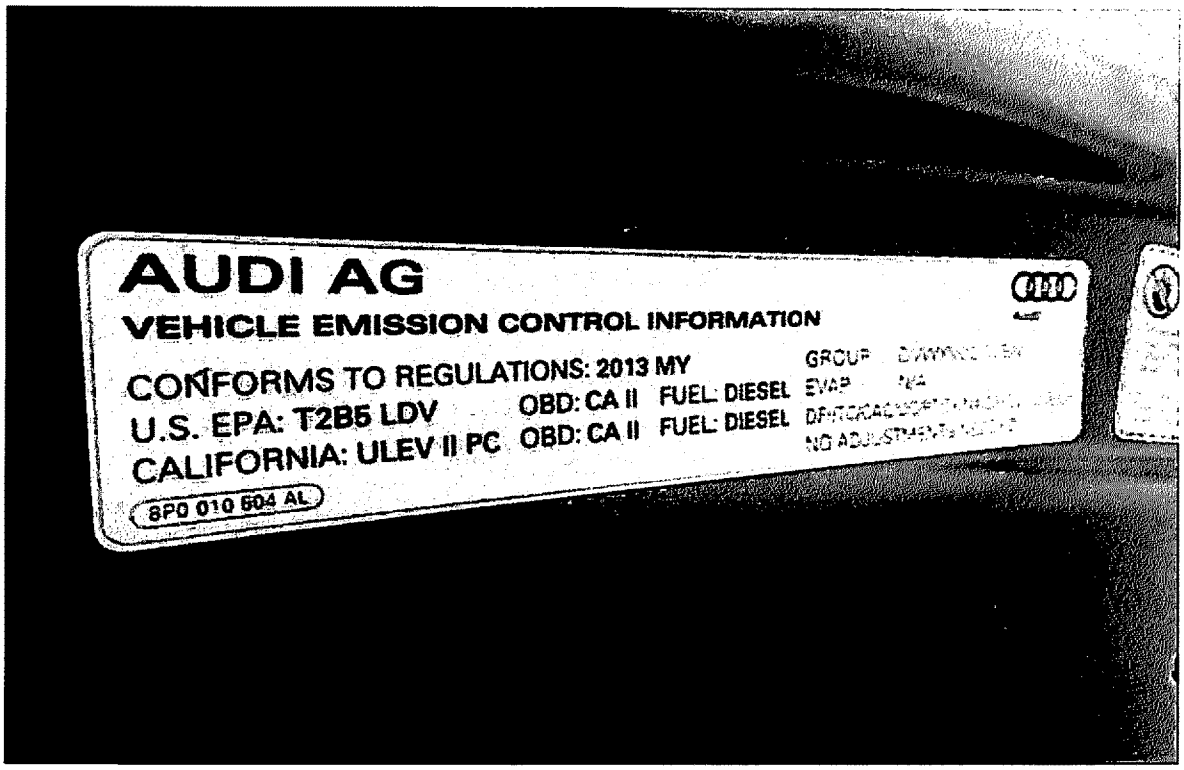
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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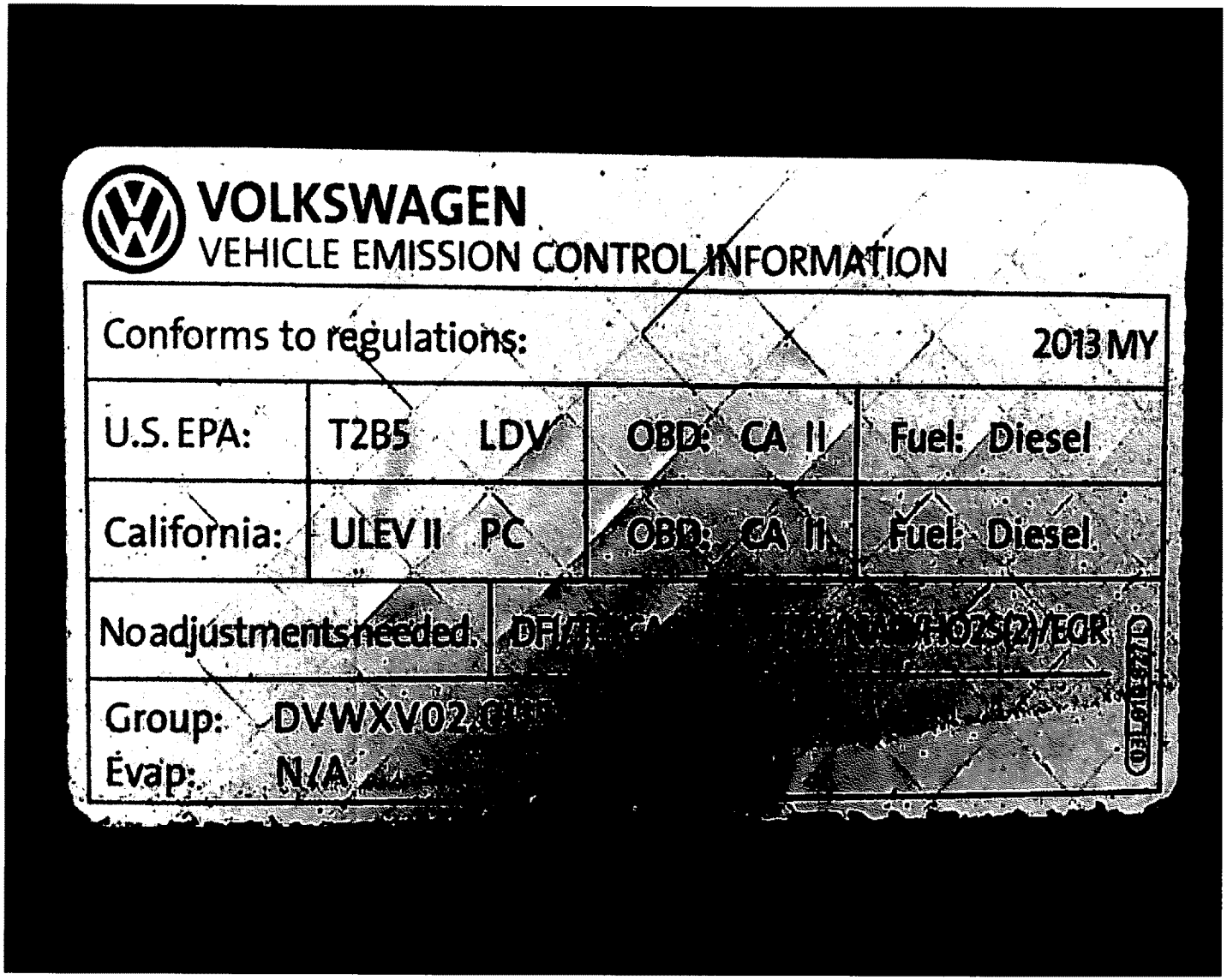

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DFI/TC/CAC/DOC/CPF/SCR/EGR		
Group: DVWXV02.0U4			
Evap: N/A			

17

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030716

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030718

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_030720

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

****

I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

****

The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

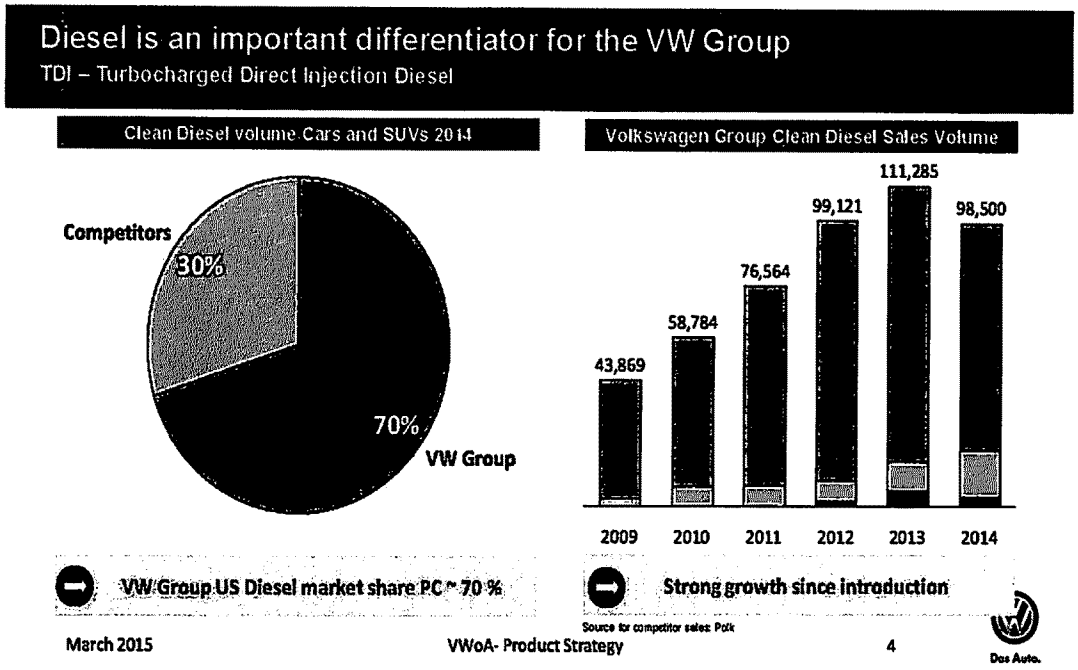
Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

VW FOIA, EPA 06/20/2017 2017-FFP_030726



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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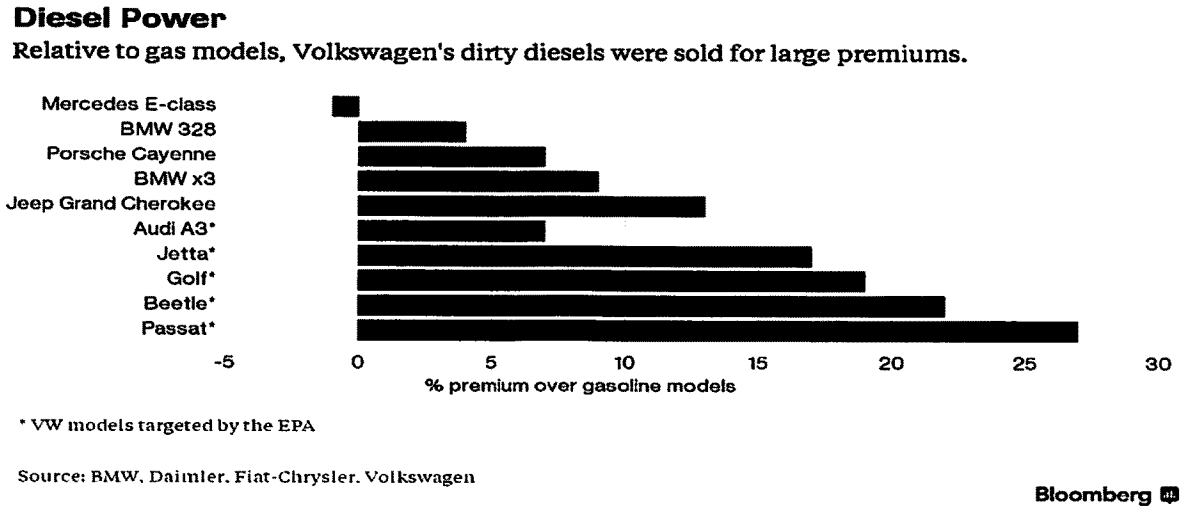
[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

for Clean Diesel vehicles over those of its competitors.[66]



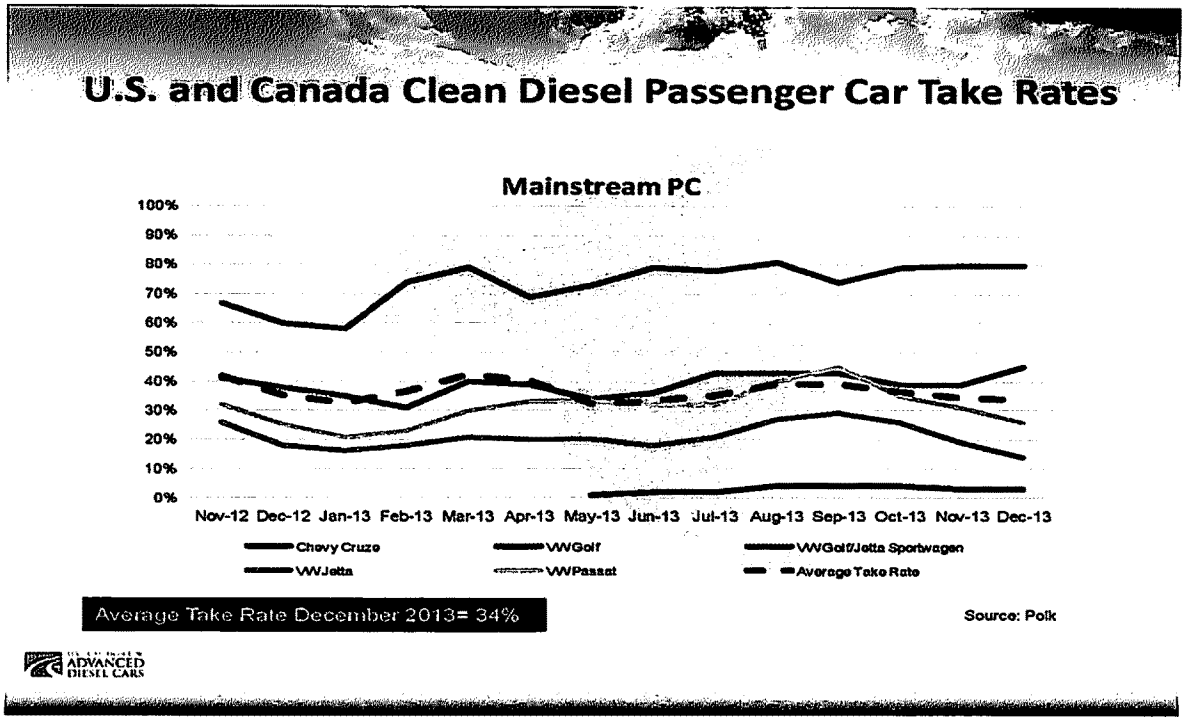
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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68 https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

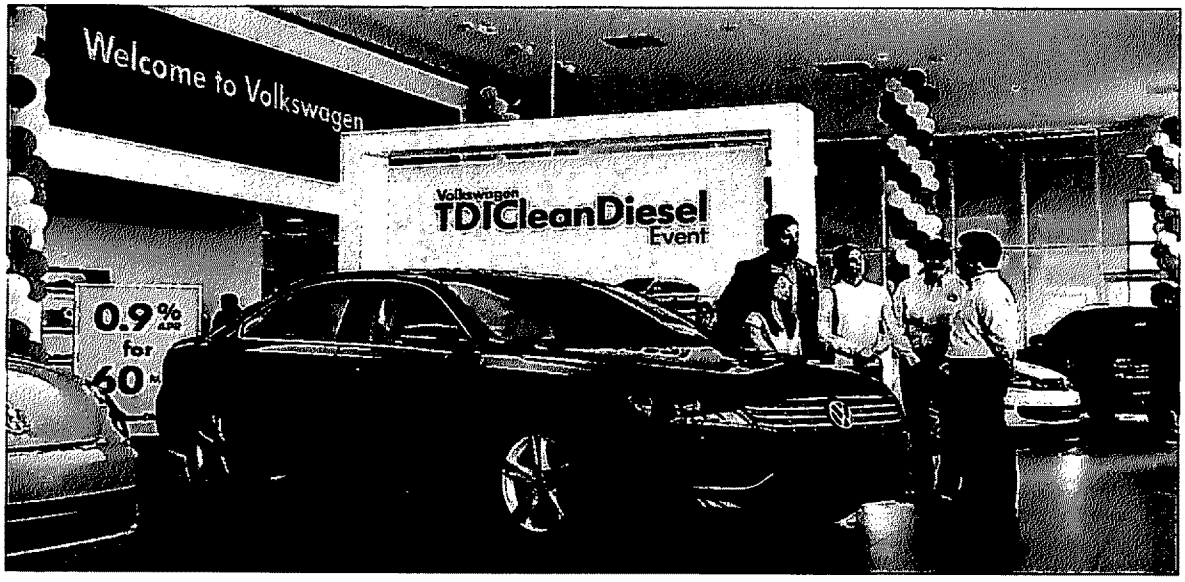
69 https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

70 http://abcnews.go.com/Business/story?id=7493781.

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:



[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

VW FOIA, EPA 06/20/2017 2017-FFP_030737

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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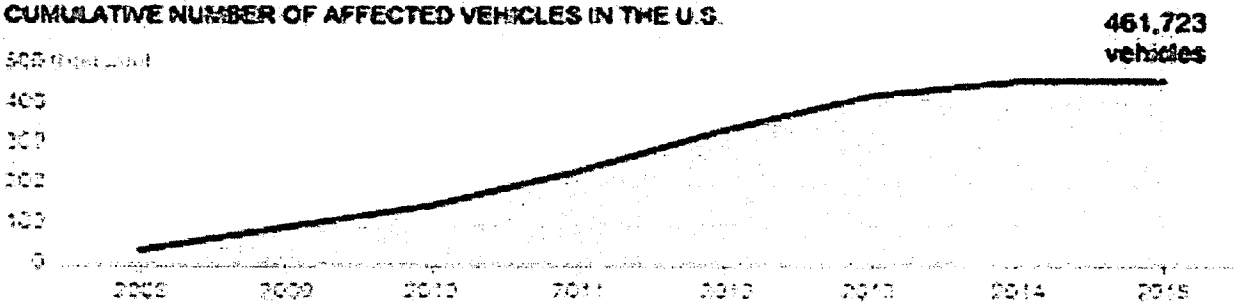
[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

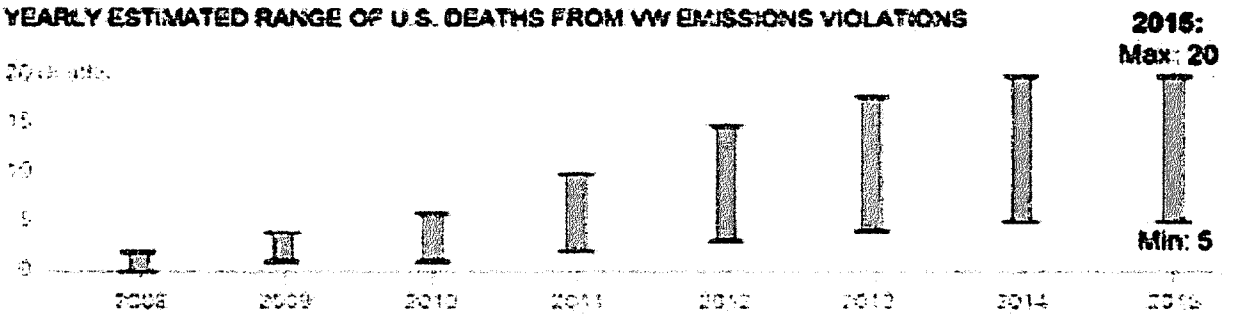
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

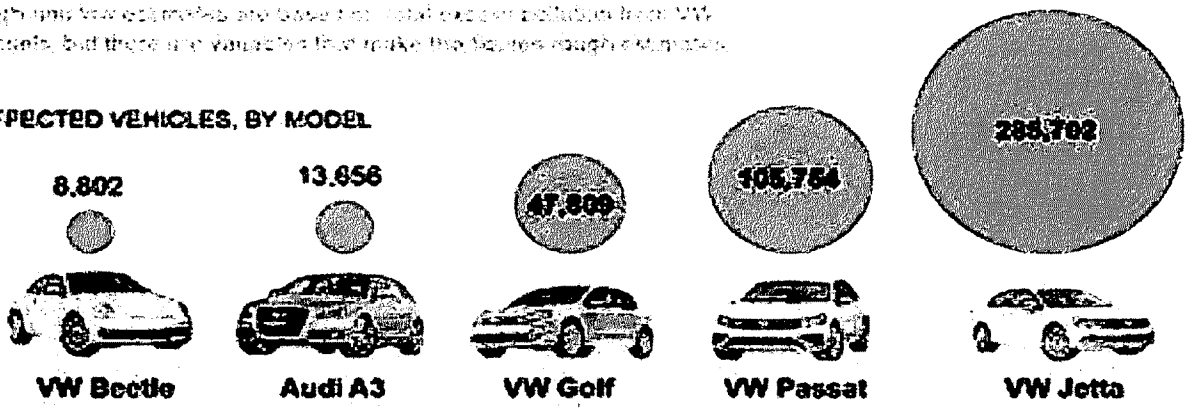
CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.



YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



AFFECTED VEHICLES, BY MODEL



87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

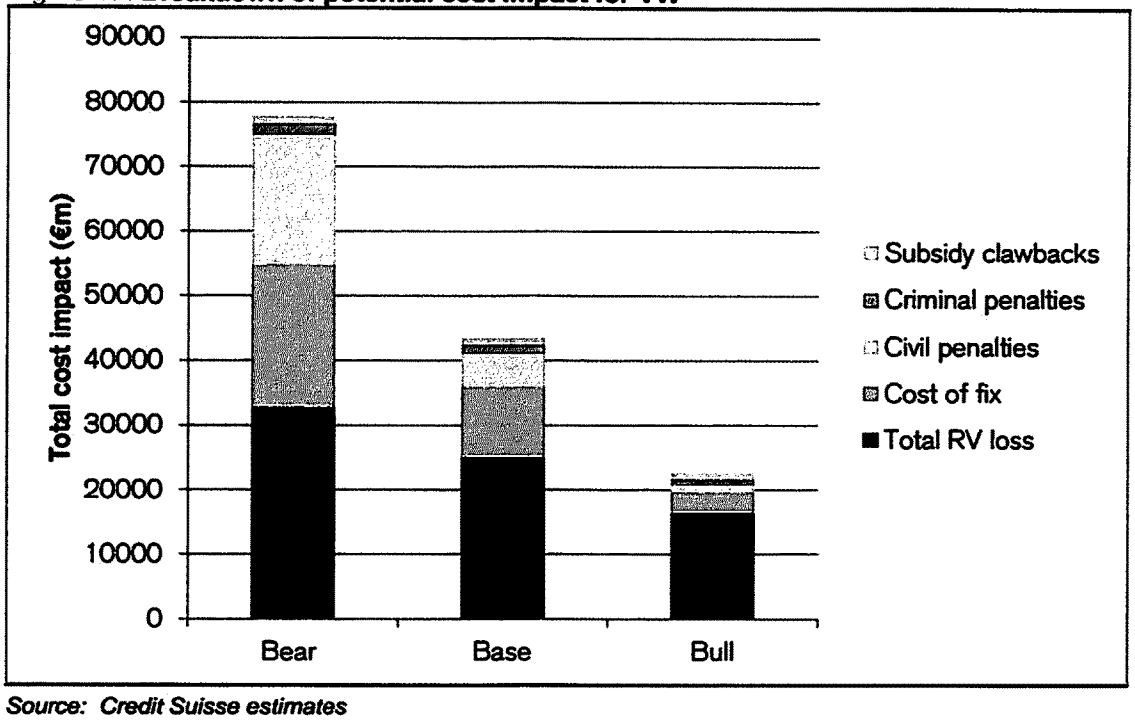
[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_030745

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030747

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_030748

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_030749

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

VW FOIA, EPA 06/20/2017 2017-FFP_030750

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_030751

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_030752

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_030753

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_030754

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_030755

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

VW FOIA, EPA 06/20/2017 2017-FFP_030756

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_030757

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_030758

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_030759

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_030760

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_030761

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

VW FOIA, EPA 06/20/2017 2017-FFP_030762

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_030763

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_030764

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_030765

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_030766

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_030767

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

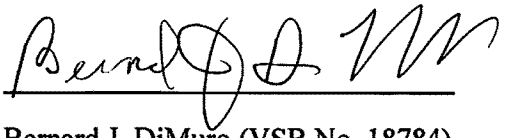
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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Counsel for Plaintiffs and the Putative Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030769

To: Kaul, Meetu[Kaul.Meetu@epa.gov]
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Sent: Fri 10/9/2015 5:50:29 PM
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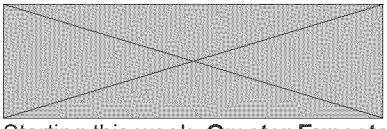
GREATER EXPECTATIONS SPECIAL REPORT



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7.LOBBYING:
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8.CALIFORNIA:
Brown signs coal divestment, other environment bills

9.CAMPAIGN 2016:
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CONGRESS

10.CLIMATE:
Capito bill would clip EPA's wings on Clean Power Plan -- CBO

11.FINANCE:
Ex-Im Bank supporters to get long-coveted House vote

NATURAL RESOURCES

12.MARINE MAMMALS:
Calif. allows SeaWorld whale tanks, but with breeding ban

13.ENDANGERED SPECIES:
NPS fears disease outbreak threatens Calif. bighorn sheep

14.ENDANGERED SPECIES:

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Coalition calls for release of more Mexican gray wolves

15.WILDLIFE:

Zombie bees under researchers' microscope

16.WILDLIFE:

Toxic runoff killing coho, but remedy proves effective -- study

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Coal price decline devastates rural mining town

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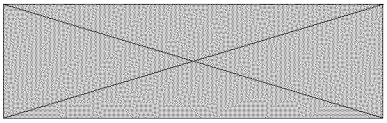
GREATER EXPECTATIONS SPECIAL REPORT



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To: Kerley, David[David.Kerley@abc.com]
From: Grundler, Christopher
Sent: Fri 10/9/2015 6:16:14 PM
Subject: RE: Didn't air last night

I need to speak to your producer!

Nice get---VW owner

From: Kerley, David [mailto:David.Kerley@abc.com]
Sent: Friday, October 09, 2015 7:23 AM
To: Grundler, Christopher
Subject: Didn't air last night

http://abcnews.go.com/WNT/video/volkswagen-us-chief-grilled-capitol-hill-34359774

David Kerley

Correspondent

ABC News Washington, DC

202-222-7254

To: Ex. 6
From: Grundler, Christopher
Sent: Fri 10/9/2015 6:18:37 PM
Subject: RE: vw TDI diesel & emissions

Dear Mr Ex. 6

Thanks for sharing your concerns. I don't blame you in the least for feeling this way. We are taking this matter very seriously.

Chris Grundler

From: Ex. 6
Sent: Friday, October 09, 2015 9:06 AM
To: Grundler, Christopher
Subject: vw TDI diesel & emissions

Christopher Grundler

Director USEPA

Dear Sir,

As the owner of a 2012 Jetta SportWagon TDI I want to express my anger, disgust and great disappointment at VW for flat out lying about the engine's emissions compliance and the USEPA for not performing real road testing of the effected cars, both initially and later on a random basis. (EPA should be testing ALL vehicles this way!)

I expect VW to be required to retrofit the effected cars with the urea injection system to make them comply with the emission standards.

My purchase of this car (and my previous 2009 model) was based on:

1. its fuel economy,

2. its drivability & performance,

3. and its "clean" diesel technology's environmental compliance.

Reprogramming the car to reach compliance will decrease both its fuel economy and its performance and is simply not an acceptable option for me!

A quite Sincerely pissed off owner,

Ex. 6

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Kerley, David
Sent: Fri 10/9/2015 6:23:19 PM
Subject: Re: Didn't air last night

We used her the day I did you. Her quote then "I'm pissed"

David Kerley
Correspondent
ABC News Washington, DC
202-222-7254

On Oct 9, 2015, at 2:19 PM, Grundler, Christopher <grundler.christopher@epa.gov> wrote:

I need to speak to your producer!

Nice get---VW owner

From: Kerley, David [mailto:David.Kerley@abc.com]
Sent: Friday, October 09, 2015 7:23 AM
To: Grundler, Christopher
Subject: Didn't air last night

http://abcnews.go.com/WNT/video/volkswagen-us-chief-grilled-capitol-hill-34359774

David Kerley

Correspondent

ABC News Washington, DC

202-222-7254

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

The New York Times | http://nyti.ms/1GxZCfd

INTERNATIONAL BUSINESS

Regulators Investigating 2nd VW Computer Program on Emissions

By DANIELLE IVORY and KEITH BRADSHER OCT. 8, 2015

WASHINGTON — Federal and California regulators have begun an investigation into a second computer program in Volkswagen's diesel cars that also affects the operation of the cars' emission controls.

Volkswagen said that it had withdrawn 2016 models of its diesel cars from environmental certification in the United States because the company should have disclosed the software and sought regulators' approval, but had not done so.

The disclosure of the software was made in testimony by the head of Volkswagen's American unit, Michael Horn, before a House Energy and Commerce subcommittee hearing, and later confirmed by the Environmental Protection Agency and the California Air Resources Board.

The software qualifies under state and federal laws as a so-called auxiliary emissions control device —

something that modifies the performance of emissions equipment. Volkswagen and regulators declined to say whether this software was intended to defeat emissions control tests, like the software that the automaker already admitted last month that it had installed in 11 million diesel cars since the 2009 model year.

"VW did very recently provide E.P.A. with very preliminary information on an auxiliary emissions control device that VW said was included in one or more model years," said Nick Conger, an agency spokesman. He added that federal and California regulators "are investigating the nature and purpose of this recently identified device."

Volkswagen is already struggling with the spiraling cost and growing damage to its image from last month's revelation that it had installed software to detect when a car was undergoing an emissions test and minimize harmful emissions. When not being tested, the cars would emit up to 40 times the allowable levels of pollution.

Volkswagen and regulators refrained from characterizing the second software program in any way. The automaker gave no indication of whether it was also devised to defeat emissions tests.

"In Volkswagen Group of America's recent discussions with the regulators, we described to the E.P.A. and C.A.R.B. that our emissions control strategy also included a software feature that should be disclosed to and approved by them," the automaker said.

Stanley Young, a spokesman for the California Air Resources Board, said the state agency was investigating the nature of the second device, but declined to provide specifics because Volkswagen's application "is still pending." Mr. Young said that while Volkswagen has withdrawn its 2016 application with federal regulators, it has not withdrawn the similar application filed with California regulators.

VW FOIA, EPA 06/20/2017 2017-FFP_030780

"We're still going through all the information they provided and determining the next step," he said.

Under normal circumstances, automakers are allowed to use the auxiliary emissions control devices under deals negotiated with regulators that provide for higher emissions in very specific circumstances (like going up a steep hill, or in very cold weather). But they must be disclosed.

Mr. Young said he could not comment on exactly when Volkswagen disclosed the existence of its auxiliary emissions control device, or A.E.C.D.

"What we don't know yet is if the 2016 A.E.C.D. is also a defeat device, or is a device that meets the guidance previously given by E.P.A.," said John German, a senior fellow specializing in emissions and efficiency technology at the International Council on Clean Transportation, the nonprofit group that first noticed that the real-world emissions of Volkswagen diesels in the United States were far above regulatory limits.

Federal regulators warned manufacturers of heavy-duty trucks in 1998 that it would strictly scrutinize any devices that interfered with the normal operation of emissions control equipment, after finding that they had installed systems similar to what Volkswagen disclosed last month in its diesel cars.

Dan Becker, the director of the Safe Climate Campaign at the Center for Auto Safety, a nonprofit Washington research group, said that Volkswagen's new admission was a potential violation of the law.

"They put it in their vehicles, and then they signed a certification petition to the regulator saying what they put in their vehicles and didn't mention it," he said. "It's certainly a material omission."

Lawmakers did not discuss Volkswagen's admission at length during the hearing. But Representative

VW FOIA, EPA 06/20/2017 2017-FFP_030781

Fred Upton, Republican of Michigan, openly wondered if Volkswagen was skirting regulations in other ways. "If they were willing to cut corners here, what else have they done?" he asked.

In addition to disclosing the second investigation in his opening testimony, Mr. Horn of Volkswagen laid out the automaker's plans to fix the cars currently affected and cautioned the panel that owners might have to wait a year or two.

Most of the more than 480,000 affected cars in the United States will need a "major fix," he said, including a hardware and software change. That repair, which would be applicable to almost 70 percent of those vehicles, may consume as much as 10 hours of work per car and might not get started until next year. The remaining vehicles are expected to be fixed next year, he said.

"This is pretty shocking for people," said Representative Jan Schakowsky, a Democrat of Illinois, expressing dismay at the scandal and demanding a specific timeline for fixes. "Asking customers for patience is really just not sufficient."

Some lawmakers asked Mr. Horn why Volkswagen did not replace the vehicles — a costly proposition — and, although he emphasized repairs, he said Volkswagen might consider an option like a buyback.

"Our plan is not to buy back the inventory," he said. "Our plan is to fix the cars."

Although Mr. Horn apologized for the deception and even said he felt deceived by the scandal, he came under withering criticism for not delivering a concrete deadline for fixing most of the cars, and not providing more details about how the scheme was conceived or who was responsible.

In response to questioning by Representative Joe Barton, Republican of Texas, Mr. Horn said that

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neither Volkswagen's supervisory board nor its top executives ordered the emissions deception. Instead, he attributed the decision to "a couple of software engineers who put this in for whatever reason."

After an incredulous Mr. Barton expressed doubts that top Volkswagen executives in Germany were unaware of the cheating before September, Mr. Horn did not argue.

"I agree it is very hard to believe," he said.

"This was not a corporate decision," Mr. Horn said. "This was something individuals did." His comments echoed recent statements by Volkswagen's new chief executive, Matthias Müller, who said that only a few employees at the company had been aware of the cheating.

Also on Thursday, German investigators searched Volkswagen's headquarters in Wolfsburg, Germany, and elsewhere. State prosecutors in Braunschweig said in a statement that they were looking for documents and data storage that would give them clues as to who might have been responsible for the decision to install the software that led to the emissions cheating.

Mr. Horn deflected demands by the House subcommittee for more information. He told lawmakers that, as the chief of Volkswagen's American unit, he could not make promises for Volkswagen headquarters to turn over documents. He noted that there were "quite a number of people above me."

Volkswagen has been asked to turn over documents to the committee by Tuesday.

In addition to Mr. Horn, two officials from the E.P.A. testified before the panel on Thursday, to a less hostile reception. One of them, Christopher Grundler, director of the Office of Transportation and Air Quality, acknowledged that the agency had failed to detect the cheating in the first place — it was found by

VW FOIA, EPA 06/20/2017 2017-FFP_030783

the International Council on Clean Transportation in conjunction with a laboratory at West Virginia University.

"We've learned from this episode, for sure," he said. "We wish we had found it sooner."

Danielle Ivory reported from Washington and Keith Bradsher from New York. Aaron M. Kessler contributed reporting from Washington and Melissa Eddy from Wolfsburg, Germany.

A version of this article appears in print on October 9, 2015, on page B1 of the New York edition with the headline: Regulators Investigating 2nd VW Emissions Program.

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To: Belser, Evan[Belser.Evan@epa.gov]
From: Brooks, Phillip
Sent: Fri 10/9/2015 7:19:27 PM
Subject: Fwd: As promised.
Bourn v. Volkswagen Complaint (Class Action).pdf
ATT00001.htm

Sent from my iPhone

Begin forwarded message:

From: "Ludwiszewski, Raymond B." <RLudwiszewski@gibsondunn.com>
To: "Brooks, Phillip" <Brooks.Phillip@epa.gov>
Subject: As promised.

Good to talk to you. Thx, RAY

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ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_030786

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030787

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

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[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

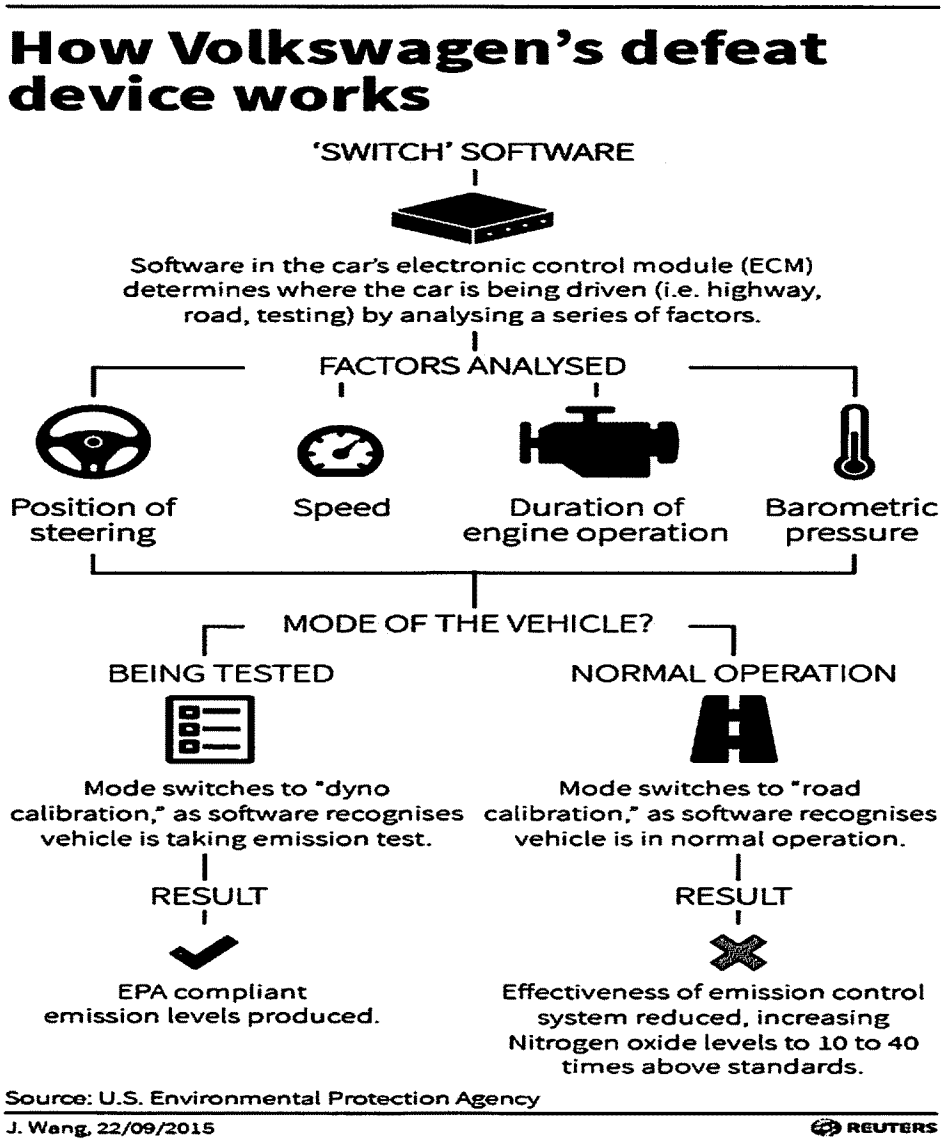
[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

[5] http://media.vw.com/release/1080/.

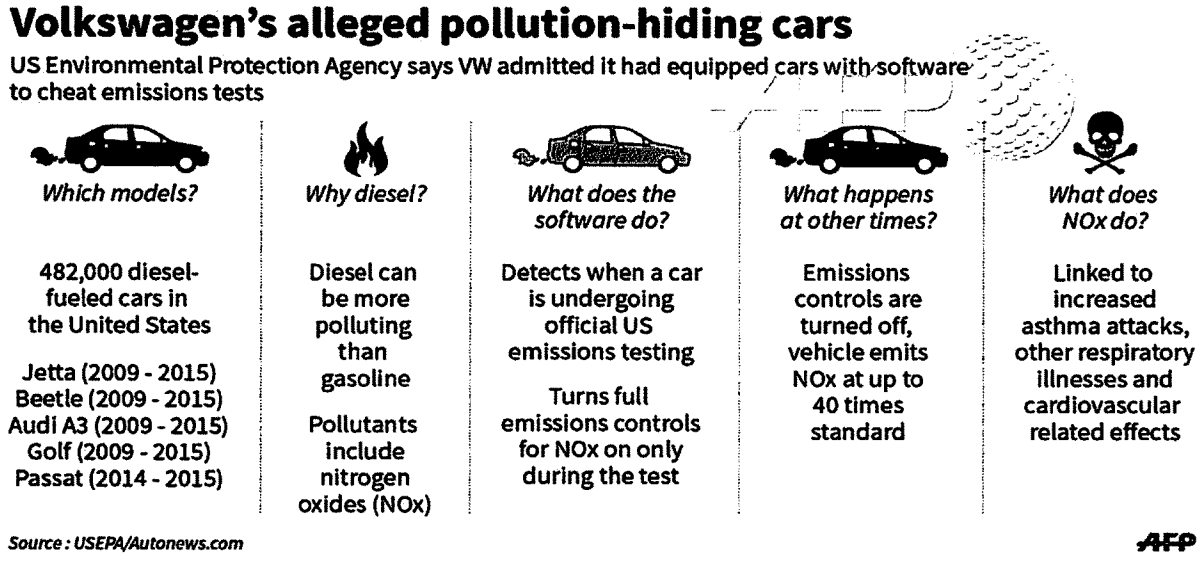
[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

VW FOIA, EPA 06/20/2017 2017-FFP_030788

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that **"I accept responsibility for the irregularities that have been found in diesel engines."** (Emphases added). [13] He further observed

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[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_030792

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

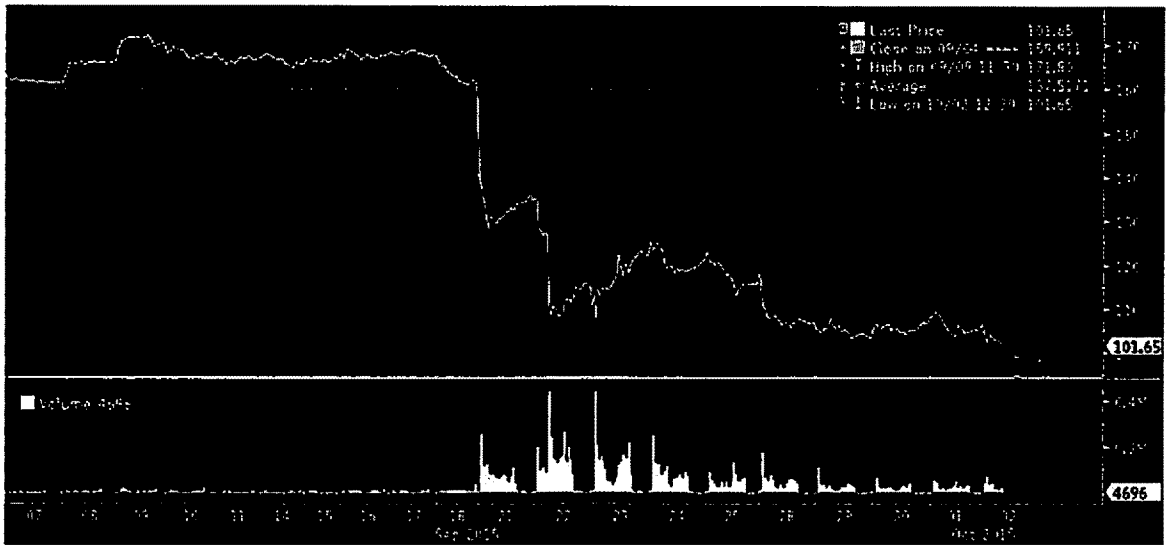
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_030796

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

VW FOIA, EPA 06/20/2017 2017-FFP_030797

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_030798

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

VW FOIA, EPA 06/20/2017 2017-FFP_030799

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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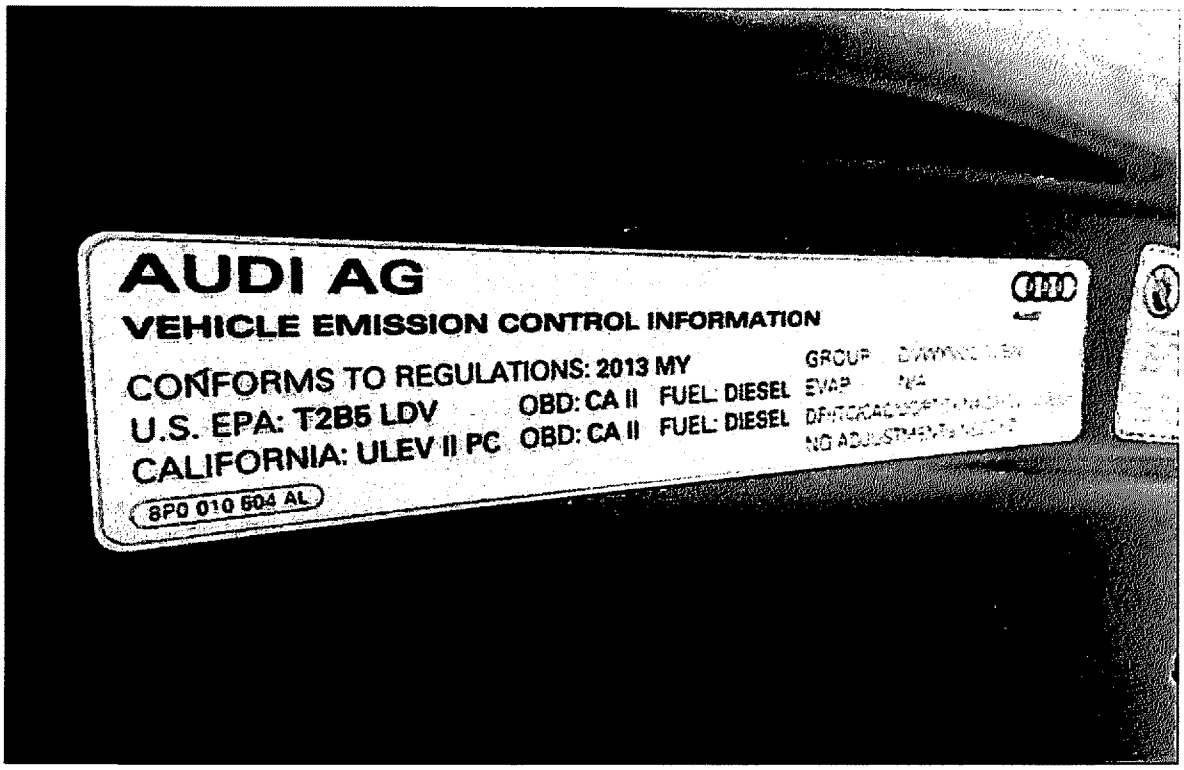
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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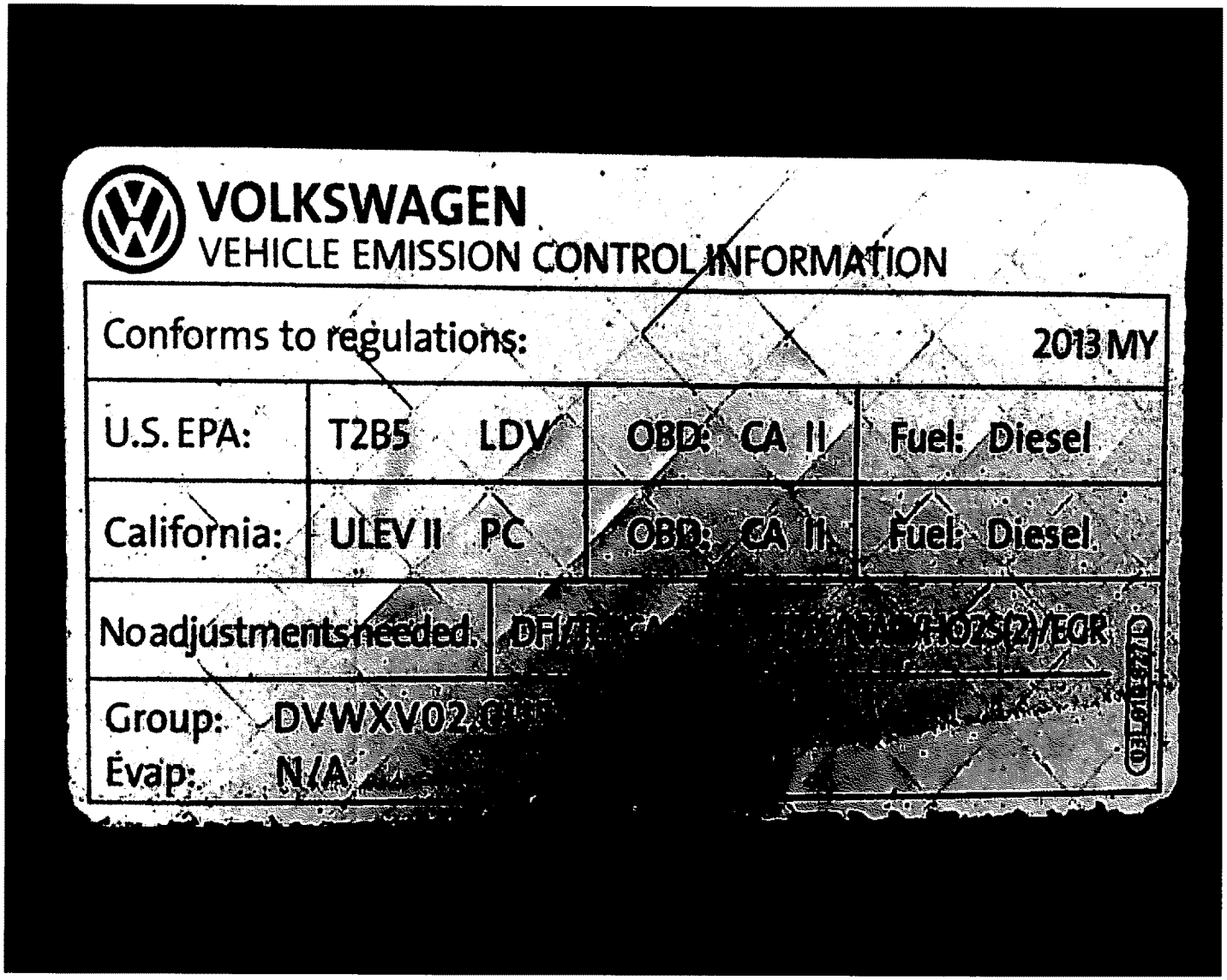

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DFI/TC/CAC/DOC/CPF/SCR/EGR		
Group: DVWXV02			
Evap: N/A			

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030803

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_030807

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

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[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

****

I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

****

The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

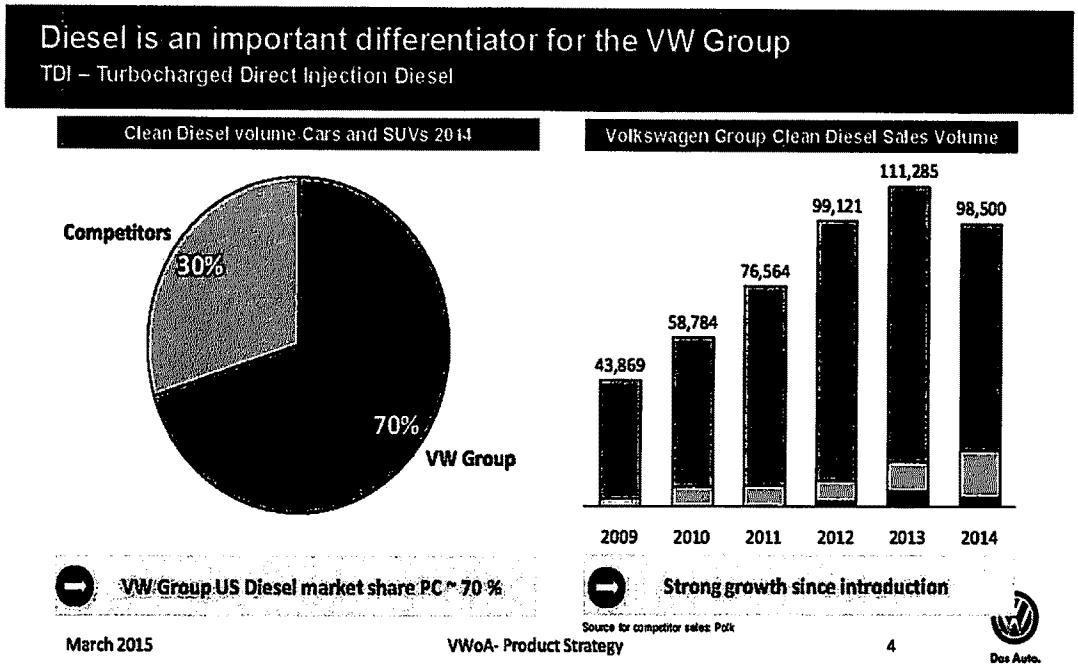
> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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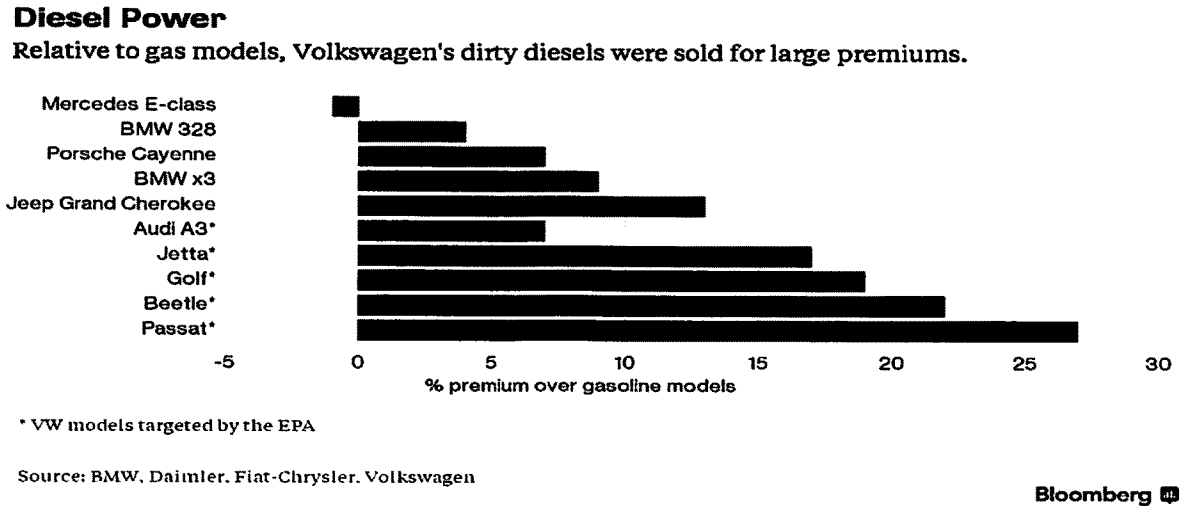
[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

for Clean Diesel vehicles over those of its competitors.[66]



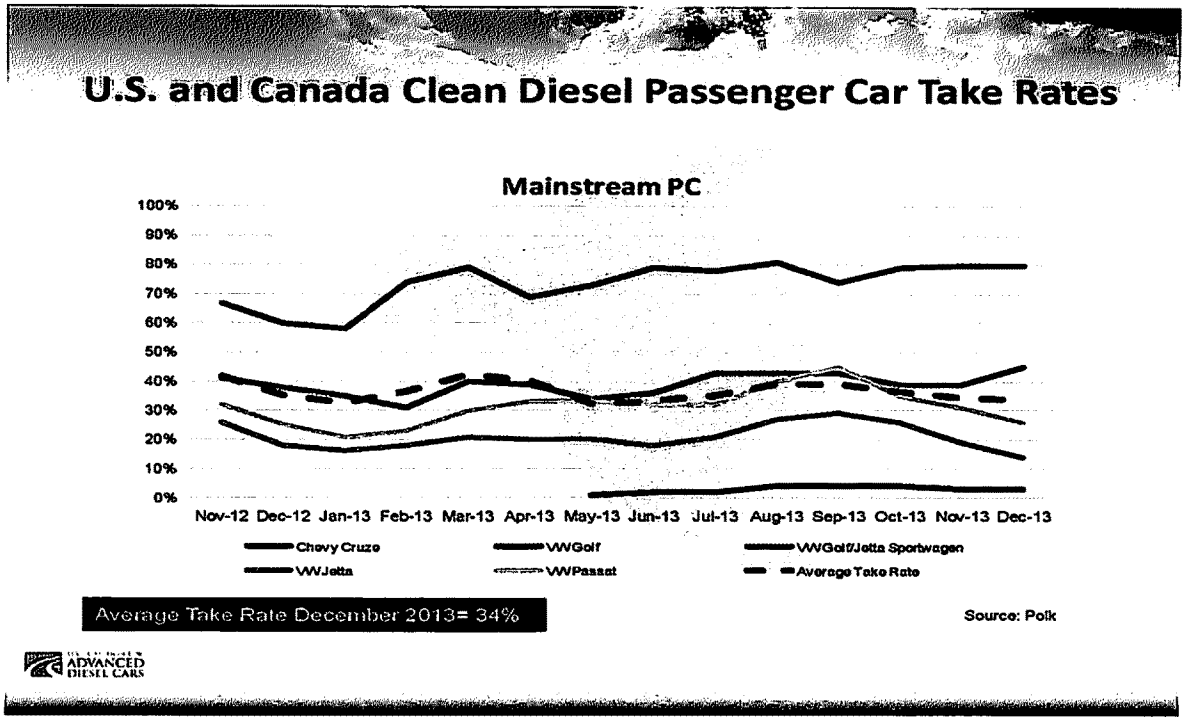
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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68 https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

69 https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

70 http://abcnews.go.com/Business/story?id=7493781.

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:

[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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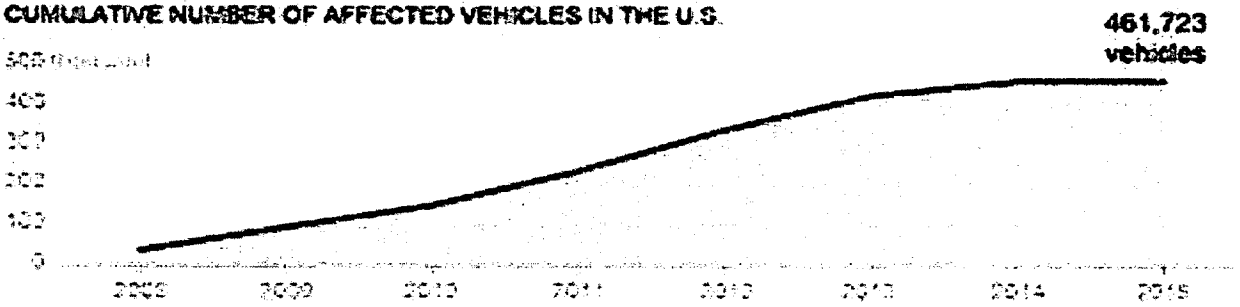
[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

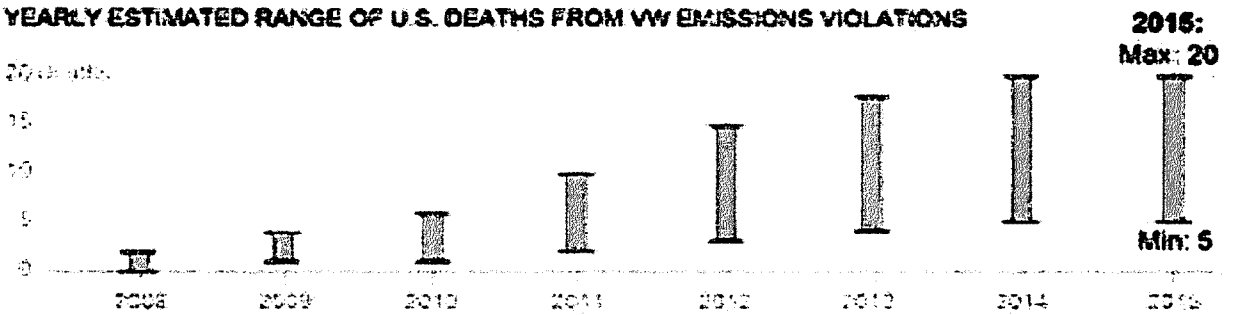
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.

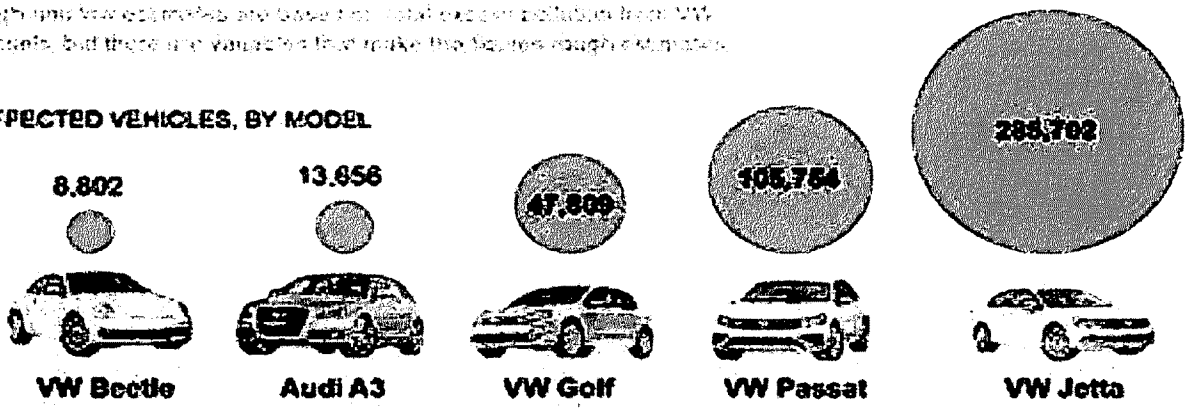


YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



High and low estimates are based on total excess pollution from VW diesels, but there are variables that make the figures rough estimates.

AFFECTED VEHICLES, BY MODEL



NOTE: The total of 47,809 for VW Golf includes 8,833 VW GTI sportswagen vehicles. The total of 461,723 is derived from Kelley Blue Book vehicle registration data. The Environmental Protection Agency puts the total number of affected vehicles in the U.S. at about 482,000.

SOURCES: AP analysis of data from the U.S. Environmental Protection Agency and Kelley Blue Book; AP Statistical Police Affairs Cullen/Frey; Volkswagen Asia

87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

VW FOIA, EPA 06/20/2017 2017-FFP_030830

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

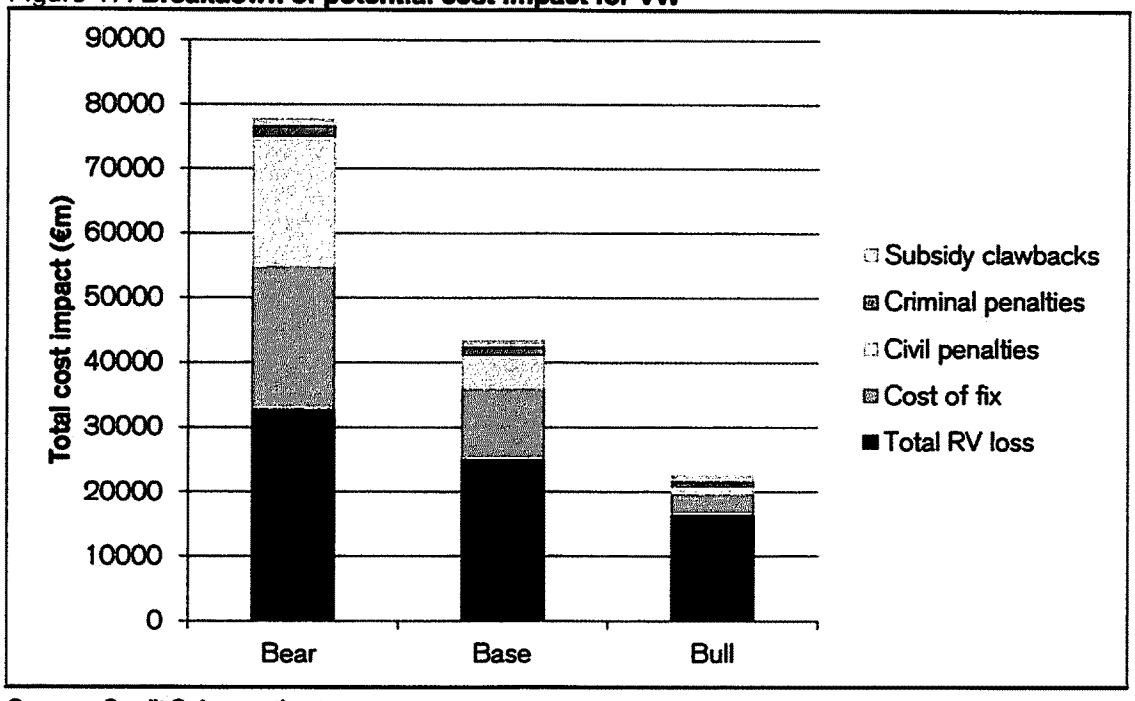
[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_030832

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030834

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_030835

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_030836

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_030838

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_030839

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_030840

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_030841

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_030842

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

VW FOIA, EPA 06/20/2017 2017-FFP_030843

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_030844

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_030845

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_030846

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_030847

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_030848

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

VW FOIA, EPA 06/20/2017 2017-FFP_030849

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_030850

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_030851

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_030852

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_030853

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_030854

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

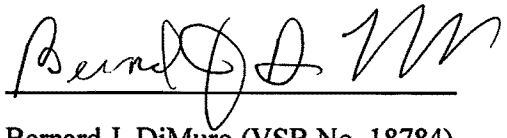
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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VW FOIA, EPA 06/20/2017 2017-FFP_030856

FILED

2015 OCT -6 P 5:00

CLERK US DISTRICT COURT
ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_030857

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030858

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

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[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

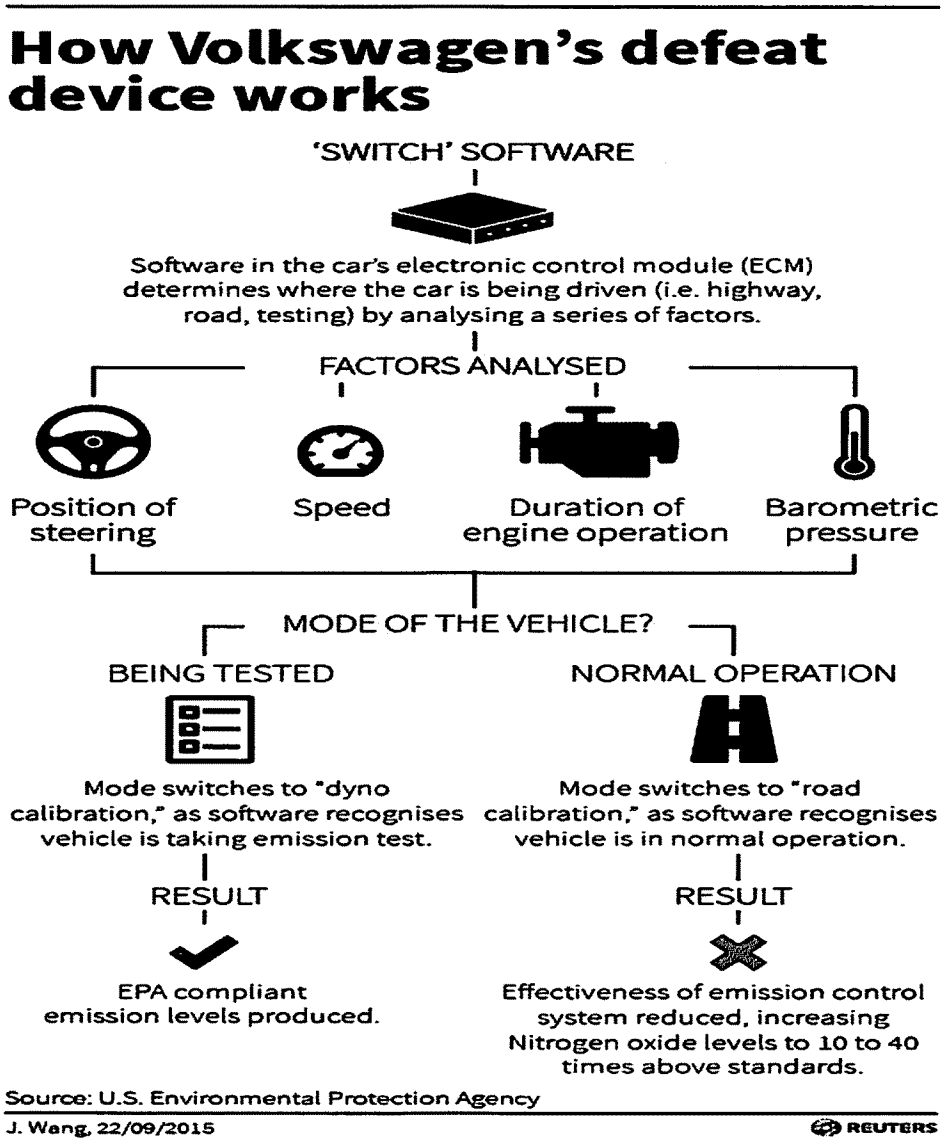
[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

[5] http://media.vw.com/release/1080/.

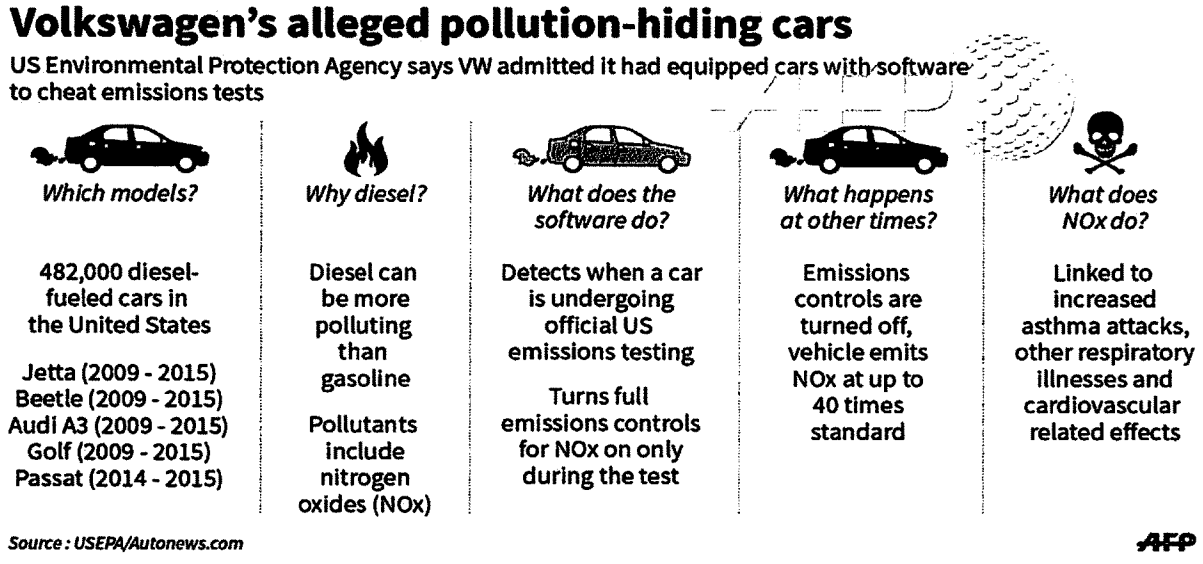
[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

VW FOIA, EPA 06/20/2017 2017-FFP_030859

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that "**I accept responsibility for the irregularities that have been found in diesel engines.**" (Emphases added). [13] He further observed

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[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_030863

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

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[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

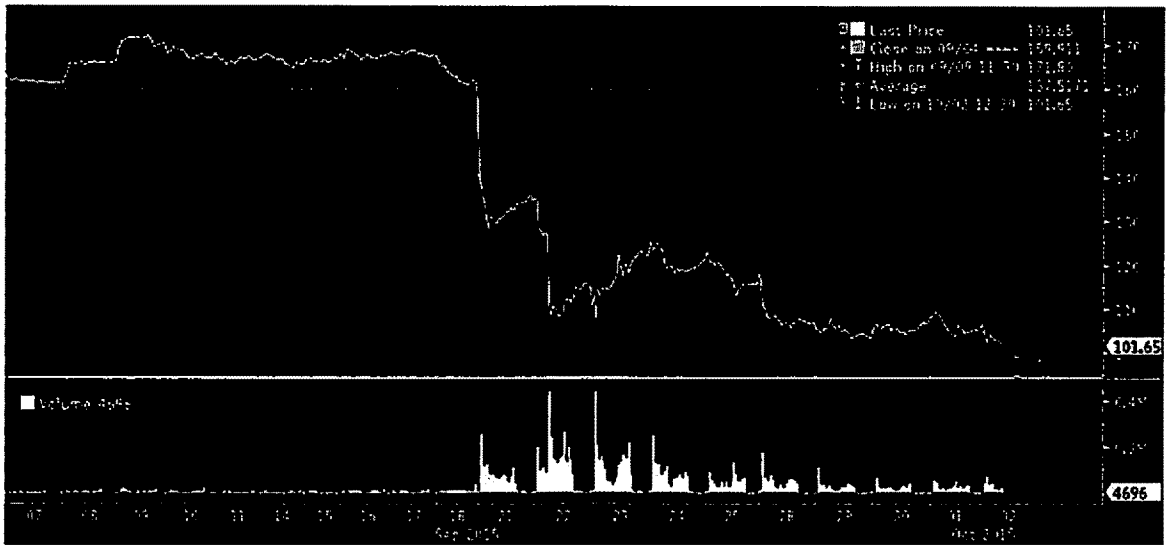
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_030867

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

VW FOIA, EPA 06/20/2017 2017-FFP_030868

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_030869

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

VW FOIA, EPA 06/20/2017 2017-FFP_030870

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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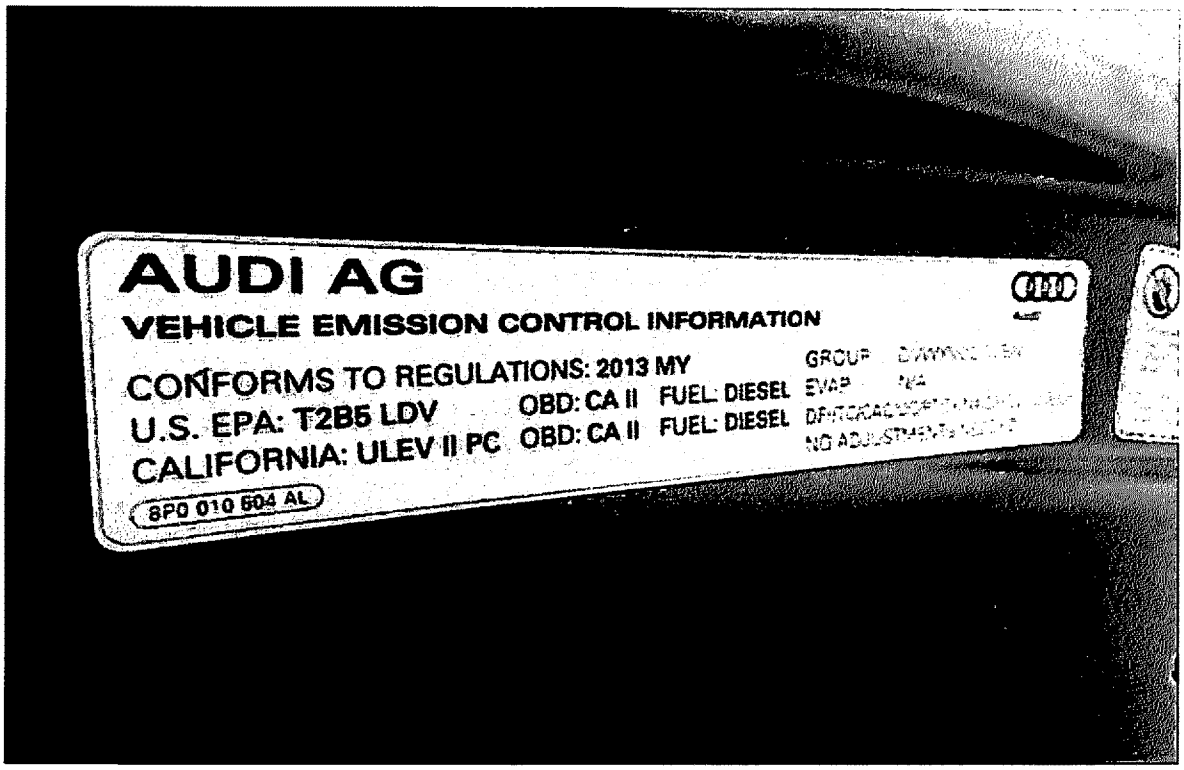
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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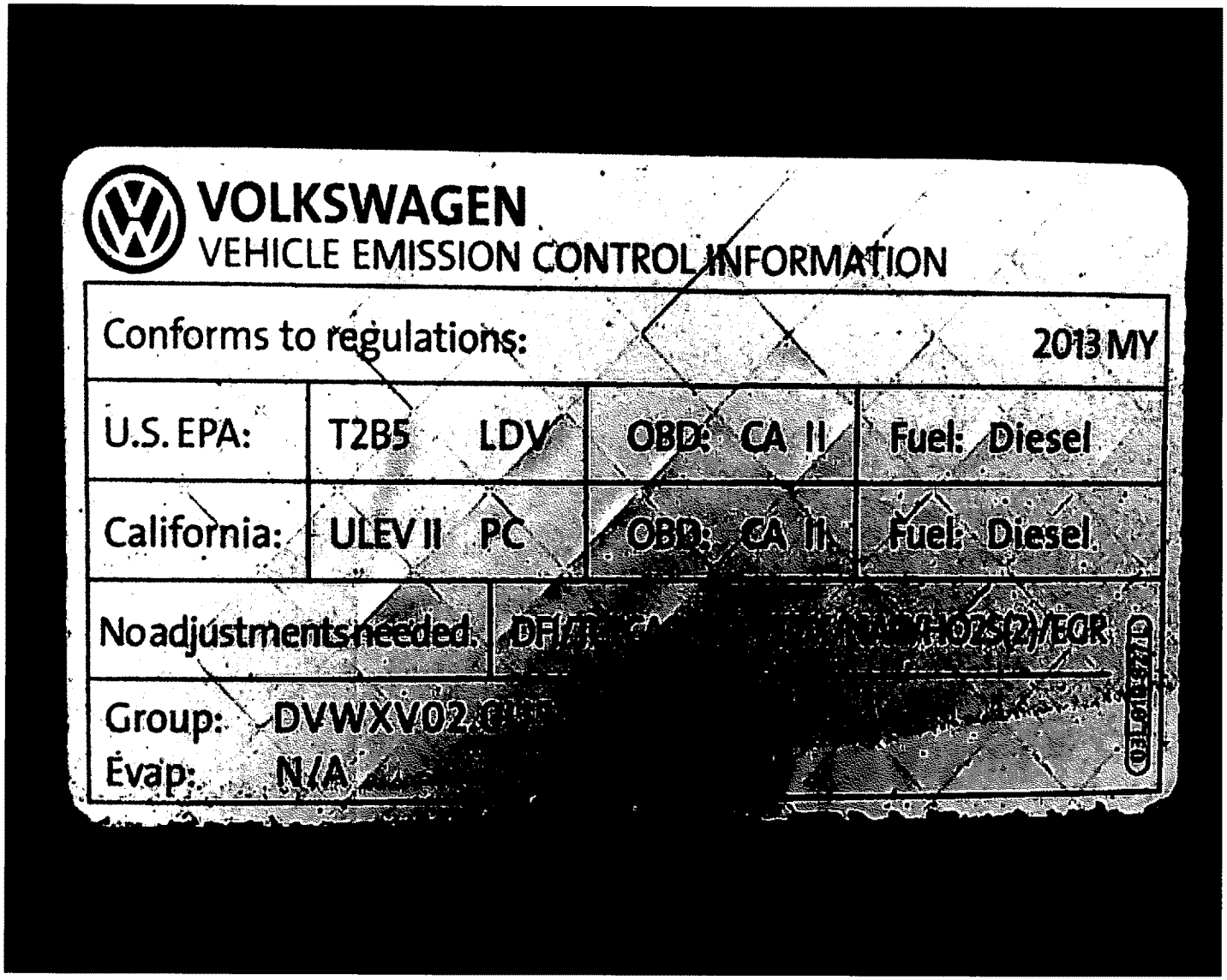

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DFI/TC/CAC/DOC/CPF/SCR/EGR		
Group: DVWXV02.0U4			
Evap: N/A			

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030874

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030876

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_030878

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

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[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

VW FOIA, EPA 06/20/2017 2017-FFP_030879

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

****

I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

****

The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

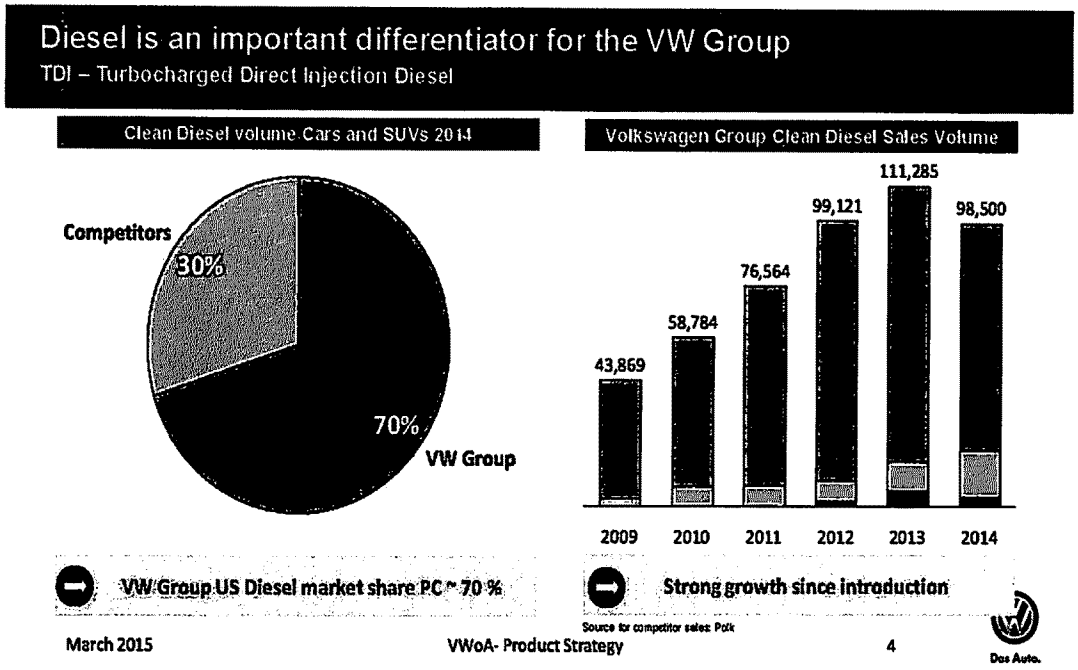
Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

VW FOIA, EPA 06/20/2017 2017-FFP_030884



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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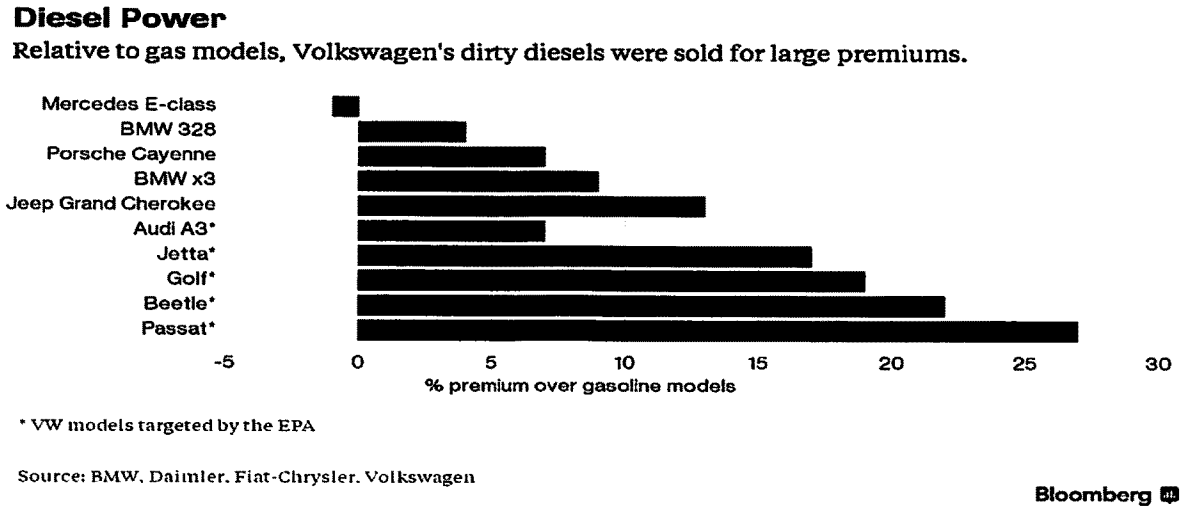
[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

for Clean Diesel vehicles over those of its competitors.[66]



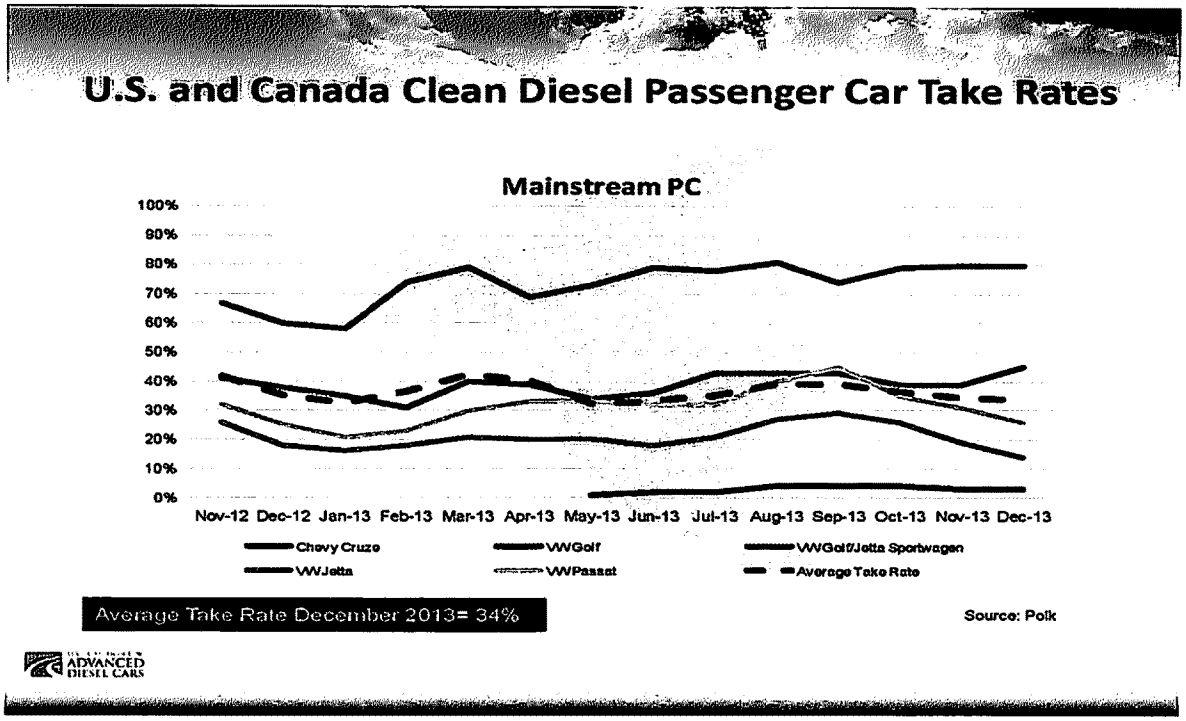
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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68 https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

69 https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

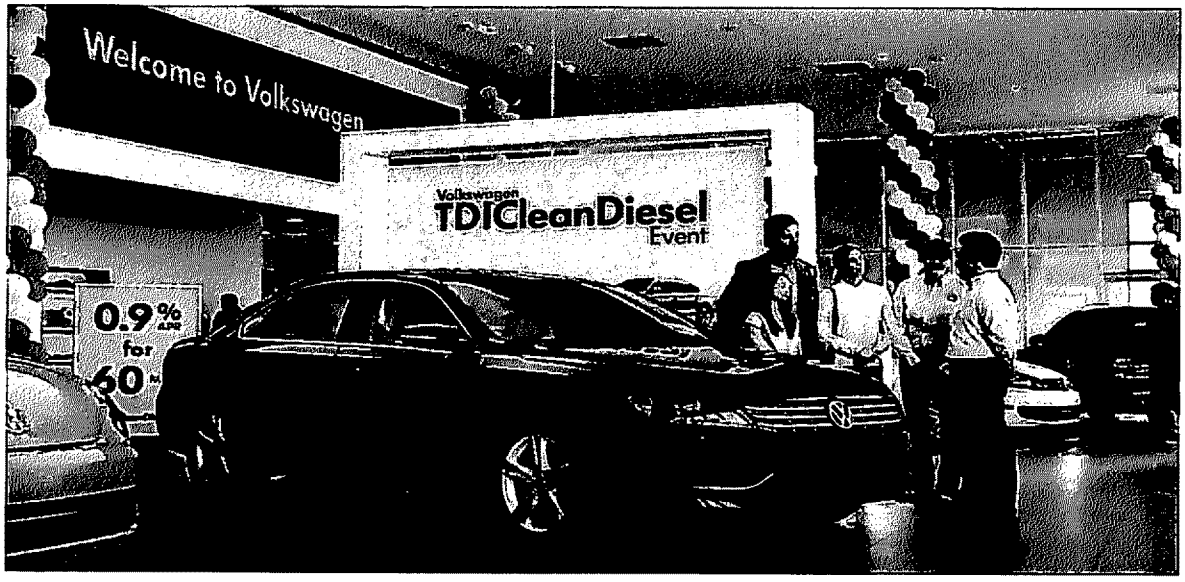
70 http://abcnews.go.com/Business/story?id=7493781.

VW FOIA, EPA 06/20/2017 2017-FFP_030889

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:



[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

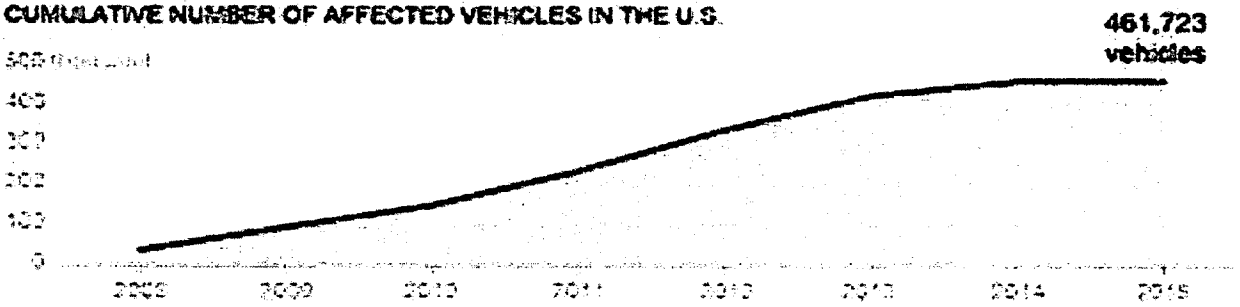
[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

VW FOIA, EPA 06/20/2017 2017-FFP_030898

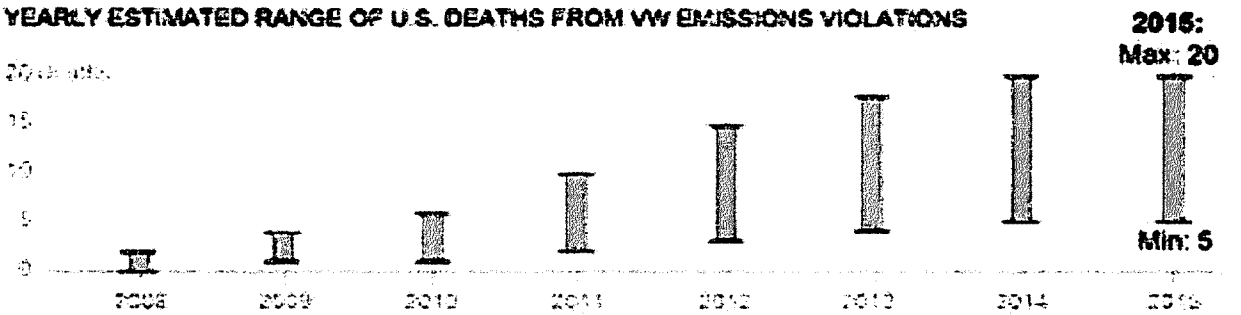
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

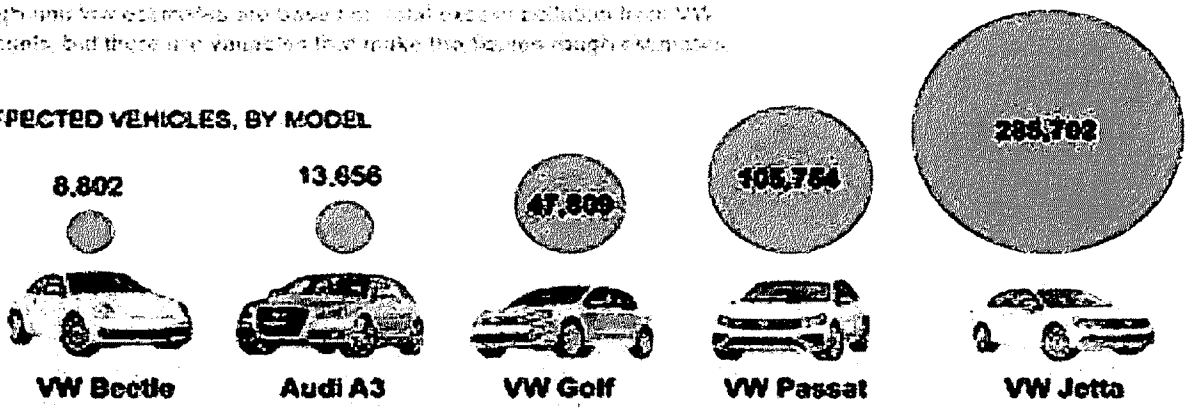
CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.



YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



AFFECTED VEHICLES, BY MODEL



87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

VW FOIA, EPA 06/20/2017 2017-FFP_030901

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

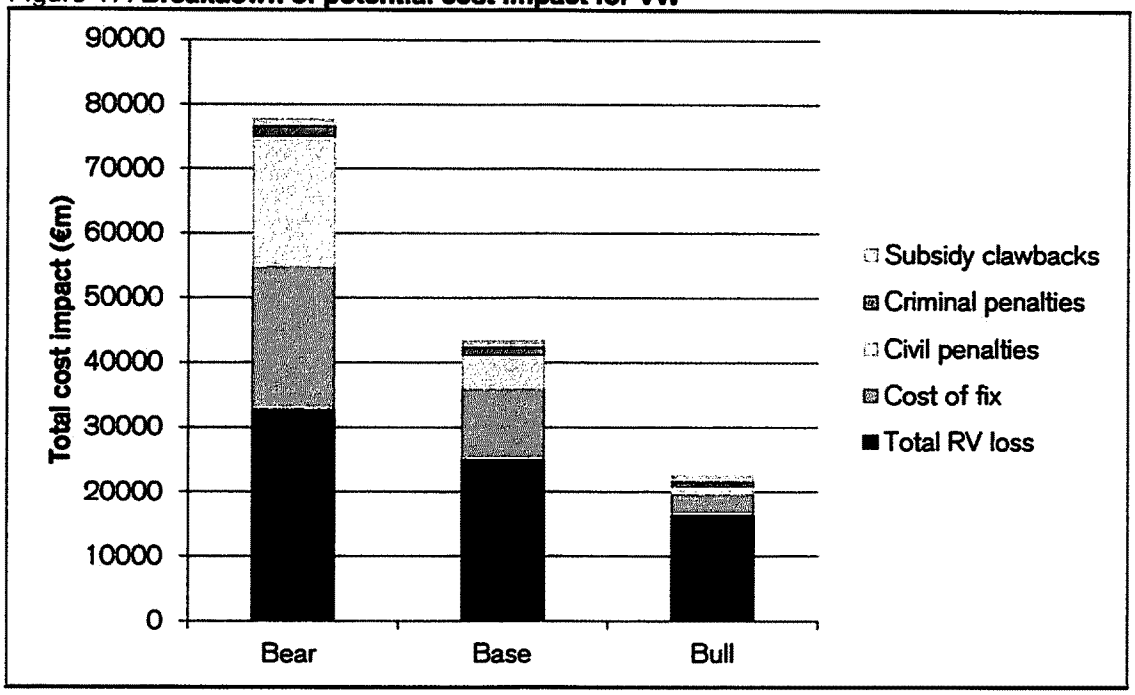
[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

VW FOIA, EPA 06/20/2017 2017-FFP_030902

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_030903

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030905

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_030906

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_030907

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_030909

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_030910

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_030911

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_030912

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_030913

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

VW FOIA, EPA 06/20/2017 2017-FFP_030914

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_030915

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_030916

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_030917

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_030918

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_030919

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_030921

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_030922

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_030923

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_030924

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_030925

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

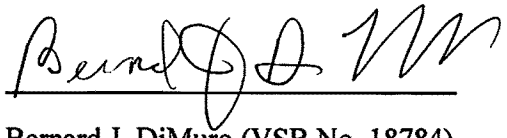
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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VW FOIA, EPA 06/20/2017 2017-FFP_030926

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Counsel for Plaintiffs and the Putative Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_030927

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Fri 10/9/2015 8:18:48 PM
Subject: RE: Volkswagen Clips 10/9/2015

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-09/epa-s-new-volkswagen-probe-may-reveal-failure-to-disclose

EPA's New Volkswagen Probe May Reveal Failure to Disclose

Elisabeth Behrmann Jeff Plungis

Agency looking into computer program that affects emissions

VW recently revealed second software program to regulator

The U.S. Environmental Protection Agency is investigating a second emissions-control software program on Volkswagen AG cars that were rigged to pass pollution tests, one that the automaker may have failed to properly disclose.

The computer program is on the EA 189 diesel engines used since 2009 that are also fitted with software that the automaker has admitted was designed to fool emissions tests, according to a person familiar with the matter who asked not to be named because the information is private.

"VW did very recently provide EPA with very preliminary information on an auxiliary emissions control device that VW said was included in one or more model years," EPA spokesman Nick Conger said. The agency, as well as its California counterpart, "are investigating the nature and

purpose of this recently identified device."

The possibility of a second device under scrutiny will make it harder for Volkswagen to emerge from the crisis. Already, VW faces criminal and civil liability as a company, including more than 250 class-action lawsuits. Some of its executives also face individual charges, and investigators and prosecutors are trying to figure out just how widespread the cheating was.

Automakers are required to point out if engines have special operating modes that can affect the way pollution-control equipment works. Such programs aren't necessarily prohibited, and don't by themselves indicate an attempt to cheat, though carmakers are supposed to disclose them so regulators can adjust their tests to be sure the vehicles still meet standards.

2016 Application

Volkswagen has withdrawn applications for EPA certification of diesel vehicles for the 2016 model year. The company decided the newly disclosed technology qualified as an emissions-control device that the EPA needed to review, Michael Horn, the president and chief executive officer of Volkswagen of America, told Congress Thursday.

Jeannine Ginivan, a spokeswoman for Volkswagen of America, Inc., didn't have an immediate comment.

The probing of the second software feature in vehicles to be sold on 2016 models raised the possibility of VW's latest diesel engines being affected.

"Investors are traumatized by the events that have happened in the past, they will be paralyzed if VW's current diesel line-up has questionable software on board," Arndt Ellinghorst, a London-based analyst with Evercore ISI said in a note Oct. 9. "In our view this is a question VW needs to answer asap."

As many as 11 million diesel-powered autos worldwide have software designed to fool U.S. pollution testers. That includes 8 million cars in the European Union and 482,000 in the U.S., where regulators first detected the cheating. Volkswagen is delaying or canceling non-essential projects to limit spending after determining that the 6.5 billion euros ($7.4 billion) set aside to address the scandal won't be enough.

The California Air Resources Board spokesman Stanley Young declined to comment beyond saying the agency is engaged in the certification process.

Questions about the second software feature were previously reported by the New York Times.

From: Gong, Kristiene
Sent: Friday, October 09, 2015 9:54 AM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia; Purchia, Liz
Subject: Volkswagen Clips 10/9/2015

AP (via Washington Post):

http://www.washingtonpost.com/business/technology/vw-may-compensate-owners-of-diesel-cars-for-loss-of-value/2015/10/09/082a262c-6e8a-11e5-91eb-27ad15c2b723_story.html

VW may compensate owners of diesel cars for loss of value

By Tom Krisher | AP October 9 at 9:31 AM

DETROIT — Volkswagen could compensate owners of diesel-powered cars that emit high levels of pollutants, possibly by paying them for the lost value of their vehicles, the company's top U.S. executive said.

Speaking to lawmakers investigating the emissions cheating, U.S. CEO Michael Horn also said fixing most of the 500,000 affected cars in the U.S. could take one to two years, possibly more. The fix, he said, would not hurt fuel mileage, but it could hinder the cars' performance, knocking one or two miles-per-hour off the top speed.

"There might be a slight impact on performance," Horn said Thursday to a subcommittee of the House Energy and Commerce Committee.

Horn told the committee that VW hasn't calculated how much value the scandal has cost owners of the affected cars. But earlier this week Kelley Blue Book said the value of VWs with 2-liter diesel engines had fallen 13 percent since mid-September. Used car values often drop in the fall, but the VW diesel drop was unusually large.

VW has admitted to installing so-called defeat devices on Volkswagen and Audi cars with four-cylinder diesel engines dating to the 2009 model year. The devices — actually software code — switch on pollution controls when the cars are being tested, but turn off the controls when the software determines that the cars are back on real roads. Affected models include the Jetta, Golf, Beetle, Passat and Audi A3. VW has said a total of 11 million cars worldwide have the software worldwide.

Under questioning from Rep. Jan Schakowsky, D-Ill., Horn said VW isn't considering offering owners loaner cars because the U.S. government says the diesels equipped with the defeat devices are safe to drive. The cars, though, emit 10 to 40 times the nitrogen oxide pollution that's allowed under federal law.

Horn said software changes alone will work to fix newer models, but 430,000 cars dating to 2009 will need mechanical repairs that are still being developed. Horn said engineers are working on either a larger catalytic converter that would treat nitrogen oxide, or a system that injects a chemical called urea into the exhaust.

Rep. Morgan Griffith, R-Va., asked if the urea system would require an extra storage tank that would take space from the cars' trunks. That also could affect the cars' value.

EPA Director of Transportation and Air Quality Christopher Grundler said the answer depends on the remedies VW offers to the agency. "We're going to take a very careful look at what impact this is going to have on owners," Grundler said.

Software alone will repair some newer Passat models, but they may need an additional sensor, Horn said. He didn't have an exact timeline on when the repairs might take place, but said it could take multiple years to develop the fix, get government approval and distribute parts to the company's U.S. dealers. The fixes may take five to 10 hours per car for dealership mechanics to complete, he said.

Horn conceded that the $7.3 billion (6.5 billion euros) VW has set aside so far to pay for the scandal may not be enough. Ultimately, the total cost will depend on fines from government agencies, how much it costs to fix the cars and the price tag for any compensation to customers.

The Guardian:

http://www.theguardian.com/sustainable-business/2015/oct/09/vw-bp-corporate-scandals-emissions-tests-oil-spill-horsemeat-rana-plaza

VW and the toxic problem of corporate amnesia

Scandals such as the BP oil spill, horsemeat and the recent revelations about VW raise serious questions about how to ensure companies don't repeat wrongdoing

André Spicer Friday 9 October 2015 09.10 EDT Last modified on Friday 9 October 2015 09.12 EDT

When it was revealed that VW had been cheating on emissions tests, people were shocked. The automaker that had styled itself as a champion of corporate social responsibility and clean technology suddenly no longer looked so ethical.

It turns out this is not the first time VW has cheated emissions tests. As far back as 1973, VW had been fitting defeat devices to cars. The company was pursued by the EPA and eventually settled out of court with a fine of $120,000 (£78,500). So why didn't VW learn its lesson?

Many companies readily forget costly lessons they learn following gross acts of irresponsibility. This is what happened in the Bangladeshi textile industry in the run-up to the collapse of Rana Plaza in 2013, despite multiple factory collapses and a factory fire in previous years.

In the past, companies would go to great lengths to avoid taking responsibility for wrongdoing. VW may have paid a fine in 1973, but the company admitted no responsibility. A similar thing happened following the financial crisis. When chiefs of the largest banks were called to explain themselves to the Treasury select committee, they expressed profound regret at the unfortunate turn of events. None of them accepted responsibility.

Companies more recently have started to admit culpability and ask for forgiveness. The former CEO of VW, Martin Winterkorn, for example, said sorry and outlined steps to put things right. This did not save Winterkorn, but is considered best practice by PR and crisis management experts.

Doing things differently

Saying sorry and claiming you are going to do something is one thing, learning from mistakes and wrongdoing is quite another.

Colleagues and I were puzzled by this corporate amnesia. We wanted to know why companies in so many industries are so bad at learning from their past bad practice. As we started looking deeper into corporate crises, we noticed that when a crisis occurs there is a clear pattern of response.

To begin with, companies go out of their way to play down the crisis. They do this by claiming the harm that the crisis has caused is not so bad. Then they shift the blame on to an individual or a small group of people. Volkswagen is a case in point – the automaker has started heaping blame for a collective failure on to the shoulders of just four people, the CEO and three divisional heads. Finally, they shift attention away from the scandal to another issue.

We also noticed that corporations often forget about deep crises such as the horsemeat scandal and Toshiba overstating its profits at an amazingly rapid rate. Three to six months after a crisis, there is usually almost no public discussion about what were once burning issues. After the initiate public fury passes, companies seemingly forget their own wrongdoing. They get rid of people who might remember what went wrong. If they don't fire people, they try to gag them with legal settlements. A third common tactic is sidelining people who were in the know by placing them in marginal roles.

There is a danger this could happen at VW. Already we have seen "clean skins" who were not attached to the emissions crisis replacing those who had some connection with it. While it's often vital to remove the CEO, the end result of getting rid of everyone involved is that the people who have learned painful lessons will not be around to remind others not to do it again.

Corporate amnesia

Once the immediate crisis has blown over, companies attempt to ensure it is wiped from people's long-term memory. Material artefacts such as failed technologies and traces of a collapsed building are disposed of, documents are shredded or made hard to access and media stories are drowned out with fresh online content.

Following one of the biggest oil spills in US history at San Luis Obispo in California, Unocal – a now defunct US oil company which was later acquired by Chevron Corporation – covered it up. Employees repeatedly lied in public about it and a culture of silence emerged around the spill within the company. As a result, 20m gallons of gasoline continued to seep into local sand dunes, fouling the groundwater and the beach. Unocal finally began speaking up about the spill after a whistleblower leaked the issue in the 1990s.

Forgetting about corporate scandals is a double-edged sword. On the one hand, putting past wrongdoing behind it helps a company to move on. For instance, BP wanted to move on from the oil spill in the Gulf of Mexico, not just because it is a drain on corporate resources but also because it continues to damage the company's reputation. One BP executive told me that, following the spill, she would not tell people she met who she worked for because she was so ashamed. Now things seem to have changed due to the passing of time and BP employees happily hand out their business cards.

But when companies fail to remember their past wrongdoing, there is a very real danger that they end up repeating the same bad behaviour again. This is what has happened at VW.

Next steps

When faced with a large-scale corporate crisis, firms need to show that they are doing something substantive. Following the explosion of the Piper Alpha oil platform in 1988, companies operating in the oil industry took practical steps to improve worker safety and showed they were taking safety issues seriously.

We're more than mere consumers, and business should remember that

John C. Havens

Companies also need to ensure they preserve the memory of what went wrong. This is hard because people naturally want to distance themselves. But forgetting makes it tough to learn. This means avoiding the knee-jerk reaction of doing a symbolic cleaning out of the company.

Companies also need to hold on to reminders of what went wrong. These might be stories of wrongdoing or even evidence of what went wrong. The US apparel maker Gore-Tex, for example, ritually celebrates failed projects with champagne. The idea is that by raising a glass to failure, it will help people to learn from it.

Other companies ensure that newcomers are told about times when things went disastrously wrong. For instance, there are many reminders of the explosion of the Challenger space shuttle in Nasa. Engineers working with the agency are often drilled in the failure as a case study of what can go wrong. This is a powerful reminder for employees of what not to do in the future.

To: Valentine, Julia[Valentine.Julia@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Millett, John[Millett.John@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
Cc: Dennis, Allison[Dennis.Allison@epa.gov]
From: Conger, Nick
Sent: Fri 10/9/2015 8:28:33 PM
Subject: RE: URGENT: second emissions testing cheating?

Ex. 5

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: Valentine, Julia
Sent: Friday, October 09, 2015 4:27 PM
To: Birgfeld, Erin; Hengst, Benjamin; Millett, John; Grundler, Christopher; Bunker, Byron
Cc: Dennis, Allison; Conger, Nick
Subject: URGENT: second emissions testing cheating?
Importance: High

Ex. 5

Thanks!

Julia P. Valentine

Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

From: Conger, Nick
Sent: Friday, October 09, 2015 4:24 PM
To: Purchia, Liz; Harrison, Melissa
Cc: Valentine, Julia
Subject: FW: second emissions testing cheating?

Ex. 5

Nick Conger

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From: Harder, Amy [mailto:Amy.Harder@wsj.com]
Sent: Friday, October 09, 2015 4:20 PM
To: Conger, Nick
Subject: second emissions testing cheating?

Hi Nick, can you confirm this Bloomberg story that says EPA is investigating a second emissions-control software program, and also, can you confirm how many additional models this could impact, and how many cars? Can you also clarify how this is different from the ones already under investigation?

Best,

Amy

Amy Harder

energy reporter

The Wall Street Journal

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C: 202.906.9629

amy.harder@wsj.com

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Fri 10/9/2015 8:43:07 PM
Subject: DAILY: UAW details worker gains in new FCA deal | How do VW diesels run with activated emissions systems? | Musk calls Apple 'Tesla Graveyard' | Lexus to debut concept in Tokyo

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October 9, 2015

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with FCA at deadline

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HANS GREIMEL

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VW brand faces full-year loss on scandal costs, report says

VW faces Nov. 20 deadline in California for fix to diesel violations

Texas sues VW claiming deception, diesel pollution

VW's 2016 diesel sales 'months' away

A Stanford professor's quest to fix driverless cars' major flaw

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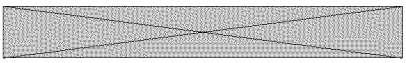
» Jan. 12 - Automotive News World Congress



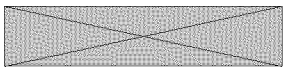
WEBINARS

» Oct. 15 at 2pm ET - Create Loyal Customers
by Auto/Mate

» Oct. 22 at 2pm ET - Save on Energy
by KeyBank

» Oct. 28 at 2pm ET - Targeted Digital Advertising
by DMEautomotive

» Nov. 4 at 11am ET - Digital Disruption
by IBM



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Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]
From: Charmley, William
Sent: Fri 10/9/2015 8:55:40 PM
Subject: Follow-up from the OTAQ meeting earlier this week with NHTSA Administrator Rosekind regarding the topic of recall campaigns.

Ex. 5

Ex. 5

Bill

<< article from the Detroit News >>

Automakers study efforts to boost recall completions

David Shepardson, Detroit News Washington Bureau 3:23 p.m. EDT October 7, 2015

Washington — One third of vehicle owners who received a recall notice say they are extremely or very concerned and 1 in 20 owners won't get repairs, a new survey released Wednesday shows.

Two major auto trade associations unveiled a new survey that looks at why about a quarter of all vehicle recalls are never completed.

The research comes as automakers recalled a record 63.95 million vehicles in 2014 in 803 campaigns. In the first eight months of 2015, automakers recalled more than 32.4 million vehicles vehicles — a figure that topped the prior record of 30.8 million vehicles recalled in all of 2004.

Several automakers are on pace for a record-setting number of recalls. And the total number of campaigns this year could come close to last year.

A newly emboldened National Highway Transportation Safety Administration has demanded recalls in more than a dozen instances — including Volkswagen, Ford Motor Co., and Nissan Motor Co. callbacks. NHTSA Chief Mark Rosekind caught the industry's attention when he suggested in January that automakers could recall more vehicles in 2015 than in 2014.

The Alliance of Automobile Manufacturers and Association of Global Automakers commissioned Public Opinion Strategies to conduct a survey of 1,500 vehicle owners, including those who reported receiving recall notices within the last two years, to explore reasons for consumer behavior related to the recalls. The agencies briefed NHTSA on the results Wednesday.

The findings show most owners take recalls seriously — with 70 percent of owners saying they would not feel safe ignoring a low-risk recall. Just over one-third of owners say they have not gotten a recall completed.

The auto groups poll asked owners about a series of ideas to see if consumers would agree to get vehicles fixed — including a recall notification on their vehicle from the EZ Pass system when driving through a toll booth — and more than half had said that would be effective.

A majority of those polled endorsed tying recalls to vehicle registration or when registering used cars.

General Motors Co. offered $25 gift cars last year to try to prod owners of vehicles recalled for ignition switch defects to get their vehicles repaired.

Rosekind has urged automakers, dealers and others to try to find ways to boost recall completion rates. The survey found 5 percent of respondents will not get recalls completed.

The polling firm tested three different types of vehicle recalls, ranging from minor to moderate to more serious recalls, and examined how consumers said they would respond to recalls at each level and how the recall impacts their perceptions about the safety of their vehicles.

"Nationwide, 93 percent of those who had heard about a safety recall on their vehicle learned about it from the automaker and new vehicle dealer communications," said Mitch Bainwol, president and CEO of the Auto Alliance. "Many consumers said they responded to the recall notice because they would rather be 'safe than sorry.' "

"We want everyone who gets a recall notice to take their vehicle to be repaired," said John Bozzella, president and CEO, Global Automakers. "Since little public opinion

research has been done in this area, for the first time we are learning about what motivates people to respond to safety recalls."

DShepardson@detroitnews.com

News Release from the Automotive Alliance

http://www.autoalliance.org/index.cfm?objectid=FADB8130-6D32-11E5-997E000C296BA163

New Survey Identifies Factors Influencing Recall Completion Rate

October 7, 2015

Washington, DC -- The Auto Alliance and Global Automakers today released the initial results of research designed to understand why roughly 25 percent of the owners of recalled vehicles never complete the free repair. An extensive survey conducted by Public Opinion Strategies illuminates a variety of factors that play into how consumers respond to recall notices and suggests potential opportunities for increasing consumer participation.

"Nationwide, 93 percent of those who had heard about a safety recall on their vehicle learned about it from the automaker and new vehicle dealer communications," said Mitch Bainwol, president and CEO of the Auto Alliance. "Many consumers said they responded to the recall notice because they would rather be 'safe than sorry.'"

"We want everyone who gets a recall notice to take their vehicle to be repaired," said John Bozzella, president and CEO, Global Automakers. "Since little public opinion research has been done in this area, for the first time we are learning about what motivates people to respond to safety recalls."

Several challenges to getting consumers to repair their recalled vehicles were identified. The research indicates that many consumers are doing their own risk assessments when they receive a

notice and deciding if the recall seems important enough for a response. Many survey respondents showed a reduced likelihood to repair a recalled vehicle if they perceived the recall to be "low" or "moderate" risk, saying it seemed to be "no big deal." Used vehicle owners are less likely to be motivated to respond to recall communications, even when they are aware of a recall on their vehicle.

The survey also indicated that many consumers may support state laws that only allow a vehicle's registration to be renewed if all safety recalls have been completed. Survey respondents supported several ways to help convince people to bring their vehicle into a dealership for the free recall repair, including ranking the severity of the recall as high, making the recall notice stand out while also denoting the repair is free, and providing a reminder of an "open" safety recall in their insurance renewal notices.

Public Opinion Strategies, one of the nation's leading public opinion research firms, conducted a national online survey of 1,500 motor vehicle owners, including those who reported receiving recall notices within the last two years, to explore reasons for consumer behavior related to the recalls (both responders and non-responders) through a series of closed and open-ended questions. The firm tested three different types of vehicle recalls, ranging from minor to moderate to more serious recalls, and examined how consumers said they would respond to recalls at each level and how the recall impacts their perceptions about the safety of their vehicles. Survey results provided descriptions of consumer sub-groups who respond and don't respond, and began identifying potentially effective ways to increase the participation rate of recalls. The survey results have been shared with the National Highway Traffic Safety Administration.

The national survey represents the first phase of research, and it is being followed by focus groups to learn more about non-responders and their views, as well as the experiences of new vehicle dealership employees who frequently interact with customers about recalls.

From: Ex. 7
Location: ARB Conference Room Non-Responsive
Importance: High
Subject: Canceled: Meeting –In- Use Compliance Section/ARB and VW
Start Date/Time: Thur 10/15/2015 4:00:00 PM
End Date/Time: Thur 10/15/2015 8:00:00 PM

;
Meeting –In- Use Compliance Section/ARB and VW
ORGANIZER: Ex. 7 Non-Responsive

Ex. 7

Non-ARB INVITEES: EPA - Byron Bunker, Linc Wehrly, Joel Ball, Jim Snyder, Joel Dalton; VW - Ex. 7
Ex. 7
MEETING PURPOSE: Meeting to Address Questions Related to VW Recall Action
CONFERENCE ROOM: Non-Responsive
Agenda and Conference Call Number to be provided

To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Fri 10/9/2015 9:18:49 PM
Subject: Crude export backers begin press for 60 Senate votes

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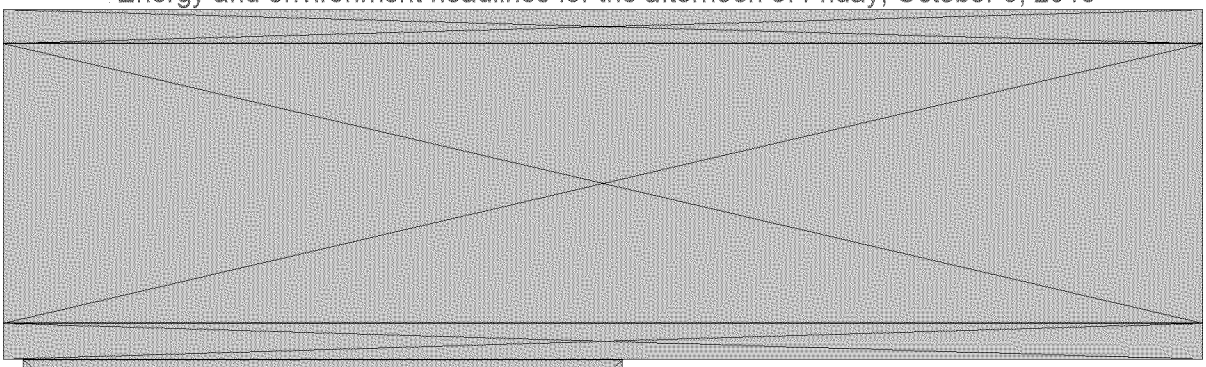
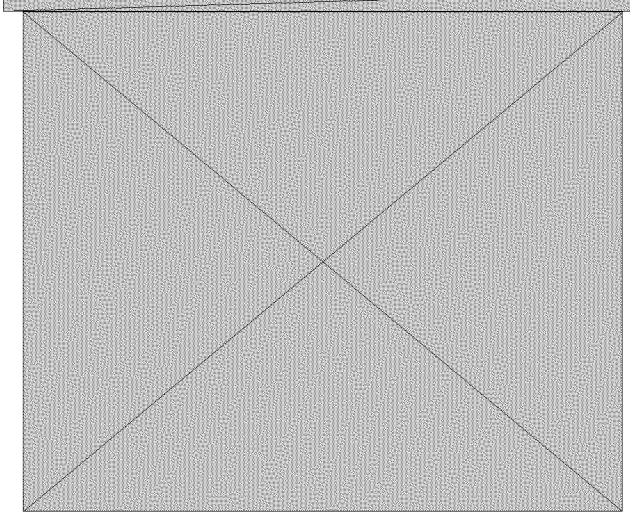
Energy and environment headlines for the afternoon of Friday, October 9, 2015





Crude export backers begin press for 60 Senate votes

By Kevin Rogers

With the support of 60 percent of its members, the House passed a bill to lift the decades-old ban on crude oil exports, and backers set their sights on hitting 60 again — this time, in the Senate.

The bill from Rep. Joe Barton, R-Texas, was approved on a mostly party-line vote of 261-152, with 26 Democrats supporting the legislation. Six Republicans voted against the

measure.

Following the vote, Barton told reporters the legislation's fate in the Senate is uncertain, and he isn't sure what form the final bill would take. He nonetheless expressed optimism that he and his Senate allies could win over six Democrats to the cause.

"We don't have six Democrats right now, but we're in hunting range of them," he said. "I think there's still a chance to do it in the Senate as a stand-alone bill."

Sen. Heidi Heitkamp, D-N.D., who is sponsoring a Senate bill to lift the ban, said she had begun the process of wrangling additional Democratic supporters. Sen. Joe Manchin, D-W.Va., is already a co-sponsor.

"Bipartisan support will help move our legislation forward, and over the past year, we have been meeting with senators to explain why lifting the ban makes so much sense," she said in a statement. "It's encouraging that others — especially Democratic senators — have recently expressed an interest and a willingness to craft a deal to address this outdated policy."

Some members of the Democratic caucus have said they could support lifting the crude export ban if it is coupled with provisions to support renewable energy. Heitkamp, however, was the sole Democrat who voted to favorably report her bill to the Senate floor at a Banking Committee hearing last week.

Her legislation, like Barton's, is a stand-alone bill to lift the ban. The Senate may also consider a package advanced by Senate Energy and Natural Resources Chairman Sen. Lisa Murkowski, R-Alaska, which includes more controversial provisions such as changes to energy revenue sharing programs and expanded offshore oil and gas drilling.

"House approval of legislation to lift the ban on crude oil exports is great news," Murkowski, who has also signed onto Heitkamp's bill, said in a statement. "It sends a strong signal that Congress will lead where the administration has failed."

Opponents of lifting the ban said the bill, even if it can get to the president's desk, is an exercise in futility, since there aren't enough votes to override the threatened presidential veto. The White House has said the legislation is "not needed."

"The Administration has made clear crude export legislation will be vetoed," Jay Hauck, executive director of Consumers and Refiners United for Domestic Energy said in a statement. "The proponents today failed to get 290 votes in the House. The bill is dead."

Barton said he would address the issue of a veto override once the bill made its way through the Senate.

"First we have to get the bill through the Senate. There's a lot to be done" he said. "We didn't get the veto override, but we got close enough to it, where we could be optimistic."

The oil industry representatives backing the bill cheered the House action, and voiced optimism that the Senate would answer the call.

"We are eager to see this bill taken up in the Senate, where members of two committees have already endorsed efforts to lift the 1970s-era ban on crude exports," American Petroleum Institute President and CEO Jack Gerard said in a statement. "The time to act is now."

Environmentalists slammed the bill as a giveaway to the oil industry, but took heart in the administration's opposition.

"Today's vote once again makes clear that the radical leadership of the U.S. House of Representatives is more concerned with lining the pockets of Big Oil than standing up for American families," said Sara Chieffo, vice president of government affairs for the League of Conservation Voters. "Thankfully, the Administration has already threatened to veto this destructive bill."

Quick Links

Court stays EPA water rule nationwide until challenges resolved

Equipment malfunction causes explosion at Washington dam

Judge gives final approval for $338M oil train settlement

Officials: Broken rail caused West Virginia train derailment

Petition drive assures House vote to revive Ex-Im Bank

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Weatherford chief says time needed for oil market to recover

Biggest effort on smart thermostats launched in Chicago

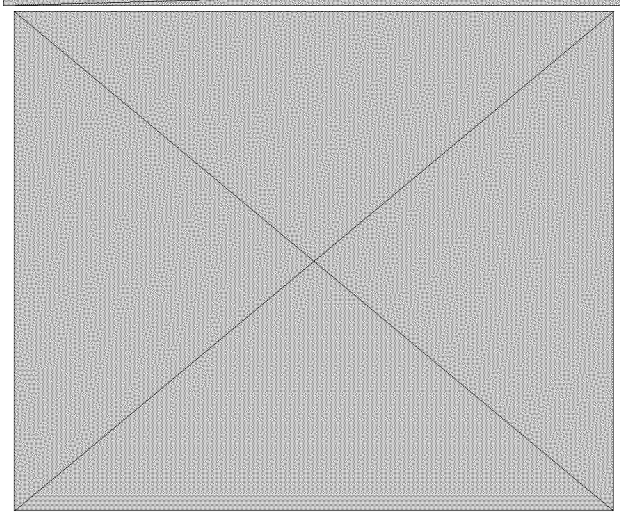
Schweitzer sees consumer energy storage, renewables as key to future

Solar firms hit by UK government move to cut subsidies

N.M. startup finds success with solar credit device

Prosecutor says corruption may have cost Brazil's Petrobras $5.3 billion

Upcoming Events



Court stays EPA water rule nationwide until challenges resolved

By Kevin Rogers

A federal appeals court in Ohio has ruled that a stay of the Environmental Protection Agency's Clean Water Rule must apply nationwide, delaying implementation of the regulation until the courts decide whether it is legal.

The 6th U.S. Circuit Court of Appeals, in a 2-1 decision, on Friday expanded the 13-state stay approved by a federal judge in North Dakota in August. That stay had been granted before the regulation took effect.

The appeals court said that the states challenging the rule didn't make a compelling case that the rule would cause "immediate irreparable harm." But it also said that delaying implementation of the rule wouldn't threaten "imminent injury" to the nation's waterways, and a full stay would allow more time to determine the legality of the rule, and limit confusion on how states should move forward.

"A stay allows for a more deliberate determination whether this exercise of executive power, enabled by Congress and explicated by the Supreme Court, is proper under the dictates of federal law," the court wrote. "A stay temporarily silences the whirlwind of confusion that springs from uncertainty about the requirements of the new rule and whether they will survive legal testing."

The states challenging the rule, which aims to clarify what bodies of water are subject to Clean Water Act protections, contend that it constitutes a federal overreach and would infringe on state water control.

EPA and the Army Corps of Engineers, however, said it would only expand the federal government's jurisdiction by 3 percent and only applies to bodies of water that can carry pollution downstream.

EPA spokeswoman Melissa Harrison said the agency was ready to defend the rule in court and get it implemented.

"The agencies respect the court's decision to allow for more deliberate consideration of the issues in the case and we look forward to litigating the merits of the Clean Water Rule," she said in a statement.

"The Clean Water Rule was developed by the agencies to respond to an urgent need to improve and simplify the process for identifying waters that are and are not protected under the Clean Water Act, and is based on the latest science and the law," she said.

West Virginia Attorney General Patrick Morrisey, whose state joined the suit to block the rule, said the regulation wouldn't survive in court.

"This decision is a critical victory in our fight against this onerous federal overreach," he said in a statement. "We have said from the beginning that this new rule does not pass legal muster."

EPA's detractors in Congress also cheered the decision, but derided the agency for finalizing what they believe to be an illegal rule.

"It is sad that we need the courts to tell the Obama Administration to rethink this issue and do the right thing," said House Natural Resources Chairman Rep. Rob Bishop, R-Utah. "Why can't the agencies just work with Congress to do the right thing the first time?"

Equipment malfunction causes explosion at

Washington dam

By Nicholas K. Geranios

SPOKANE, Wash. (AP) — An electrical equipment malfunction caused an explosion at a hydroelectric dam on Washington's Columbia River that injured six workers, utility officials said Friday.

The explosion occurred Thursday afternoon at one of 10 electricity generating units at the Priest Rapids Dam near the central Washington city of Mattawa, Grant County Public Utility District spokesman Chuck Allen said.

"There was no structural damage to the facility and no resulting threats to public safety related to this incident," he said. "The dam is being operated safely at this time."

Five workers were being treated at Harborview Medical Center in Seattle. Two men, both in their 40s, are in critical condition and in the intensive care unit, while three men are in satisfactory condition, spokesman Susan Gregg said Friday. All were being treated for burns.

More

Judge gives final approval for $338M oil train settlement

By David Sharp

PORTLAND, Maine (AP) — A U.S. bankruptcy judge on Friday approved a $338 million settlement fund for victims of the fiery 2013 oil train derailment that claimed 47 lives in Quebec, clearing the way for payments to victims by year's end.

Judge Peter Cary announced his approval after Canadian Pacific dropped its objection to the settlement plan and after a Canadian judge gave conditional approval Thursday. He praised attorneys for working together to get a substantial settlement in place as quickly as possible.

Barring any surprises, payments could be made to victims by the end of November or by year's end at the latest, said Robert Keach, the U.S. bankruptcy trustee. About $83 million, or about $110 million in Canadian dollars, is being set aside to settle wrongful death claims.

"We don't pretend to suggest that we made up for everything that happened. But within the limits of the civil system, this is substantial compensation for the victims and they deserve it," Keach said.

More

Officials: Broken rail caused West Virginia train derailment

By John Raby

MONTGOMERY, W.Va. (AP) — A fiery oil train derailment in southern West Virginia last February resulted from a broken rail that started with a crack that should have been detected but was missed in two inspections, federal investigators said Friday.

A CSX train was carrying 3 million gallons of Bakken crude when it derailed Feb. 16 during a snowstorm in Mount Carbon. Twenty-seven of the train's 109 cars derailed. Twenty cars leaked crude oil.

The Federal Railroad Administration said the broken rail resulted from a crack that had expanded. The problem was missed by CSX Corp. and a contractor on inspections in December 2014 and last January, said Sarah Feinberg, the FRA's acting chief.

"This accident, like many rail accidents, was preventable," Feinberg said at a news conference.

Petition drive assures House vote to revive Ex-Im Bank

By Andrew Taylor

WASHINGTON (AP) — Several dozen Republicans teamed up with Democrats Friday to assure a House vote on reviving the U.S. Export-Import Bank, giving the effort to save the bank new life more than three months after its charter lapsed.

The development came as bank supporters got a majority of the House to sign a petition to dislodge a measure to revive it from a powerful panel controlled by a bank opponent. The bank helps finance sales of U.S. exports to foreign customers.

The bank's charter expired June 30, and it has been unable to approve new applications to help overseas buyers get financing to purchase U.S. products like airplanes and heavy equipment. Supporters say the bank helps sustain tens of thousands of manufacturing jobs.

Bank supporters have been stymied by opposition from tea party Republicans, House Financial Services Committee Chairman Jeb Hensarling, R-Texas, and top GOP leaders like Majority Leader Kevin McCarthy, R-Calif.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

Senator asks EPA to stop Montreal sewage-dumping plan

By Mary Esch

ALBANY, N.Y. (AP) — Sen. Charles Schumer asked U.S. environmental regulators Friday to work with Canadian officials to stop the city of Montreal from dumping 2 billion gallons of raw sewage into the St. Lawrence River.

Montreal Mayor Denis Coderre said the weeklong sewage dumping would start Oct. 18 and is necessary as the city rebuilds a riverside expressway. The sewage will head away from New York, but it has drawn condemnation from U.S. officials.

Schumer urged the U.S. Environmental Protection Agency to work with the Canadian government and the State Department to devise an alternative plan.

"If this plan is allowed to move forward, this sewage could severely impact the river ecosystem and wildlife, and the St. Lawrence County tourism industry on which the North Country depends," Schumer said.

More

Judge denies environmentalists' intervention in Exxon case

By Michael Catalini

TRENTON, N.J. (AP) — A Democratic state senator and environmental groups cannot intervene in the state's $225 million settlement with Exxon Mobil over contaminated gas stations and other sites, a New Jersey judge ruled Friday.

Superior Court Judge Michael Hogan said Friday he denied the request from state Sen. Raymond Lesniak and the four groups because they did not have standing to bring the lawsuit in the first place. It's the second time Hogan has denied their petition in a case that

stretches back to 2004.

The groups — Clean Water Action, Delaware Riverkeeper, Environment New Jersey and New Jersey Sierra Club — plan further appeals.

"Judge Hogan was wrong," New Jersey Sierra Club director Jeff Tittel said. "He went along with the Christie administration's sell-out for less than one penny on the dollar for billions of dollars in damages." Lesniak also plans to appeal, saying "this miscarriage of justice will not stand."

More

VW may compensate owners of diesel cars for loss of value

By Tom Krisher

DETROIT (AP) — Volkswagen could compensate owners of diesel-powered cars that emit high levels of pollutants, possibly by paying them for the lost value of their vehicles, the company's top U.S. executive said.

Speaking to lawmakers investigating the emissions cheating, U.S. CEO Michael Horn also said fixing most of the 500,000 affected cars in the U.S. could take one to two years, possibly more. The fix, he said, would not hurt fuel mileage, but it could hinder the cars' performance, knocking one or two miles-per-hour off the top speed.

"There might be a slight impact on performance," Horn said Thursday to a subcommittee of the House Energy and Commerce Committee.

Horn told the committee that VW hasn't calculated how much value the scandal has cost owners of the affected cars. But earlier this week Kelley Blue Book said the value of VWs with 2-liter diesel engines had fallen 13 percent since mid-September. Used car values often drop in the fall, but the VW diesel drop was unusually large.

More

US rig count declines by 14 this week to 795

HOUSTON (AP) — Oilfield services company Baker Hughes Inc. says the number of rigs exploring for oil and natural gas in the U.S. this week declined by 14 to 795.

It was the sixth consecutive week of declines.

Houston's Baker Hughes said Friday that 605 rigs were seeking oil and 189 explored for

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natural gas. One was listed as miscellaneous. A year ago, with oil prices about double the prices now, 1,930 rigs were active.

Among major oil- and gas-producing states, Oklahoma lost six rigs, Texas declined by four and Kansas, Louisiana, North Dakota, Ohio and Pennsylvania each dropped by one.

Colorado gained one rig.

More

In rare event, remnants of Pacific hurricane hit Alaska

By Becky Bohrer

JUNEAU, Alaska (AP) — Remnants of Pacific Hurricane Oho battered Alaska's southeast coast on Friday, the latest unusual weather event to hit a state that so far this year has dealt with a lack of snow, warmer temperatures and intense wildfires.

The storm on Thursday brought more than 7 inches of rain to Ketchikan, a scenic town in Alaska's coastal rainforest. Gusts of up to 80 mph were forecast for Friday, and more rain was expected across the region. Jon Dorman, deputy emergency manager for the city of Ketchikan, said Friday morning that creeks were swollen and residents were keeping an eye on the storm, but no other major issues had been reported.

The remnants of Oho were picked up by a larger low-pressure system. Oho was among a record number of tropical cyclones in the central Pacific so far this hurricane season, which officials attributed to unusually warm ocean temperatures from El Nino.

While it's not unusual for Alaska to feel the remnant effects of tropical storms from the west, it's rare for the remnants of a central Pacific tropical storm to reach this far because tropical systems north of Hawaii often fall apart rapidly as they reach cooler water temperatures, said meteorologist Shaun Baines of the weather service's Anchorage office.

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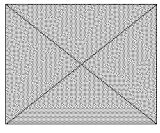

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

Murkowski pushes for comprehensive drought bill

"A unified legislative response" is needed to address the complex issues surrounding the West's drought problem, Energy and Natural Resources Committee Chairman Sen. Lisa Murkowski, R-Alaska, said at a hearing Thursday, E&E reports.

More

FutureGen hires Landrieu to help revive clean coal project

For the second time, FutureGen Industrial Alliance is trying to get its Illinois clean coal project revived, and has engaged former Sen. Mary Landrieu to lobby to restore federal backing, The Hill reports.

More

Oil steady in finishing out strong week

Oil prices gained 9 percent on the week after holding relatively steady Friday. Light, sweet crude for November delivery finished 20 cents higher to settle at $49.63 a barrel on the Nymex, while in London, Brent lost 40 cents to $52.65, Dow Jones reports.

More

Weatherford chief says time needed for oil market to recover

Oil prices may be rebounding but it will take time for demand to pick up again, Bernard Deroc-Danner, chief of oil field services company Weatherford International, told The Wall Street Journal, as he defended the firm's job cuts.

More

Biggest effort on smart thermostats launched in Chicago

Google's Nest Labs, Commonwealth Edison, and several other utility partners have launched a program aiming to get 1 million smart thermostats into homes in Northern Illinois in the next five years, E&E reports.

More

Schweitzer sees consumer energy storage, renewables as key to future

"Power Up Energy," former Montana Gov. Brian Schweitzer's new book, portrays energy storage and renewables as the future of the industry, The Associated Press reports.

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Solar firms hit by UK government move to cut subsidies

SunEdison's push into the British solar market was halted by the government's decision to drastically cut subsidies, The New York Times reports.

More

N.M. startup finds success with solar credit device

The SunPort, which plugs into outlets and gives the users access to solar energy through solar credits, has won startup PlugSolar an award from the Consumer Electronic Association, opening the door to more investment funding, Albuquerque Business First reports.

More

Prosecutor says corruption may have cost Brazil's Petrobras $5.3 billion

Calling Petrobras' April move to write down 6.2 billion reais lost to corruption as just "the tip of the iceberg," a prosecutor said Friday the scandal may end up costing the company more than 20 billion reais—$5.3 billion at the current exchange rate, Reuters reports.

More

Upcoming Events

- Oct. 9, Washington: The House to vote on a bill from Rep. Joe Barton, R-Texas, that would lift the Commerce Department ban on crude oil exports. 9:00 am , U.S. Capitol Building

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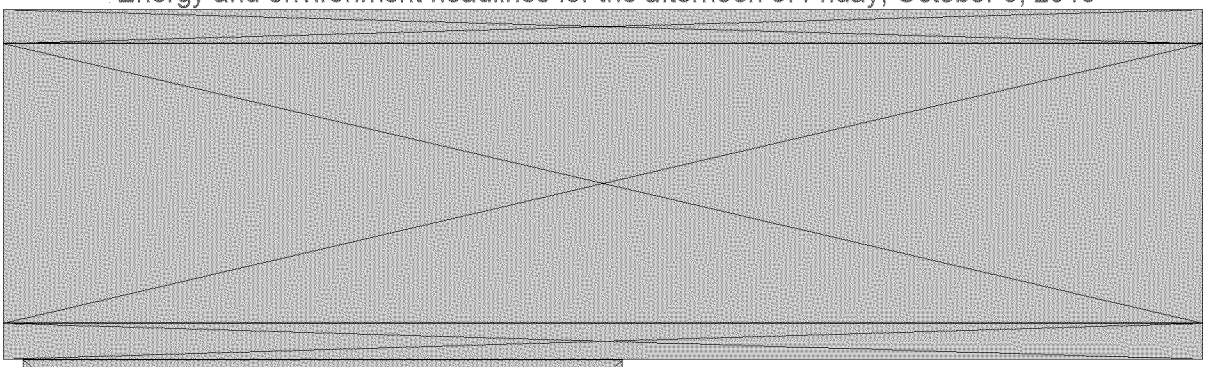

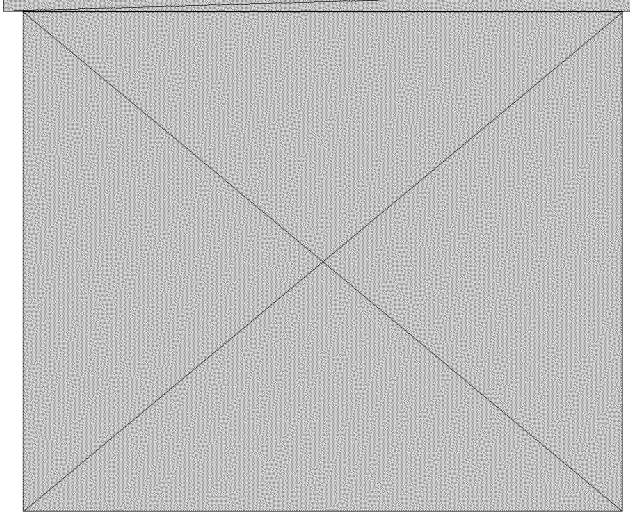

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Following the vote, Barton told reporters the legislation's fate in the Senate is uncertain, and he isn't sure what form the final bill would take. He nonetheless expressed optimism that he and his Senate allies could win over six Democrats to the cause.

"We don't have six Democrats right now, but we're in hunting range of them," he said. "I think there's still a chance to do it in the Senate as a stand-alone bill."

Sen. Heidi Heitkamp, D-N.D., who is sponsoring a Senate bill to lift the ban, said she had begun the process of wrangling additional Democratic supporters. Sen. Joe Manchin, D-W.Va., is already a co-sponsor.

"Bipartisan support will help move our legislation forward, and over the past year, we have been meeting with senators to explain why lifting the ban makes so much sense," she said in a statement. "It's encouraging that others — especially Democratic senators — have recently expressed an interest and a willingness to craft a deal to address this outdated policy."

Some members of the Democratic caucus have said they could support lifting the crude export ban if it is coupled with provisions to support renewable energy. Heitkamp, however, was the sole Democrat who voted to favorably report her bill to the Senate floor at a Banking Committee hearing last week.

Her legislation, like Barton's, is a stand-alone bill to lift the ban. The Senate may also consider a package advanced by Senate Energy and Natural Resources Chairman Sen. Lisa Murkowski, R-Alaska, which includes more controversial provisions such as changes to energy revenue sharing programs and expanded offshore oil and gas drilling.

"House approval of legislation to lift the ban on crude oil exports is great news," Murkowski, who has also signed onto Heitkamp's bill, said in a statement. "It sends a strong signal that Congress will lead where the administration has failed."

Opponents of lifting the ban said the bill, even if it can get to the president's desk, is an exercise in futility, since there aren't enough votes to override the threatened presidential veto. The White House has said the legislation is "not needed."

"The Administration has made clear crude export legislation will be vetoed," Jay Hauck, executive director of Consumers and Refiners United for Domestic Energy said in a statement. "The proponents today failed to get 290 votes in the House. The bill is dead."

Barton said he would address the issue of a veto override once the bill made its way through the Senate.

"First we have to get the bill through the Senate. There's a lot to be done" he said. "We didn't get the veto override, but we got close enough to it, where we could be optimistic."

The oil industry representatives backing the bill cheered the House action, and voiced optimism that the Senate would answer the call.

"We are eager to see this bill taken up in the Senate, where members of two committees have already endorsed efforts to lift the 1970s-era ban on crude exports," American Petroleum Institute President and CEO Jack Gerard said in a statement. "The time to act is now."

Environmentalists slammed the bill as a giveaway to the oil industry, but took heart in the administration's opposition.

"Today's vote once again makes clear that the radical leadership of the U.S. House of Representatives is more concerned with lining the pockets of Big Oil than standing up for American families," said Sara Chieffo, vice president of government affairs for the League of Conservation Voters. "Thankfully, the Administration has already threatened to veto this destructive bill."

Quick Links

Court stays EPA water rule nationwide until challenges resolved

Equipment malfunction causes explosion at Washington dam

Judge gives final approval for $338M oil train settlement

Officials: Broken rail caused West Virginia train derailment

Petition drive assures House vote to revive Ex-Im Bank

Senator asks EPA to stop Montreal sewage-dumping plan

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Schweitzer sees consumer energy storage, renewables as key to future

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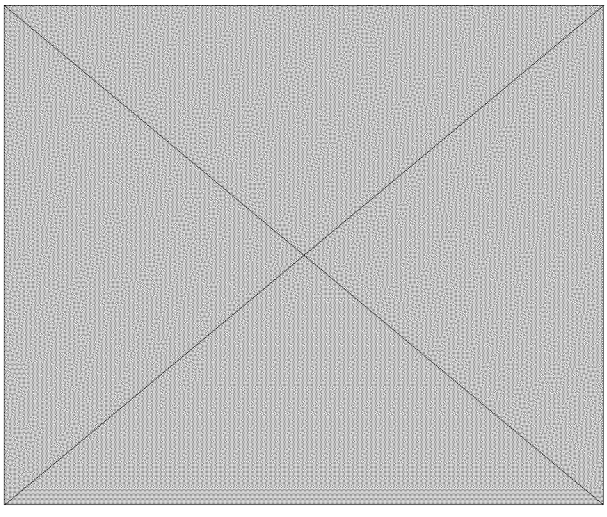
Prosecutor says corruption may have cost Brazil's Petrobras $5.3 billion

Upcoming Events



Court stays EPA water rule nationwide until challenges resolved

By Kevin Rogers

A federal appeals court in Ohio has ruled that a stay of the Environmental Protection Agency's Clean Water Rule must apply nationwide, delaying implementation of the regulation until the courts decide whether it is legal.

The 6th U.S. Circuit Court of Appeals, in a 2-1 decision, on Friday expanded the 13-state stay approved by a federal judge in North Dakota in August. That stay had been granted before the regulation took effect.

The appeals court said that the states challenging the rule didn't make a compelling case that the rule would cause "immediate irreparable harm." But it also said that delaying implementation of the rule wouldn't threaten "imminent injury" to the nation's waterways, and a full stay would allow more time to determine the legality of the rule, and limit confusion on how states should move forward.

"A stay allows for a more deliberate determination whether this exercise of executive power, enabled by Congress and explicated by the Supreme Court, is proper under the dictates of federal law," the court wrote. "A stay temporarily silences the whirlwind of confusion that springs from uncertainty about the requirements of the new rule and whether they will survive legal testing."

The states challenging the rule, which aims to clarify what bodies of water are subject to Clean Water Act protections, contend that it constitutes a federal overreach and would infringe on state water control.

EPA and the Army Corps of Engineers, however, said it would only expand the federal government's jurisdiction by 3 percent and only applies to bodies of water that can carry pollution downstream.

EPA spokeswoman Melissa Harrison said the agency was ready to defend the rule in court and get it implemented.

"The agencies respect the court's decision to allow for more deliberate consideration of the issues in the case and we look forward to litigating the merits of the Clean Water Rule," she said in a statement.

"The Clean Water Rule was developed by the agencies to respond to an urgent need to improve and simplify the process for identifying waters that are and are not protected under the Clean Water Act, and is based on the latest science and the law," she said.

West Virginia Attorney General Patrick Morrisey, whose state joined the suit to block the rule, said the regulation wouldn't survive in court.

"This decision is a critical victory in our fight against this onerous federal overreach," he said in a statement. "We have said from the beginning that this new rule does not pass legal muster."

EPA's detractors in Congress also cheered the decision, but derided the agency for finalizing what they believe to be an illegal rule.

"It is sad that we need the courts to tell the Obama Administration to rethink this issue and do the right thing," said House Natural Resources Chairman Rep. Rob Bishop, R-Utah. "Why can't the agencies just work with Congress to do the right thing the first time?"

Equipment malfunction causes explosion at

Washington dam

By Nicholas K. Geranios

SPOKANE, Wash. (AP) — An electrical equipment malfunction caused an explosion at a hydroelectric dam on Washington's Columbia River that injured six workers, utility officials said Friday.

The explosion occurred Thursday afternoon at one of 10 electricity generating units at the Priest Rapids Dam near the central Washington city of Mattawa, Grant County Public Utility District spokesman Chuck Allen said.

"There was no structural damage to the facility and no resulting threats to public safety related to this incident," he said. "The dam is being operated safely at this time."

Five workers were being treated at Harborview Medical Center in Seattle. Two men, both in their 40s, are in critical condition and in the intensive care unit, while three men are in satisfactory condition, spokesman Susan Gregg said Friday. All were being treated for burns.

More

Judge gives final approval for $338M oil train settlement

By David Sharp

PORTLAND, Maine (AP) — A U.S. bankruptcy judge on Friday approved a $338 million settlement fund for victims of the fiery 2013 oil train derailment that claimed 47 lives in Quebec, clearing the way for payments to victims by year's end.

Judge Peter Cary announced his approval after Canadian Pacific dropped its objection to the settlement plan and after a Canadian judge gave conditional approval Thursday. He praised attorneys for working together to get a substantial settlement in place as quickly as possible.

Barring any surprises, payments could be made to victims by the end of November or by year's end at the latest, said Robert Keach, the U.S. bankruptcy trustee. About $83 million, or about $110 million in Canadian dollars, is being set aside to settle wrongful death claims.

"We don't pretend to suggest that we made up for everything that happened. But within the limits of the civil system, this is substantial compensation for the victims and they deserve it," Keach said.

More

Officials: Broken rail caused West Virginia train derailment

By John Raby

MONTGOMERY, W.Va. (AP) — A fiery oil train derailment in southern West Virginia last February resulted from a broken rail that started with a crack that should have been detected but was missed in two inspections, federal investigators said Friday.

A CSX train was carrying 3 million gallons of Bakken crude when it derailed Feb. 16 during a snowstorm in Mount Carbon. Twenty-seven of the train's 109 cars derailed. Twenty cars leaked crude oil.

The Federal Railroad Administration said the broken rail resulted from a crack that had expanded. The problem was missed by CSX Corp. and a contractor on inspections in December 2014 and last January, said Sarah Feinberg, the FRA's acting chief.

"This accident, like many rail accidents, was preventable," Feinberg said at a news conference.

Petition drive assures House vote to revive Ex-Im Bank

By Andrew Taylor

WASHINGTON (AP) — Several dozen Republicans teamed up with Democrats Friday to assure a House vote on reviving the U.S. Export-Import Bank, giving the effort to save the bank new life more than three months after its charter lapsed.

The development came as bank supporters got a majority of the House to sign a petition to dislodge a measure to revive it from a powerful panel controlled by a bank opponent. The bank helps finance sales of U.S. exports to foreign customers.

The bank's charter expired June 30, and it has been unable to approve new applications to help overseas buyers get financing to purchase U.S. products like airplanes and heavy equipment. Supporters say the bank helps sustain tens of thousands of manufacturing jobs.

Bank supporters have been stymied by opposition from tea party Republicans, House Financial Services Committee Chairman Jeb Hensarling, R-Texas, and top GOP leaders like Majority Leader Kevin McCarthy, R-Calif.

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A message from the American Petroleum Institute

America is now the world's #1 natural gas producer and will soon be #1 in oil. Now more than ever, abundant energy means abundant prosperity, opportunity and security for all Americans.

Learn more at EnergyTomorrow.org

Senator asks EPA to stop Montreal sewage-dumping plan

By Mary Esch

ALBANY, N.Y. (AP) — Sen. Charles Schumer asked U.S. environmental regulators Friday to work with Canadian officials to stop the city of Montreal from dumping 2 billion gallons of raw sewage into the St. Lawrence River.

Montreal Mayor Denis Coderre said the weeklong sewage dumping would start Oct. 18 and is necessary as the city rebuilds a riverside expressway. The sewage will head away from New York, but it has drawn condemnation from U.S. officials.

Schumer urged the U.S. Environmental Protection Agency to work with the Canadian government and the State Department to devise an alternative plan.

"If this plan is allowed to move forward, this sewage could severely impact the river ecosystem and wildlife, and the St. Lawrence County tourism industry on which the North Country depends," Schumer said.

More

Judge denies environmentalists' intervention in Exxon case

By Michael Catalini

TRENTON, N.J. (AP) — A Democratic state senator and environmental groups cannot intervene in the state's $225 million settlement with Exxon Mobil over contaminated gas stations and other sites, a New Jersey judge ruled Friday.

Superior Court Judge Michael Hogan said Friday he denied the request from state Sen. Raymond Lesniak and the four groups because they did not have standing to bring the lawsuit in the first place. It's the second time Hogan has denied their petition in a case that

stretches back to 2004.

The groups — Clean Water Action, Delaware Riverkeeper, Environment New Jersey and New Jersey Sierra Club — plan further appeals.

"Judge Hogan was wrong," New Jersey Sierra Club director Jeff Tittel said. "He went along with the Christie administration's sell-out for less than one penny on the dollar for billions of dollars in damages." Lesniak also plans to appeal, saying "this miscarriage of justice will not stand."

More

VW may compensate owners of diesel cars for loss of value

By Tom Krisher

DETROIT (AP) — Volkswagen could compensate owners of diesel-powered cars that emit high levels of pollutants, possibly by paying them for the lost value of their vehicles, the company's top U.S. executive said.

Speaking to lawmakers investigating the emissions cheating, U.S. CEO Michael Horn also said fixing most of the 500,000 affected cars in the U.S. could take one to two years, possibly more. The fix, he said, would not hurt fuel mileage, but it could hinder the cars' performance, knocking one or two miles-per-hour off the top speed.

"There might be a slight impact on performance," Horn said Thursday to a subcommittee of the House Energy and Commerce Committee.

Horn told the committee that VW hasn't calculated how much value the scandal has cost owners of the affected cars. But earlier this week Kelley Blue Book said the value of VWs with 2-liter diesel engines had fallen 13 percent since mid-September. Used car values often drop in the fall, but the VW diesel drop was unusually large.

More

US rig count declines by 14 this week to 795

HOUSTON (AP) — Oilfield services company Baker Hughes Inc. says the number of rigs exploring for oil and natural gas in the U.S. this week declined by 14 to 795.

It was the sixth consecutive week of declines.

Houston's Baker Hughes said Friday that 605 rigs were seeking oil and 189 explored for

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natural gas. One was listed as miscellaneous. A year ago, with oil prices about double the prices now, 1,930 rigs were active.

Among major oil- and gas-producing states, Oklahoma lost six rigs, Texas declined by four and Kansas, Louisiana, North Dakota, Ohio and Pennsylvania each dropped by one.

Colorado gained one rig.

More

In rare event, remnants of Pacific hurricane hit Alaska

By Becky Bohrer

JUNEAU, Alaska (AP) — Remnants of Pacific Hurricane Oho battered Alaska's southeast coast on Friday, the latest unusual weather event to hit a state that so far this year has dealt with a lack of snow, warmer temperatures and intense wildfires.

The storm on Thursday brought more than 7 inches of rain to Ketchikan, a scenic town in Alaska's coastal rainforest. Gusts of up to 80 mph were forecast for Friday, and more rain was expected across the region. Jon Dorman, deputy emergency manager for the city of Ketchikan, said Friday morning that creeks were swollen and residents were keeping an eye on the storm, but no other major issues had been reported.

The remnants of Oho were picked up by a larger low-pressure system. Oho was among a record number of tropical cyclones in the central Pacific so far this hurricane season, which officials attributed to unusually warm ocean temperatures from El Nino.

While it's not unusual for Alaska to feel the remnant effects of tropical storms from the west, it's rare for the remnants of a central Pacific tropical storm to reach this far because tropical systems north of Hawaii often fall apart rapidly as they reach cooler water temperatures, said meteorologist Shaun Baines of the weather service's Anchorage office.

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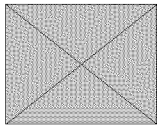

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

Murkowski pushes for comprehensive drought bill

"A unified legislative response" is needed to address the complex issues surrounding the West's drought problem, Energy and Natural Resources Committee Chairman Sen. Lisa Murkowski, R-Alaska, said at a hearing Thursday, E&E reports.

More

FutureGen hires Landrieu to help revive clean coal project

For the second time, FutureGen Industrial Alliance is trying to get its Illinois clean coal project revived, and has engaged former Sen. Mary Landrieu to lobby to restore federal backing, The Hill reports.

More

Oil steady in finishing out strong week

Oil prices gained 9 percent on the week after holding relatively steady Friday. Light, sweet crude for November delivery finished 20 cents higher to settle at $49.63 a barrel on the Nymex, while in London, Brent lost 40 cents to $52.65, Dow Jones reports.

More

Weatherford chief says time needed for oil market to recover

Oil prices may be rebounding but it will take time for demand to pick up again, Bernard Deroc-Danner, chief of oil field services company Weatherford International, told The Wall Street Journal, as he defended the firm's job cuts.

More

Biggest effort on smart thermostats launched in Chicago

Google's Nest Labs, Commonwealth Edison, and several other utility partners have launched a program aiming to get 1 million smart thermostats into homes in Northern Illinois in the next five years, E&E reports.

More

Schweitzer sees consumer energy storage, renewables as key to future

"Power Up Energy," former Montana Gov. Brian Schweitzer's new book, portrays energy storage and renewables as the future of the industry, The Associated Press reports.

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Solar firms hit by UK government move to cut subsidies

SunEdison's push into the British solar market was halted by the government's decision to drastically cut subsidies, The New York Times reports.

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N.M. startup finds success with solar credit device

The SunPort, which plugs into outlets and gives the users access to solar energy through solar credits, has won startup PlugSolar an award from the Consumer Electronic Association, opening the door to more investment funding, Albuquerque Business First reports.

More

Prosecutor says corruption may have cost Brazil's Petrobras $5.3 billion

Calling Petrobras' April move to write down 6.2 billion reais lost to corruption as just "the tip of the iceberg," a prosecutor said Friday the scandal may end up costing the company more than 20 billion reais—$5.3 billion at the current exchange rate, Reuters reports.

More

Upcoming Events

- Oct. 9, Washington: The House to vote on a bill from Rep. Joe Barton, R-Texas, that would lift the Commerce Department ban on crude oil exports. 9:00 am , U.S. Capitol Building

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CLERK US DISTRICT COURT
ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_030977

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030978

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

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[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

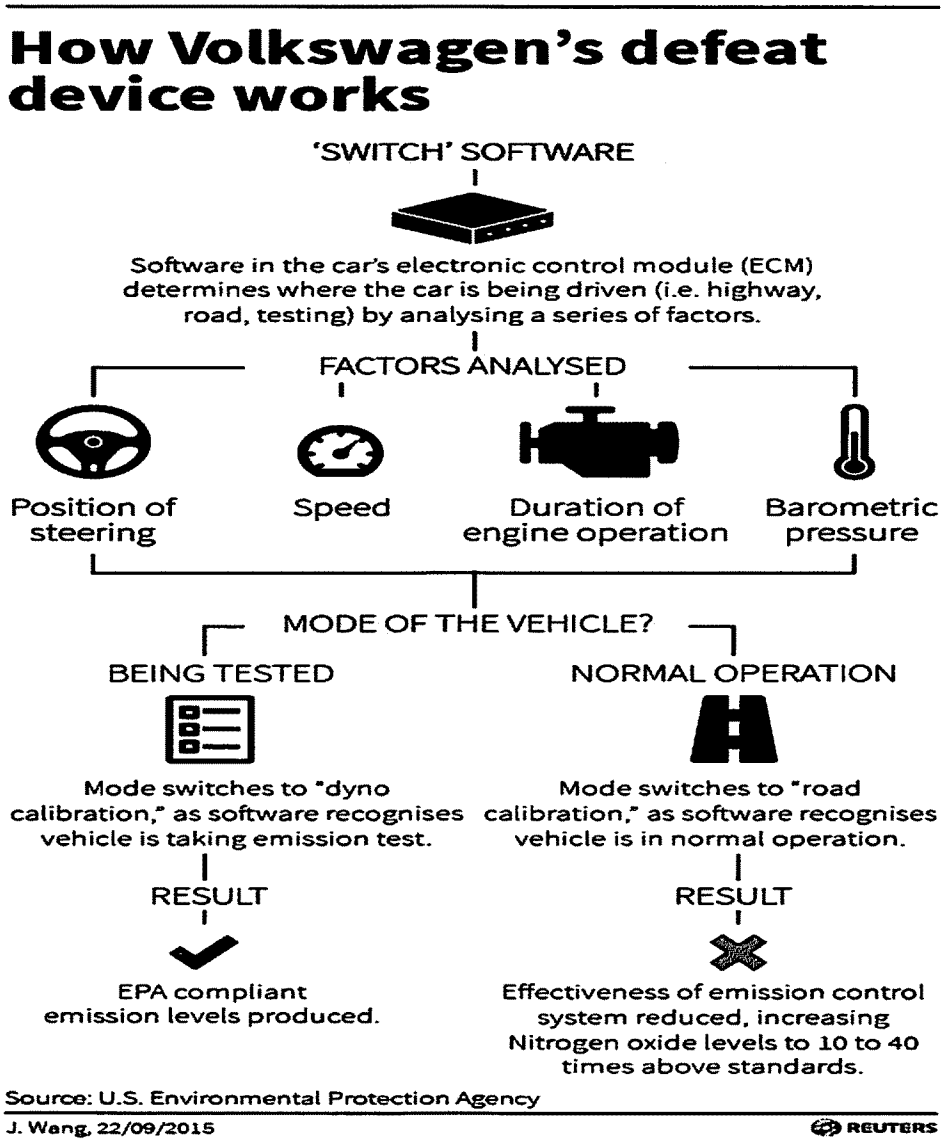
[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

[5] http://media.vw.com/release/1080/.

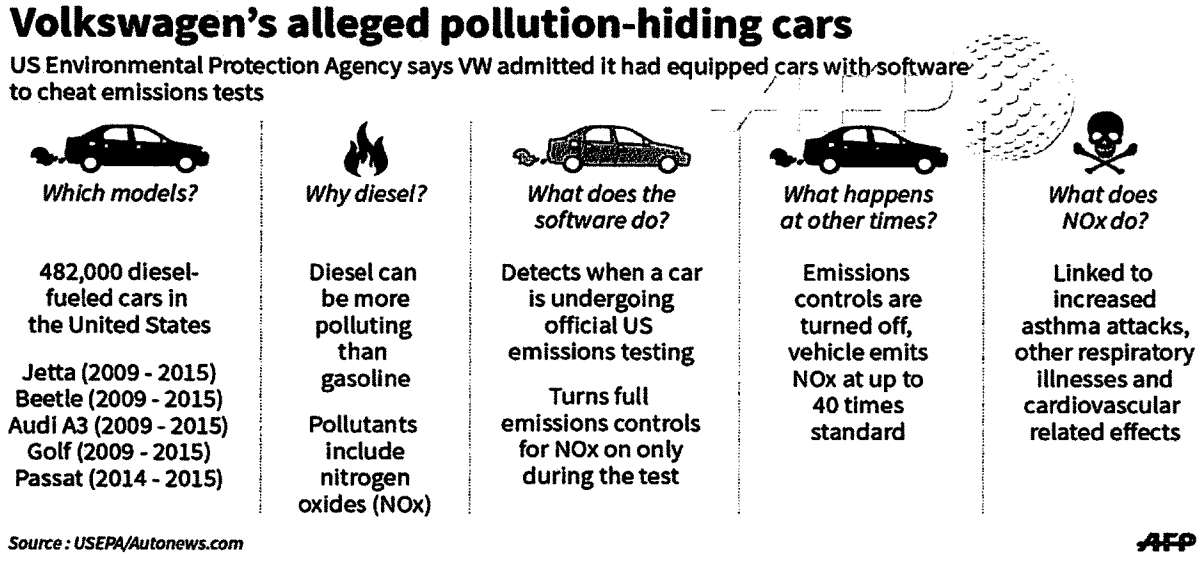
[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

VW FOIA, EPA 06/20/2017 2017-FFP_030979

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that "**I accept responsibility for the irregularities that have been found in diesel engines.**" (Emphases added). [13] He further observed

[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_030983

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

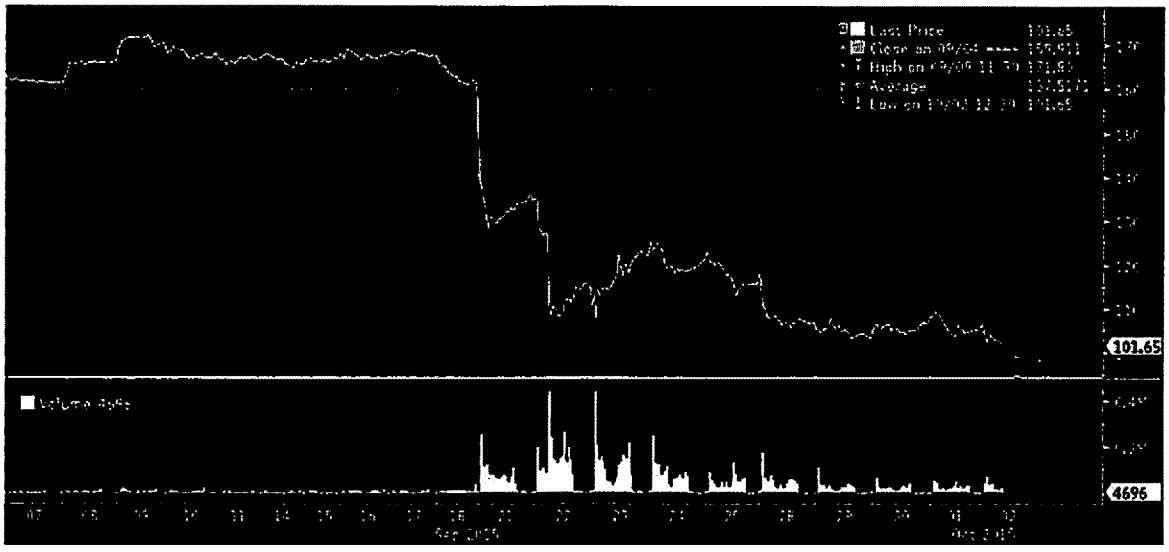
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

VW FOIA, EPA 06/20/2017 2017-FFP_030986

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_030987

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_030989

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

VW FOIA, EPA 06/20/2017 2017-FFP_030990

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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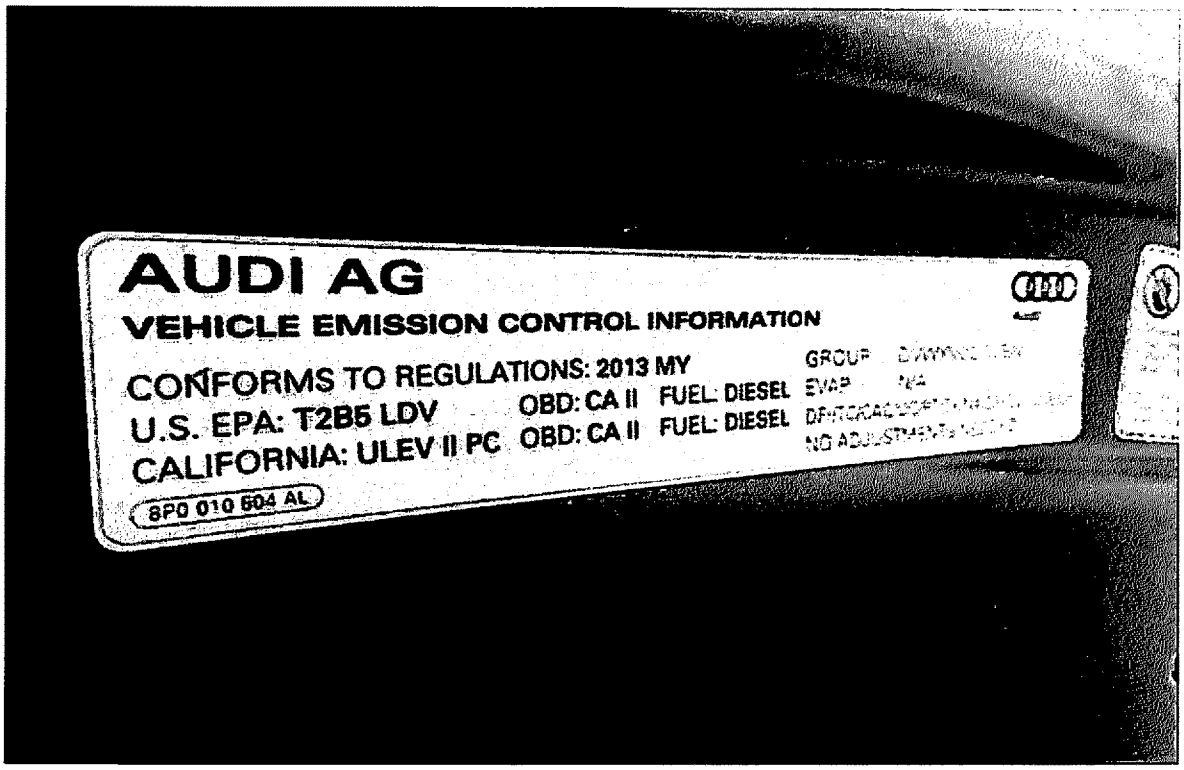
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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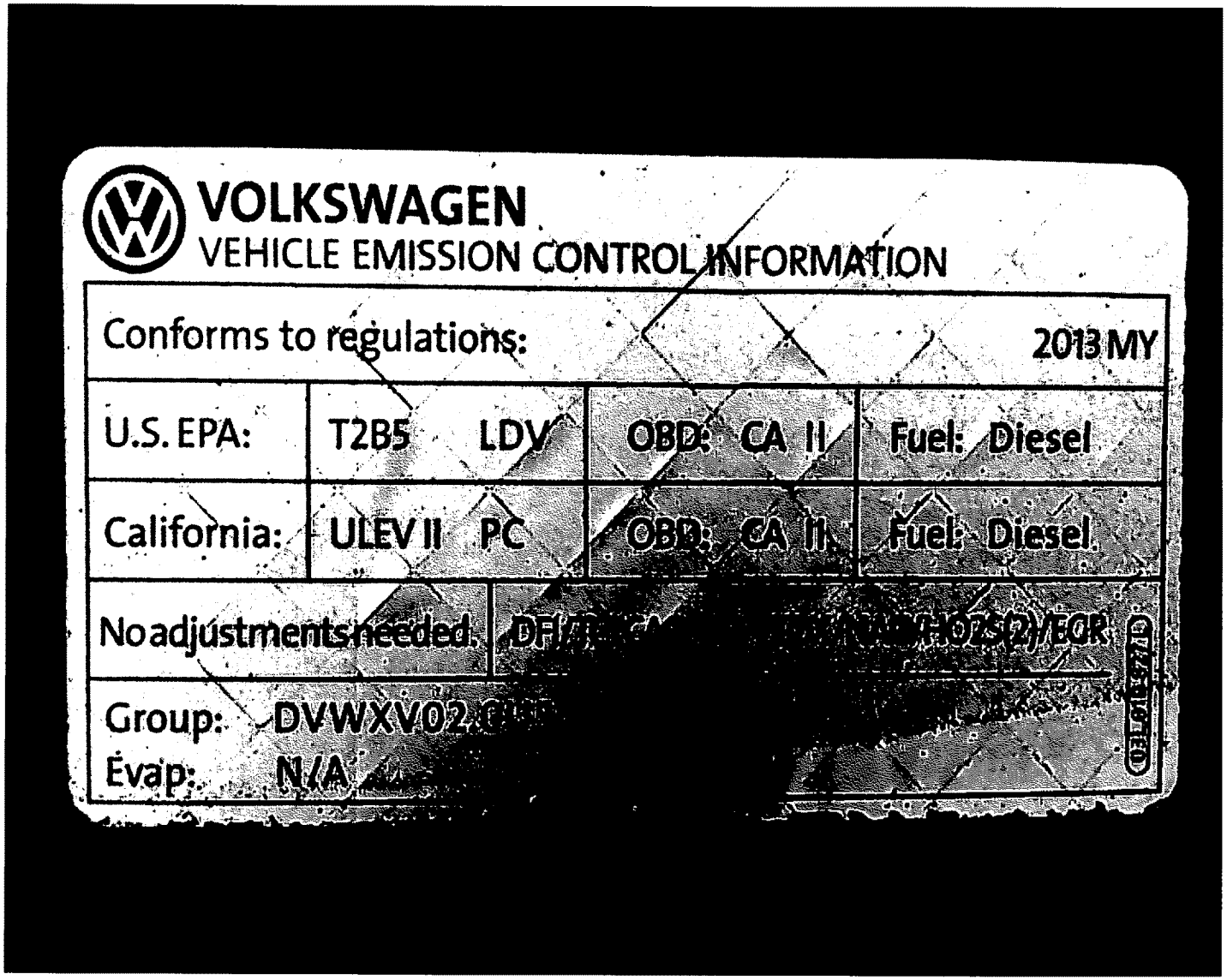

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DPF/[illegible]	[illegible]HO2S(2)/EGR	
Group: DVWXV02.[illegible]			
Evap: N/A			

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_030994

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_030996

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_030998

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

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[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

VW FOIA, EPA 06/20/2017 2017-FFP_030999

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

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I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

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The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

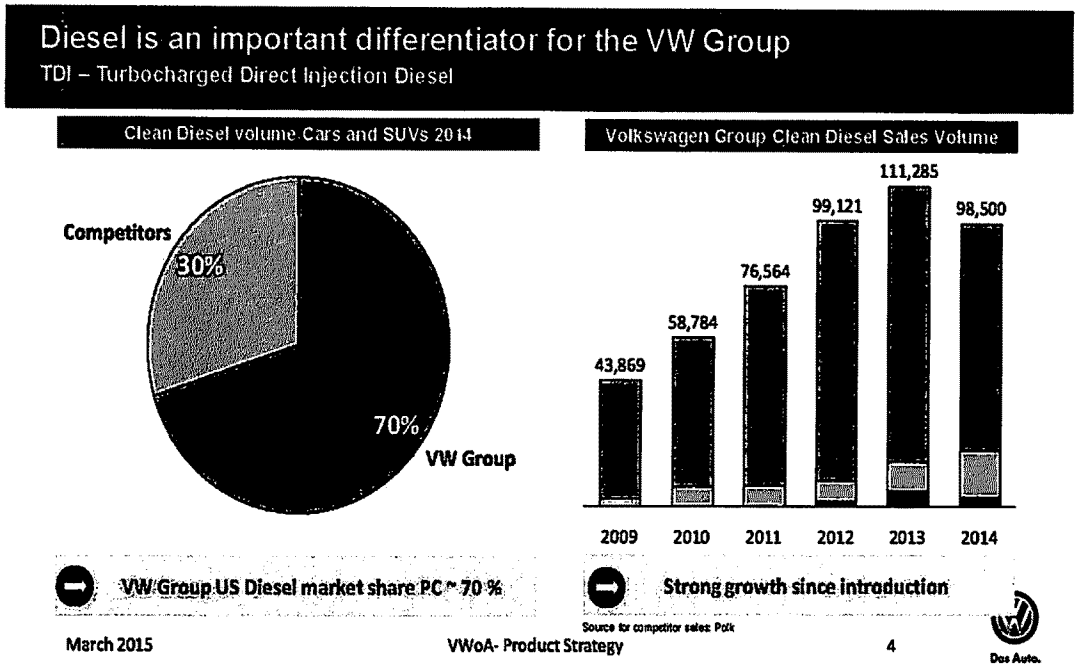
> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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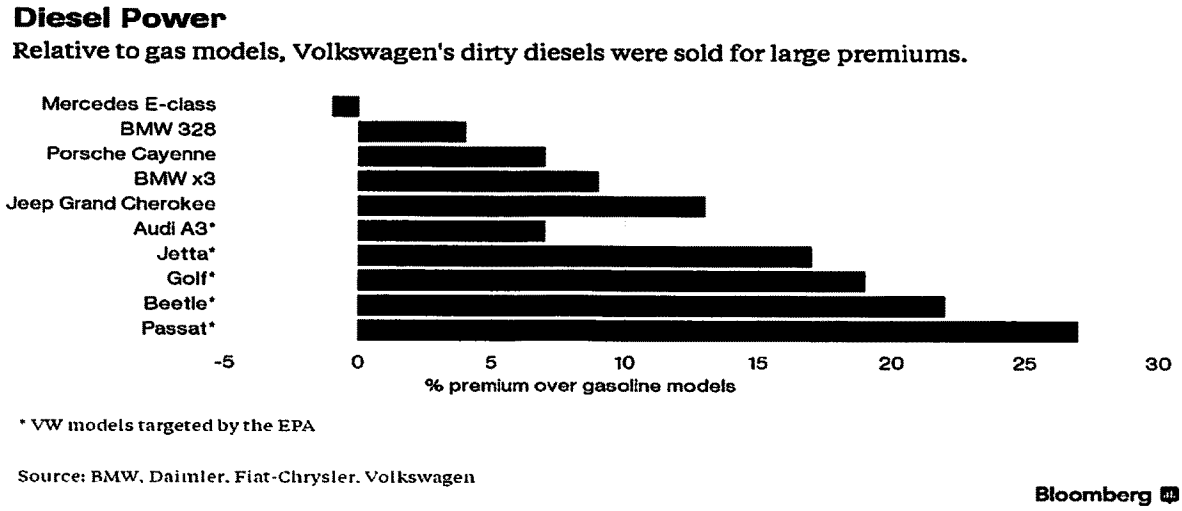
[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

for Clean Diesel vehicles over those of its competitors.[66]



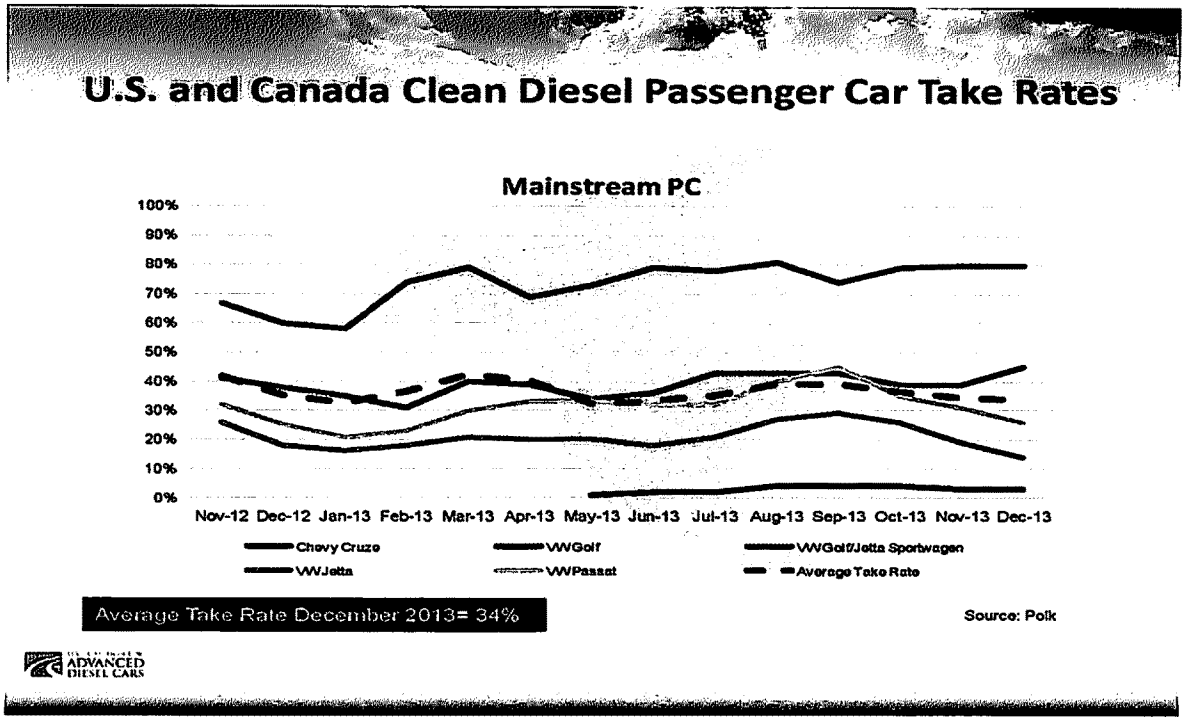
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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68 https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

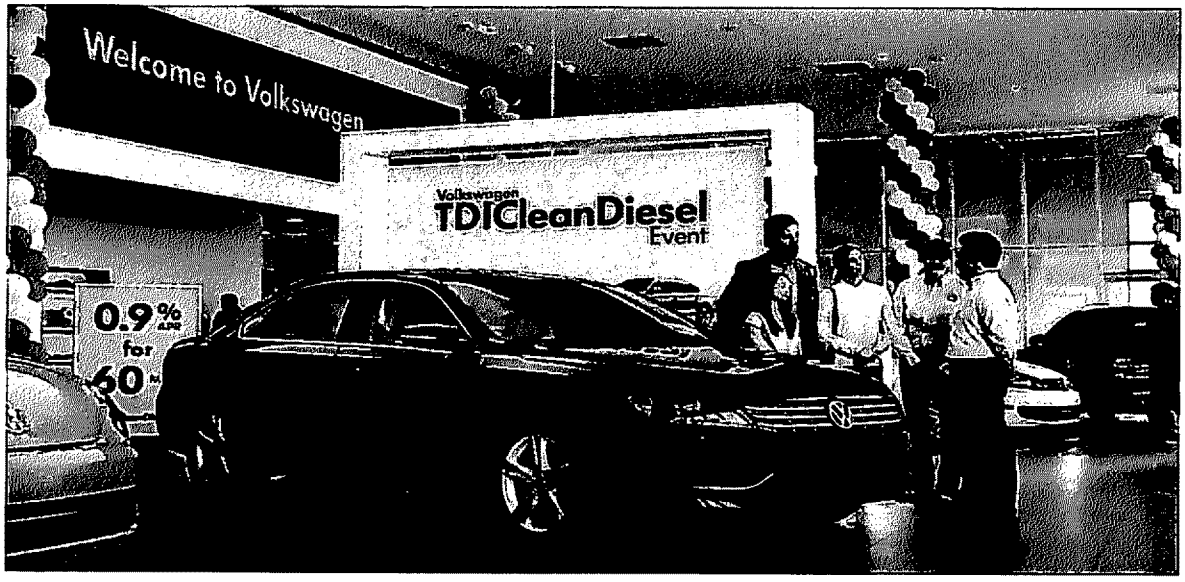
69 https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

70 http://abcnews.go.com/Business/story?id=7493781.

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:



[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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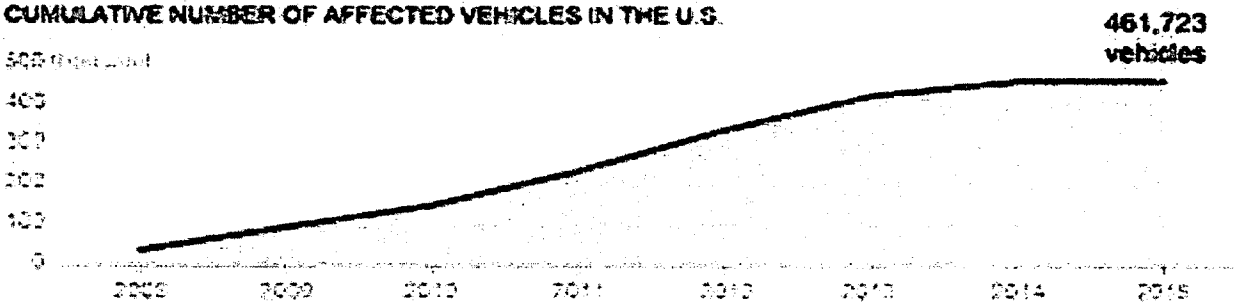
[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

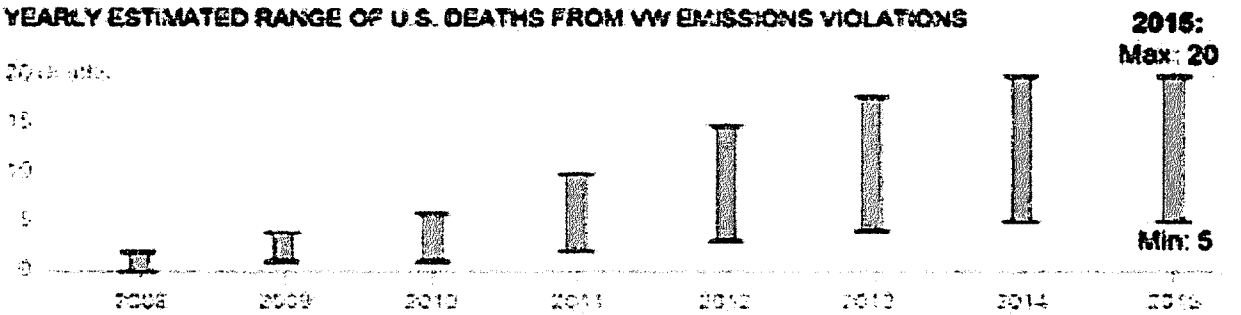
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

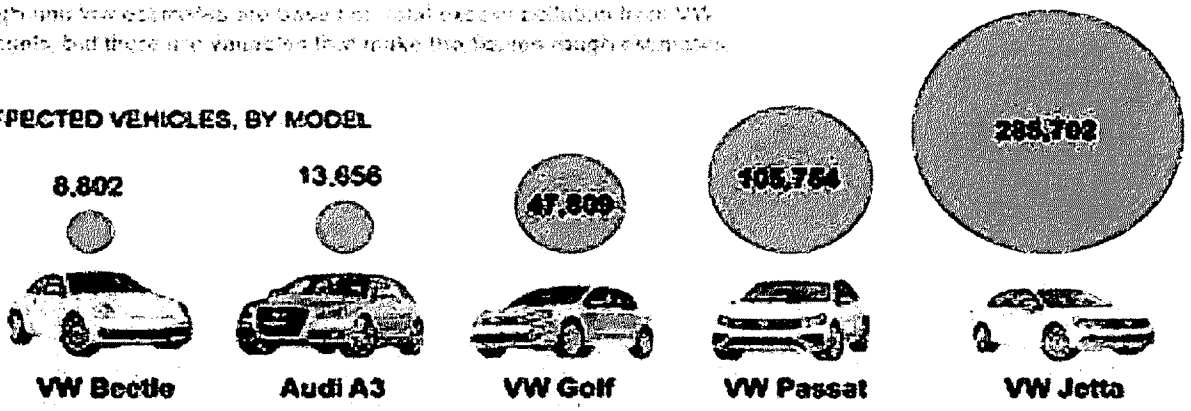
CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.



YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



AFFECTED VEHICLES, BY MODEL



87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

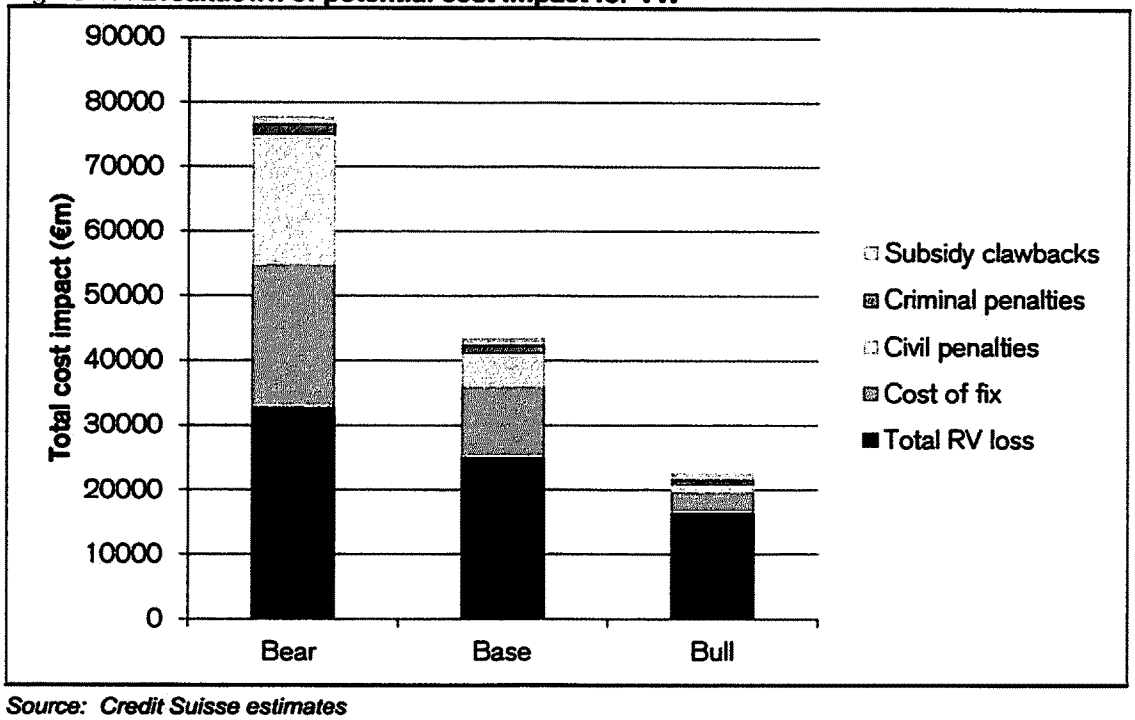
[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_031023

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_031025

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_031026

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_031027

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_031029

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_031030

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_031031

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_031032

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_031033

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

VW FOIA, EPA 06/20/2017 2017-FFP_031034

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_031035

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_031036

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_031037

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_031038

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_031039

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_031041

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_031042

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_031043

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_031044

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_031045

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

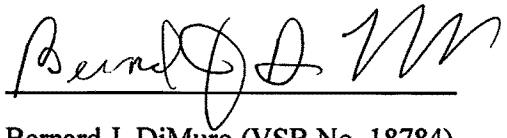
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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VW FOIA, EPA 06/20/2017 2017-FFP_031047

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From: Linda Carrizosa
Sent: Sat 10/10/2015 12:56:45 AM
Subject: CaFCP 10/20/15 Executive Board Meeting Agenda is now available on MR
20151020 EB Meeting Agenda FINAL.pdf

Good Afternoon Executive Board Members,

The agenda for the upcoming Oct 20, 2015 EB meeting is now available on MR and is located here: http://cafcpmembers.org/membersonly/eb_meeting_20151020.

RSVP: If you have not already, please let me know you are attending this IN –PERSON EB Meeting by **Friday Oct 16th**, or sooner.

We look forward to seeing everyone Oct 20.

Thank you,

Linda Carrizosa | Administrative Assistant | CaFCP

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AGENDA

CaFCP Executive Board

October 20, 2015 8:30am–5:30pm
Location: Sacramento Metropolitan Air Quality Management District
777 - 12th St. 3rd Floor, Sacramento, California 95814

8:30am – 8:40am CaFCP Chair, Justin Ward	**1. Welcome** Welcome and remarks from the CaFCP Chair Decision Item: Approve April 14, 2015 decisions & assignments
8:40am – 9:20am First Element Fuels HydrogeNXT H2 Logic Mercedes	**2. CaFCP Members** Information item: Presentations from new CaFCP members and current members.
9:20am – 10:00am Anticipated Speakers: EPA SunLine AC Transit CaFCP	**3. Medium/Heavy-Duty and FCEB** Information item: Progress and milestones with fuel cell bus roll-out, including AC Transit's 20,000 operating hour milestone and SunLine's acquisition of additional "All-American" buses. Decision item: Review M/HD Action Plan to approve or modify direction.
10:00am – 10:30am	**BREAK**
10:30am – 12:00pm Anticipated Speakers: GO-Biz CaFCP	**4. Hydrogen Stations: Aligning Progress** With the first new retail stations beginning to come online, members and staff have identified gaps in assessing and communicating progress and status. This item identifies gaps and recommends solutions for closing them. Information item: Status of California's stations, commissioning process, CaFCP website and maps. Decision items: • Confirm CaFCP's role of communicating status. • Approve consensus definition for a retail station. • Approve recommendation for station types in CaFCP outreach materials. • Agree on approach for counting stations.
12:00pm – 1:15pm	**LUNCH (on own)**

VW FOIA, EPA 06/20/2017 2017-FFP_031050

1:15pm – 3:10pm Invited Speakers: ARB CEC CAEATFA H2USA First Element CALSTART GM	**5. Hydrogen Stations: Expanding the Network** The AB8 report suggests that CEC will fund approximately seven stations in 2015, with additional funding for O&M support. Expanding the network to 100 stations in California may take additional approaches. Other states also need funding mechanisms, attracting investors and bringing players to the table. Discussion items: • Potential public and private funding and incentives for California hydrogen stations. • Methods that can be shared with other states. Decision item: • Action items for CaFCP in 2016
3:10pm – 3:30pm	**BREAK**
3:30pm – 4:15pm CaFCP	**6. Building the Bigger Tent** In 2014, executive board directed CaFCP's executive director and steering team to modify the organization's structure to include more organization that are instrumental to a commercial market. Decision items: • Proposed changes to CaFCP's membership tiers and structure • Proposed changes to decision-making process • Transition plan
4:15pm – 4:45pm CaFCP	**7. Business items** • Progress by 2015 program plan • Approve 2016 program plan and budget • Confirm 2016 vice-chair nomination • Confirm 2016 meeting dates
4:45pm – 5:15pm Chair, Justin Ward	**8. Public comment period***
5:15pm – 5:30pm Chair, Justin Ward	**9. Meeting wrap up**

A "no-host bar" reception will be held immediately following meeting at Blue Prynt – 815 11th St, Sacramento, CA 95814

*** Public comment period**
The public comment period provides an opportunity for members of the public to address the executive board on subject matters within the interest of CaFCP. Each person will be allowed a maximum of three minutes to ensure that everyone has a chance to speak.

Agenda items may be taken out of order and times may vary from those listed in the agenda. The board may choose to limit public comment at the chair's discretion.

This meeting is open to the public and will not be available by phone. This facility is accessible to persons with disabilities. Deadline for requesting ADA modification is October 14, 2015. Meeting materials will be posted at www.cafcp.org. This facility is accessible by public transit. For transit information, call (916) 321-BUSS for Sacramento Regional Transit. website: http://www.sacrt.com/schedulesfares.stm. And California Transit link: http://www.apta.com/resources/links/unitedstates/Pages/CaliforniaTransitLinks.aspx

VW FOIA, EPA 06/20/2017 2017-FFP_031051

Ex. 7

Sent: Sat 10/10/2015 12:57:15 AM
Subject: CaFCP 10/21/15 Steering Team Meeting Agenda is now available on MR
20151021 ST Meeting Agenda FINAL.pdf

Good Afternoon Steering Team Members,

The agenda for the upcoming Oct 21, 2015 ST meeting is now available on MR and is located here: http://cafcpmembers.org/membersonly/st_meeting_20151021.

RSVP: Please let me know your attendance for this IN-PERSON ST Meeting by **Friday, Oct 16, 2015.**

We look forward to seeing everyone Oct 21!

Thank you,

Linda Carrizosa | Administrative Assistant | CaFCP

D 916 371 2870 | F 916 375 8005 | lcarrizosa@cafcp.org

3300 Industrial Blvd., Ste. 1000, West Sacramento, CA 95691 | www.cafcp.com

AGENDA

CaFCP Steering Team meeting

October 21, 2015, 8:30am – 12:00pm, PST
CaFCP Headquarters
3300 Industrial Blvd, Suite 1000
West Sacramento, CA 95691

Agenda

- Next steps in CaFCP reorg
  - Operating protocols and other documents
  - Prospective members
  - Method of invitation
  - Transition timeline and plan
- 2016 Program Plan and Budget
  - Project review
  - Deliverables
  - Quarterly reporting

Grab and Go lunch available at 11:30

To: Janet McCabe[janetgmccabe@gmail.com]
From: McCabe, Janet
Sent: Sat 10/10/2015 2:24:20 AM
Subject: Fw: Draft Hot List
OAR Hot List 10-12-15 draft.docx

From: Dennis, Allison
Sent: Friday, October 9, 2015 6:12 PM
To: Niebling, William; McCabe, Janet; Goffman, Joseph; Jordan, Deborah; Shaw, Betsy
Cc: Millett, John; McCoy, Britney; Cyran, Carissa; Stewart, Lori
Subject: RE: Draft Hot List

Thanks! Added to the attachment.

From: Niebling, William
Sent: Friday, October 09, 2015 4:08 PM
To: Dennis, Allison; McCabe, Janet; Goffman, Joseph; Jordan, Deborah; Shaw, Betsy
Cc: Millett, John; McCoy, Britney; Cyran, Carissa; Stewart, Lori
Subject: RE: Draft Hot List

I would add:

VW: Chris and Phil Brooks testified before the Oversight Subcommittee of House Energy and Commerce about the VW investigation. [redacted] **Ex. 5 - Deliberative**

Ex. 5 - Deliberative

From: Dennis, Allison
Sent: Friday, October 09, 2015 1:26 PM
To: McCabe, Janet; Goffman, Joseph; Jordan, Deborah; Niebling, William; Shaw, Betsy
Cc: Millett, John; McCoy, Britney; Cyran, Carissa; Stewart, Lori
Subject: RE: Draft Hot List

With attachment

From: Dennis, Allison

Sent: Friday, October 09, 2015 1:24 PM
To: McCabe, Janet; Goffman, Joseph; Jordan, Deborah; Niebling, William; Shaw, Betsy
Cc: Millett, John; McCoy, Britney; Cyran, Carissa; Stewart, Lori
Subject: Draft Hot List

Here is the draft for this week.

OAR Hot List

Week of October 12, 2015

This week's hot list is all about the Climate Action Plan:

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

And….a big congratulations to Jacob Moss for winning the prestigious Sammies award last Thursday for his achievements on global cookstove emissions reductions! He has made the OAR and the Agency proud.

FILED

2015 OCT -6 P 5:00

CLERK US DISTRICT COURT
ALEXANDRIA, VIRGINIA

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division

MARIA BOURN, DAVID WATSON, STEPHEN VERNER, and MARK SCHUMACHER, on behalf of themselves and all others similarly situated,

Plaintiffs,

v.

VOLKSWAGEN AG, VOLKSWAGEN OF AMERICA GROUP, INC., VOLKSWAGEN OF AMERICA, INC., AUDI OF AMERICA, LLC, and AUDI AG,

Defendants.

Case No. 1:15cv1295

JURY TRIAL DEMANDED

LOG/MSN

CLASS ACTION COMPLAINT

Plaintiffs Maria Bourn, David Watson, Steven Verner, and Mark Schumacher bring this action on their own behalf and on behalf of a class of similarly situated persons against Volkswagen AG ("VWAG"), Volkswagen of America Group, Inc. and Volkswagen of America, Inc. (collectively, "VWoA"), and Audi of America, LLC and Audi AG (collectively, "Audi").[1] Plaintiffs seek injunctive relief and to recover damages caused by Volkswagen's violations of Section 2 of the Sherman Antitrust Act (15 U.S.C. § 2), the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. § 1961 *et seq.*), the Magnuson-Moss Warranty Act (15 U.S.C. § 2301 *et seq.*), the common law of fraud and unjust enrichment. and the statutory laws of California and Virginia. Plaintiffs make the following allegations upon information and belief,

[1] Unless otherwise indicated herein, all of these defendants will be referred to collectively as "Volkswagen."

VW FOIA, EPA 06/20/2017 2017-FFP_031059

except as to those allegations pertaining to the named plaintiffs, which are made on personal knowledge.

I. NATURE OF THE ACTION.

1. Four years ago, Martin Winterkorn ("Winterkorn"), Volkswagen's former Chief Executive Officer ("CEO"), announced Volkswagen's goal to become the world's largest automaker. "By 2018," he told U.S. politicians gathered for the opening of a Volkswagen plant in Chattanooga, Tennessee, "we want to take our group to the very top of the global car industry."[2] With only a relatively small share of the gigantic United States market, Winterkorn's ambitious plan required a dramatic increase in sales in that market. And the way to increase sales here, Volkswagen decided, was to convince American consumers that its diesel-powered cars were a superior alternative, with better fuel efficiency, lower emissions, and uncompromised performance.

2. Between 2009 and September 18, 2015, Volkswagen aggressively marketed its so-called Clean Diesel Turbocharged Direct Injection ("TDI") light passenger vehicles in the United States, spending millions of dollars on print, television, internet and point-of-sale advertising aimed at convincing American consumers that its cars were environmentally-friendly, fuel-efficient, powerful, and reasonably priced. In order to increase its market share, Volkswagen's cars needed all those attributes to win over a skeptical American public. Compared with Europe, with its higher fuel costs, expensive cars and less stringent tailpipe emission standards, the United States market was a tough sell for diesel-powered passenger cars.

3. Until September 18, 2015, it looked as if Winterkorn's ambitious plan had succeeded. In July of 2015, Volkswagen surpassed Toyota Corporation ("Toyota") as the world's largest automaker, selling 5.04 million vehicles in the first six months of this year, compared to

[2] http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_031060

Toyota's 5.02 million.[3]

4. As noted above, the United States was a key part of this global strategy. As reported in *Automotive News*:

> Back in 2007, the automaker vowed to crank up U.S. sales of its VW brand to 800,000 vehicles a year by 2018. It was a dizzying sum, requiring more than a tripling of its volume at that time. Many in the industry scoffed.
>
> But with steady precision, VW got the skeptics to take a second look. It launched a lower-priced, Mexico-made Jetta and built a plant in Chattanooga that began churning out a new Passat that better fit American tastes and budgets. VW sales doubled between 2009 and 2012, to nearly 440,000, lifting hopes that 800,000 was doable.[4]

By October 1, 2015, VWoA had reported sales of 264, 215 passenger vehicles in the United States through September 15, indicating that before the scandal that is the subject of this Complaint surfaced, it was expecting another excellent sales year.[5]

5. Unfortunately for American consumers, Volkswagen's success in capturing market share was based on a lie. On September 18, 2015, the United States Environmental Protection Agency ("EPA") and the California Air Resources Board ("CARB") both notified Volkswagen that it had violated federal and state laws and regulations by using a "defeat device"--software specifically intended to circumvent emission test procedures established by the EPA and by CARB. Those notices are attached as Exhibits 1 and 2 to this complaint.

6. Volkswagen's "defeat device" is a "sophisticated software algorithm"[6] that detects

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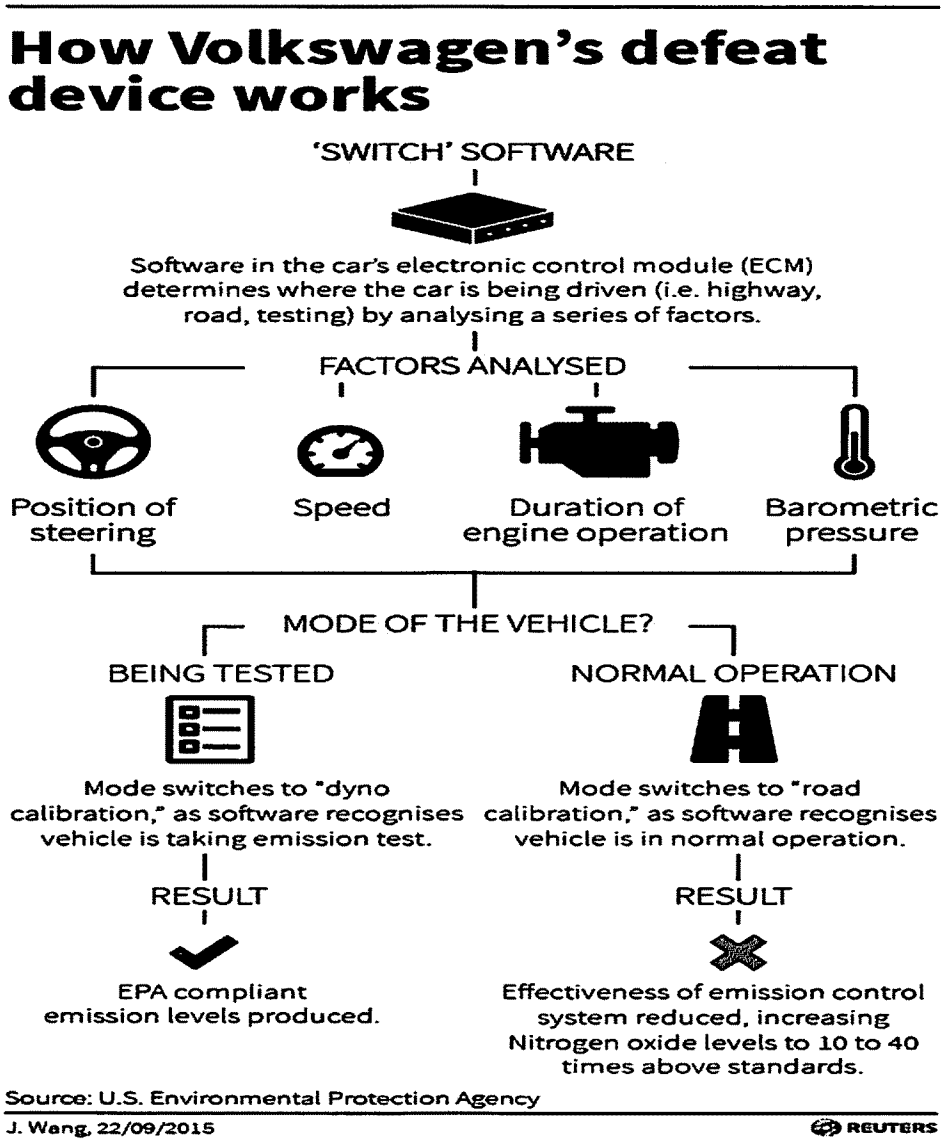
[3] http://www.usatoday.com/story/money/2015/07/28/volkswagen-surpasses-toyota-worlds-largest-automaker-first-half-2015/30772509/.

[4] http://www.autonews.com/article/20150126/RETAIL01/301269949/how-vw-veered--off-target.

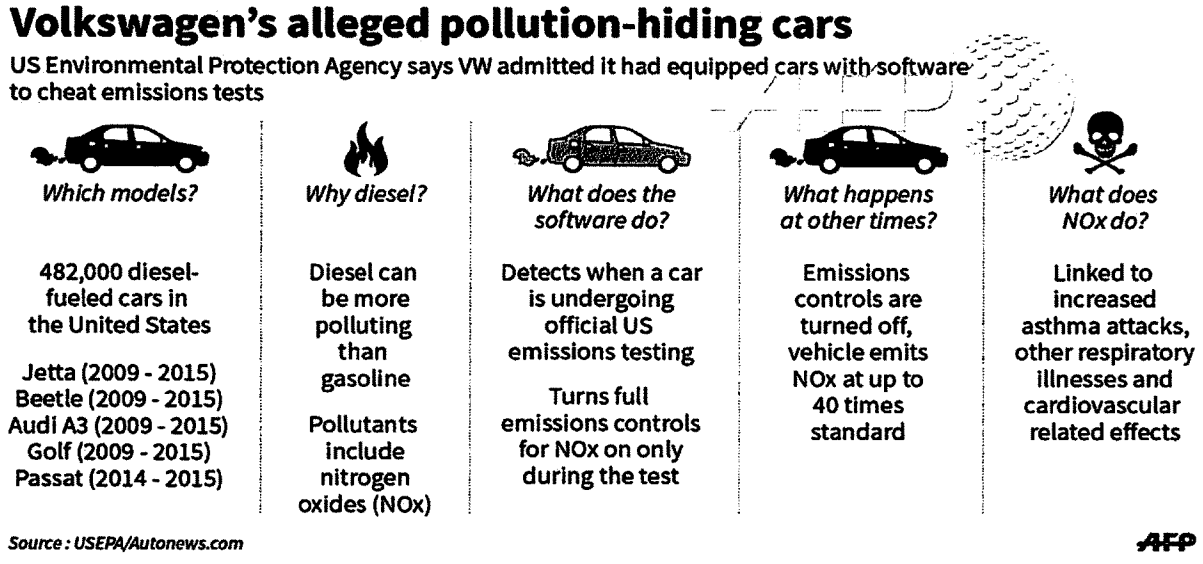
[5] http://media.vw.com/release/1080/.

[6] http://www.theguardian.com/business/2015/sep/18/epa-california-investigate-volkswagen-clean-air-violations.

when the car is undergoing emissions testing. Under such laboratory test conditions, Volkswagen's vehicles pass the EPA and CARB emissions tests with flying colors. Under normal driving situations, however, the software algorithm ***turns off*** the emissions control systems, allowing the cars to spew as much as 40 times the allowable amount of pollutants--specifically nitrogen oxides ("NOx")--into the air. Elevated NOx contributes to the creation of ozone and smog, and is linked to asthma attacks, other respiratory diseases such as emphysema and bronchitis, and causes premature death. A diagram published in Reuters depicts its operation:



7. The chart below, published by *Agence France Press*, provides a useful and concise primer on the known facts:



8. As noted below, dozens of fatalities in the United States over the last seven years have been attributed to the illegal use of this "defeat device." The scandal has been popularly referred to as "Dieselgate."

9. Volkswagen has admitted to installing these "defeat devices" in 11 million diesel vehicles that have been sold around the world, including the 482,000 in the United States. As Michael Horn ("Horn"), the President and CEO of VWoA, candidly admitted: "[l]et's be clear about this. **Our company was dishonest. With the EPA, and the California Air Resources Board, and with all of you. And in my German words, we have totally screwed up.**"[7] (Emphases added). Horn further stated in a video on VWAG's website that **"[o]ur company**

[7] http://www.roadandtrack.com/new-cars/car-technology/news/a26774/volkswagen-ceo-we-screwed-up/. A YouTube video of this extraordinary concession can be found here: www.youtube.com/watch?v=Q6z8uUJE-jE.

betrayed the trust of you, our customers, our employees, our dealers and the public."[8] (Emphases added). And as VWAG has posted on its website: "[g]overnment regulations limit the use of engine software that reduces the effectiveness of a vehicle's emissions control systems. **Those are the 'defeat device' regulations, and regrettably, VW violated those regulations. We take full responsibility** – and deeply regret that this happened."[9] (Emphases added). In a September 23, 2015 press release available on VWAG's website, the Executive Committee of VWAG's Supervisory Board ("Board") stated: "[t]he Executive Committee takes this matter extremely seriously. **The Executive Committee recognizes not only the economic damage caused, but also the loss of trust among many customers worldwide.**"[10] (Emphases added). Or, as Berthold Huber ("Huber"), Deputy Chairman of the Board, was quoted as saying in a September 25 press release, **"[t]he test manipulations are a moral and political disaster for Volkswagen. The unlawful behavior of engineers and technicians involved in engine development shocked Volkswagen just as much as it shocked the public."** [11] (Emphases added).

10. In light of the scandal, VWAG's Board forced Winterkorn to resign as CEO of VWAG on September 23.[12] In doing so, he stated that "**I accept responsibility for the irregularities that have been found in diesel engines.**" (Emphases added). [13] He further observed

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[8] https://www.vwdieselinfo.com/.

[9] http://www.vwdieselinfo.com/faqs/.

[10] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/AR_Erklaerung.html.

[11] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2015/09/Erklaerung.html.

[12] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html

[13] http://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html. Notably, however, Winterkorn plans to stay as the Chairman of the Board of Directors of Porsche Automobil Holding SE, which owns a 52% controlling stake in VWAG; he is also still demanding payment of the ten million Euros owed to him under his employment contract, which does not expire until 2016.

that "**[m]illions of people across the world trust our brands, our cars and our technologies. I am endlessly sorry that we have disappointed this trust. I apologize in every way to our customers, to authorities and the whole public for the wrongdoing.**"[14] (Emphases added). He professed surprise that "**misconduct on such a scale**" (emphases added) occurred within the Volkswagen group, suggesting that he had no knowledge of it.[15] It has been reported that Winterkorn was being investigated for fraud in connection with the conduct at issue here by prosecutors in Lower Saxony; however, more recently, those prosecutors have stated that any prosecution will await further factual information.[16]

11. Volkswagen has ordered its authorized dealers ("Volkswagen Authorized Dealers") to cease selling the vehicles in which the defeat devices are installed. These include at least the VW Jetta TDI (Model Years 2009-15), the VW Jetta SportWagen TDI (Model Years 2009-14), the VW Golf TDI (Model Years 2010-15), the VW Golf SportWagen TDI (Model Year 2015), the VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-15), the VW Passat TDI (Model Years 2012-15) and the Audi A3 TDI (Model Years 2010-15).[17] These affected vehicles will be referred to in this Complaint as the "Class Vehicles."

12. Volkswagen's internal investigation has resulted so far in the suspension of three

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http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[14] http://www.chicagotribune.com/business/ct-volkswagen-emissions-scandal-20150922-story.html.

[15] http://www.salon.com/2015/09/24/i_am_stunned_that_misconduct_on_such_a_scale_was_possible_what_you_need_to_know_about_the_volkswagen_mega_scandal/.

[16] http://www.autonews.com/article/20151001/COPY01/310019972/german-prosecutors-backtrack-on-winterkorns-role-in-vw-probe.

[17] http://www.thetruthaboutcars.com/2015/09/vw-audi-canada-halting-sales-tdi-cars-following-us-inquiry/; http://www.vwdieselinfo.com/faqs/.

VW FOIA, EPA 06/20/2017 2017-FFP_031065

executives: (a) Heinz-Jakob Neusser ("Neusser"); (b) Ulrich Hackenberg ("Hackenberg"); and (c) Wolfgang Hatz ("Hatz").[18] Spiegel Online described Hackenberg's departure, which was also typical of the others: "[h]e received news of his immediate suspension from the personnel department and was asked to turn in his company phone and leave his office. He has also been told not to set foot on company premises."[19]

13. None of these people are mere obscure midlevel engineers. Hackenberg is a VWAG Board member for Technical Development.[20] The same Spiegel Online article described Hackenberg as "a long-time confidant of Winterkorn and, up until just a few days ago, one of the most powerful men at VW." Hatz is a Porsche AG ("Porsche") Board of Management member in charge of Research and Development and is additionally Head of Engines and Transmissions Development for the Volkswagen Group.[21] Neusser was responsible for engine development at Porsche commencing in 1998 and drivetrain development commencing in 2011; in October of 2012, he succeeded Hatz as Head of Powertrain Development at the Volkswagen Group.[22]

14. The same Spiegel Online article notes that Hans-Dieter Pötsch ("Pötsch"), the VWAG Finance Chief and Board Chairman of VWAG, may also be under investigation by regulatory authorities. As discussed below, Volkswagen told the EPA about the use of a defeat device on September 3, but disclosed it publicly only on September 20. "[T]he finance chief

[18] http://uk.reuters.com/article/2015/09/29/uk-volkswagen-emissions-idUKKCN0RS0U620150929.

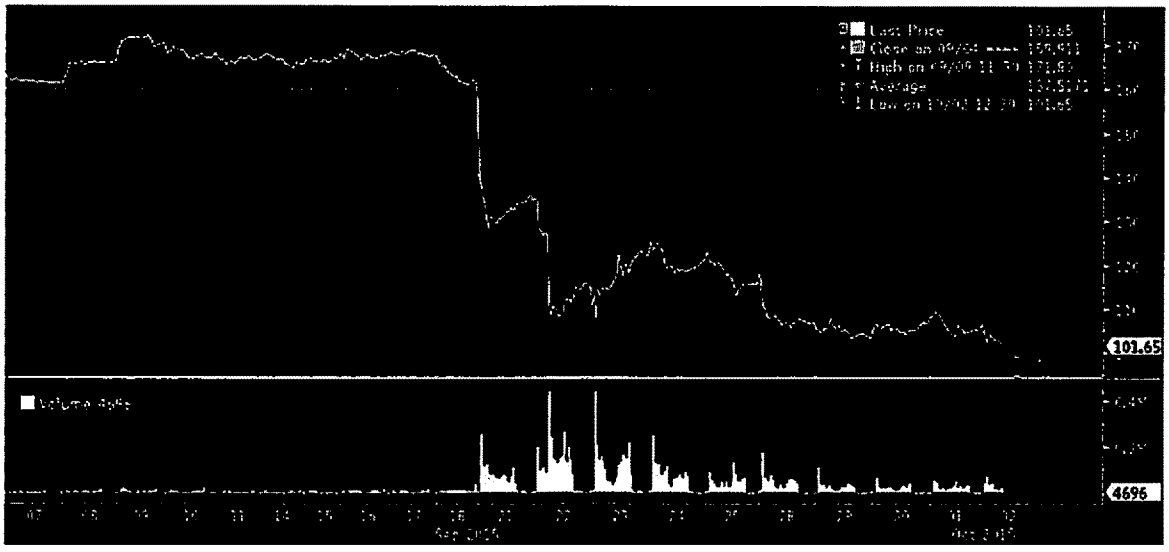
[19] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[20] http://www.audi.com/corporate/en/company/corporate-management/members-of-the-board/ulrich-hackenberg.html.

[21] http://press.porsche.com/more_about/executives/pag/hatz.php.

[22] http://www.volkswagenag.com/content/vwcorp/info_center/en/news/2012/09/Dr_Heinz_Jakob_Neusser.html.

remained silent for 17 days. During these 17 days, hundreds of thousands of investors bought VW stock. When the scandal was finally made public on Sept. 20, the price of VW shares plunged by 40 percent, costing stockholders €35 billion."[23] VWAG's shares have been on a steady decline ever since, as reflected in this graphic from the *Telegraph* in the United Kingdom:



15. According to an October 3 article from Reuters, "[a]t an internal company meeting this week at the VW headquarters in Wolfsburg, Pötsch described the situation as an 'existence-threatening crisis for the company', Germany's Welt am Sonntag reported in a release ahead of Sunday's publication."[24]

[23] http://www.spiegel.de/international/business/falsified-emissions-scandal-push-volkswagen-to-limits-a-1055897.html.

[24] http://mobile.reuters.com/article/idUSKCN0RX0GQ20151004. Pötsch's accession to the VWAG Board has been criticized. Hans-Christoph Hirt, a director of Hermes Equity Ownership Services, an adviser to pension fund investors in companies including Volkswagen, said the appointment created a "serious conflict of interest": "[Pötsch] was a key VW executive for more than a decade and under German law the management board has a collective responsibility . . . The lawyers will surely demand that he recuse himself from any supervisory board meetings when management's role is discussed."

16. As explained below, and contrary to the suggestions of some of Volkswagen's spokespersons, the unlawful conduct here was not the action of renegade lower-level employees. It was instead the product of a concerted scheme by top executives at Volkswagen to save costs through use of the TDI technology, break into the United States diesel passenger car market by concealing from regulators and the public the inability of cars using that technology to meet federal and state emissions standards, market the TDI cars through an elaborate seven-year long campaign of false advertising and lying to state and federal officials, and thereby obtain a monopoly share of the United States Clean Diesel passenger car market.

17. The German periodical *Bild am Sonntag* revealed that Robert Bosch GmbH ("Bosch"), the supplier of some components of the emissions control system, used by Volkswagen in TDI diesel vehicles, also supplied Volkswagen with diesel software for test purposes. Bosch reportedly told VWAG in 2007 that using that software in vehicles on the road would be illegal.[25] Similarly, *Süddeutsche Zeitung* has reported that Neusser had ignored least one Volkswagen engineer's warnings over "possibly illegal" practices in 2011.[26] Spiegel Online reported that groups within Volkswagen knew of potential issues as far back as 2005 or 2006.[27] Olaf Lies, a VWAG Board member, has stated publicly that **"[t]hose people who allowed this to happen, or who made the decision to install this software--they acted criminally. They must take personal responsibility**."[28] (Emphases added).

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http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

[25] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says.

[26] http://www.sueddeutsche.de/politik/abgas-affaere-vw-topmanager-schwer-belastet-1.2669920.

[27] http://www.spiegel.de/wirtschaft/unternehmen/volkswagen-aufsichtsrat-lies-macht-managern-vorwuerfe-a-1055381.html.

[28] http://www.bbc.com/news/business-3439.7426.

18. As discussed in further detail below, Volkswagen has set aside the inadequate sum of 6.5 billion Euros (approximately $7.2 billion) to deal with the fallout from this fraud. Numerous countries across the world are investigating the matter and here, in the United States, probes are being conducted by the United States Department of Justice ("DOJ"), a coalition of state attorneys general ("AGs"), and members of the United States House of Representatives. The EPA has ordered a recall.

II. THE PARTIES.

A. Plaintiffs.

19. Plaintiffs Maria Bourn ("Bourn") and David Watson ("Watson") are residents of South San Francisco, California. Bourn is a lawyer in San Francisco. Watson is a teacher. In 2015, Bourn and Watson, who are married, purchased a certified, pre-owned 2010 Model Year Jetta SportsWagen from Stevens Creek Volkswagen in San Jose, California. Stevens Creek Volkswagen is a Volkswagen Authorized Dealer. Plaintiffs purchased the SportsWagen in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. They would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

20. Plaintiff Mark Schumacher ("Schumacher") resides in Gainesville, Virginia. In 2012, he purchased a 2012 Model Year Volkswagen Passat SE TDI. Schumacher purchased the Passat from Lindsay Volkswagen in Sterling, Virginia. That company is a Volkswagen Authorized Dealer.Plaintiff Schumacher purchased the Passat in reliance on Volkswagen's representations that the car was an environmentally-friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

21. Plaintiff Stephen Verner ("Verner") is an architect and resident of Oakland,

VW FOIA, EPA 06/20/2017 2017-FFP_031069

California. In 2013, he purchased a TDI Golf four door from Royal Motor Sales in San Francisco, California. Royal Motor Sales is an Authorized Volkswagen Dealer. Verner purchased the Golf in reliance on Volkswagen's representations that the car was an environmentally friendly "clean diesel" vehicle that was highly efficient, high-performance, and fun to drive. He would not have purchased the vehicle in the absence of Volkswagen's misrepresentations about the car's environmental impact, its fuel efficiency, and performance.

B. Defendants.

22. Defendant VWAG is a car corporation organized and existing under German law, with its principal place of business in Wolfsburg, Germany. VWAG is the parent company of Defendants VWoA and Audi.

23. Defendant Audi AG is a car corporation organized and existing under German law, with its principal place of business in Ingolstadt, Germany. Audi was created when VWAG merged two of its companies, Auto Union and NSU Motorenwerke AG. Audi is a 99.55%-owned subsidiary of the Volkswagen Group. Audi is now Volkswagen's luxury vehicle brand, and uses the slogan "Truth in Engineering".

24. Defendant the Volkswagen Group of America, Inc. is a corporation organized and existing under New Jersey law. Its headquarters are in Herndon, Virginia. The Volkswagen Group of America, Inc. is a wholly-owned subsidiary of VWAG. It is one of the world's largest producers of passenger cars. It sells the Beetle, Beetle Convertible, CC, Eos, e-Golf, Golf, Golf GTI, Golf SportWagen, Jetta, Passat, Tiguan, and Touareg vehicles through Volkswagen Authorized Dealers located in the United States. Volkswagen Group of America, Inc.'s operations in the United States include research and development; parts and vehicle processing; parts distribution; sales, marketing and service offices; financial service centers; and manufacturing.

25. Defendant Volkswagen of America, Inc. is owned and operated by the Volkswagen Group of America, Inc. and sells Volkswagen vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

26. Defendant Audi of America, LLC is a subsidiary of Audi AG that sells Audi vehicles in the United States. Its United States headquarters are at the same address as Volkswagen Group of America, Inc. in Herndon, Virginia.

III. JURISDICTION AND VENUE.

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1332(d), 1337(a) and 1367. This court also has supplemental jurisdiction pursuant to 28 U.S.C. §1367(a).

28. Venue is proper in this judicial district and in the Alexandria Division thereof pursuant to 15 U.S.C. §§ 15 and 22, and 28 U.S.C. § 1391(b) and (c), in that at least one of the Defendants resides in this judicial district, is licensed to do business or is doing business in this judicial district.

IV. TRADE AND COMMERCE.

29. Approximately 482,000 Class Vehicles have been sold or leased in the United States in a continuous and uninterrupted flow of interstate commerce and foreign commerce during the last seven years, including through and into this judicial district. The business activities of the Defendants substantially affected interstate trade and commerce in the United States and caused antitrust injury in the United States.

V. FACTUAL ALLEGATIONS.

A. Automobile Emissions Regulations in the United States.

30. Congress enacted the first major Clean Air Act ("CAA") and established the EPA in 1970. The CAA, amended in 1975 and 1990, requires vehicle manufacturers to certify to the EPA that their cars and trucks will meet applicable federal emission standards.[29] The EPA administers a certification program to ensure that every vehicle complies with its emission standards. EPA-issued certificates of conformity are required for every vehicle sold in the United States, and the EPA must approve every vehicle entering United States commerce. In these

[29] http://www2.epa.gov/laws-regulations/summary-clean-air-act.

VW FOIA, EPA 06/20/2017 2017-FFP_031071

certification efforts, the EPA relies on test data submitted by automobile manufacturers, which submit the vehicles to the agency's testing procedures in their own laboratories. The EPA audits a small fraction of the new vehicles each year to ensure compliance.[30]

31. The Class Vehicles, like any other car sold in the United States, were required to satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. §86.1811-4; Clean Air Act §101(b)(1) – (2), 42 U.S.C. §7401(b)(1)(2).

32. Section 203(a)(3)(b) of the CAA prohibits the manufacture, selling, or installation of any device that bypasses, defeats or renders inoperative a required element of a vehicle's emissions control system. 42 U.S.C. §7522(a)(3)(b). Section 203(a)(10 of the same statute also prohibits the sale of motor vehicles or engines that are not covered by valid certificates of conformity with applicable emissions standards. 42 U.S.C. §7522(a)(1). The regulatory requirements for defeat devices are set forth in 40 C.F.R. Part 86.

33. The EPA has been rigorous in punishing automobile manufacturers or engine makers that utilize defeat devices. For example, in late 1995, it entered into a $45 million dollar settlement with General Motors Corporation regarding the use of defeat devices on 470,000 Cadillac cars.[31] Likewise, in August of 1998, it fined Honda $267 million and Ford $7.8 million for selling vehicles equipped with defeat devices that prevented emission control systems from working properly.[32] Similarly, in October of that year, it and the DOJ fined seven truck and heavy duty equipment manufacturers $83.4 million for engaging in similar conduct.[33]

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[30] http://www.autonews.com/article/20151004/OEM11/310059955/vw-emissions-violations-put-self-certification-under-new-scrutiny.

[31] http://www.autosafety.org/sites/default/files/imce_staff_uploads/Cadillac%20%2445%20Million%20Defeat%20Device%20Penalty%2011-31-95.pdf.

[32] http://www.autosafety.org/sites/default/files/imce_staff_uploads/defeat.pdf

[33] http://www2.epa.gov/enforcement/cummins-engine-company-diesel-engine-clean-air-act-settlement.

VW FOIA, EPA 06/20/2017 2017-FFP_031072

34. Volkswagen was or should have been aware of these precedents. Indeed, the company itself is a recidivist violator of the CAA. In July of 1973, the EPA referred to DOJ for legal action a claim that defeat devices were installed on 1973 Volkswagens. A copy of that referral is attached as Exhibit 3 to this complaint. The matter was settled for $120,000 in March of 1974.[34] Similarly, in June of 2005, Volkswagen entered into a consent decree with DOJ whereby it paid a $1.1 million penalty concerning its failure to notify the EPA of emissions defects in certain vehicles manufactured at its facility in Mexico.[35] A copy of that decree is attached as Exhibit 4 to this Complaint.

35. CARB is a department of the California Environmental Protection Agency. It was created in 1967. California is the only state permitted to have such a regulatory agency, because it was created prior to the enactment of the CAA. CARB's mission is to "[t]o promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state."[36]

36. The EPA introduced phased in Tier 2 emissions standards from 2004 to 2009. California has similar standards in its CA LEV II standard. The Tier 2 Bin rating system applied to all passenger vehicles regardless of fuel type. Tier 2 Bin 5 standards--the ones applicable to the Class Vehicles--imposed an emission rate for NOx of 0.07 grams per mile.[37]

37. New cars that are sold bear stickers indicating that they are EPA-and/or CARB compliant. Here is a photograph of such a sticker on the inside of the hood of a TDI Audi A3, one of the Class Vehicles.

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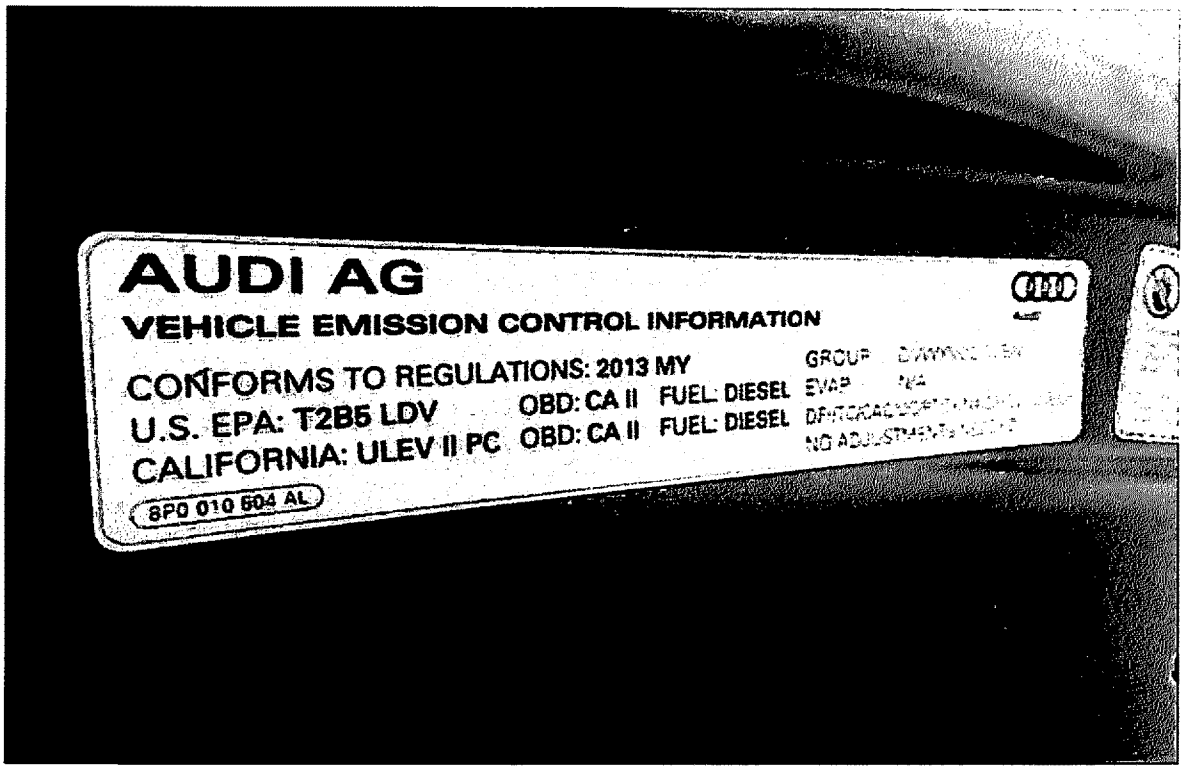
[34] http://www.autosafety.org/sites/default/files/imce_staff_uploads/VW%20Defeat%20Device%20%24120%2C00%20fine%203-12-74%20Pr.pdf.

[35] http://www.autosafety.org/sites/default/files/imce_staff_uploads/volkswagen-cd.pdf.

[36] http://www.arb.ca.gov/html/mission.htm.

[37] http://www.nctcog.org/TRANS/air/vehicles/tech/compliance/index.asp.



And here is a similar sticker for a 2013 TDI Volkswagen Golf:

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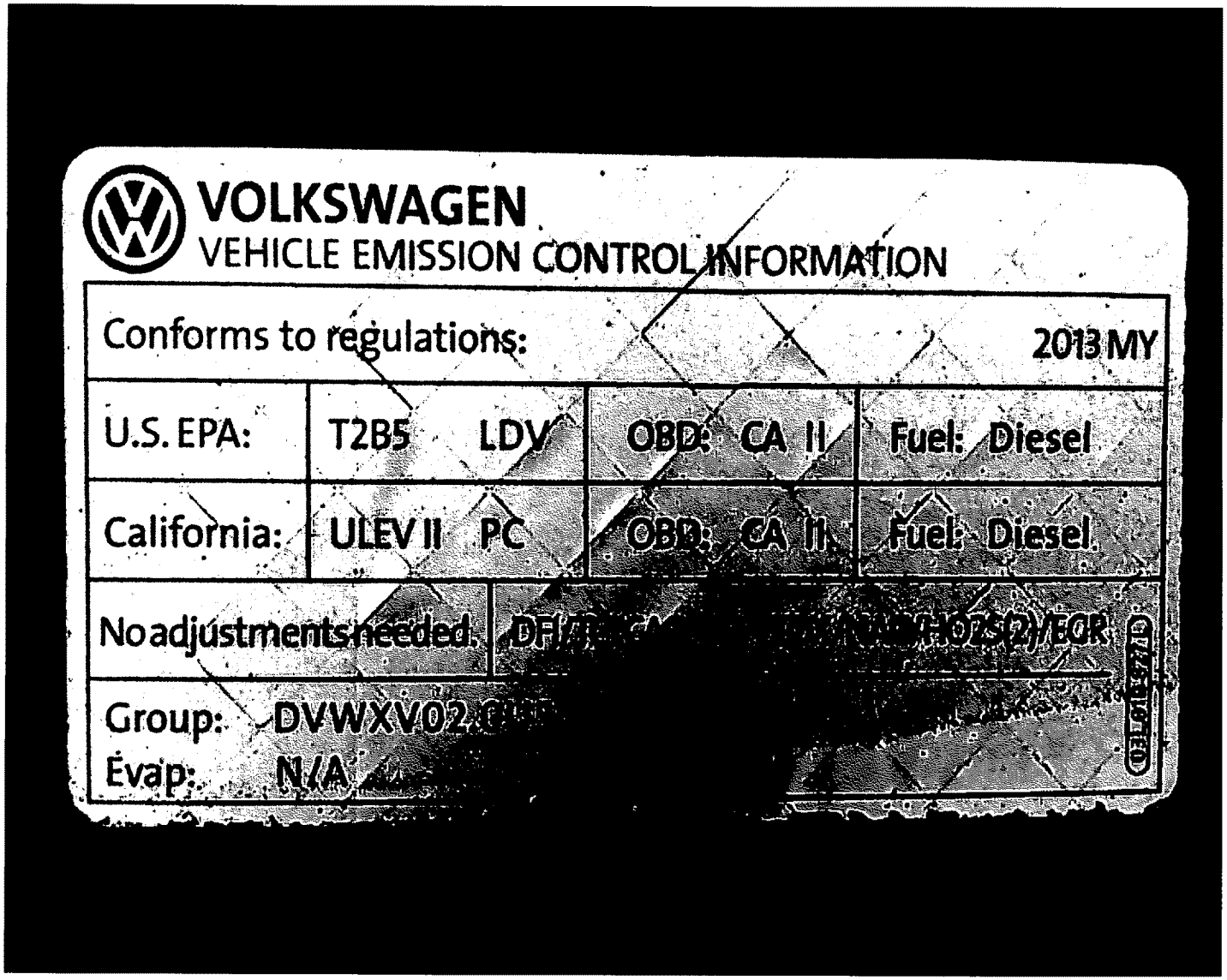

VOLKSWAGEN
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations:			2013 MY
U.S. EPA:	T2B5 LDV	OBD: CA II	Fuel: Diesel
California:	ULEV II PC	OBD: CA II	Fuel: Diesel
No adjustments needed.	DFI/TC/CAC/DOC/CPF/SCR/EGR		
Group: DVWXV02.0U4			
Evap: N/A			

Through these types of notice, Volkswagen was representing to customers that the Class Vehicles complied with federal and state emissions laws. This was an outright lie.

B. Diesel Cars And Control of NOx Emissions.

38. Diesel-powered cars, like gasoline-powered cars, must also meet the emissions standards established by the EPA and CARB. With diesel-powered engines, car manufacturers must use different--and more expensive--emission control systems than are used in gasoline-powered cars.

39. Diesel fuel has a greater energy density than gasoline. It converts heat into energy more efficiently than gasoline, sending less heat out of the tailpipe than gas-powered vehicles. Because it has greater energy density, diesel also is more efficient: diesel vehicles can get up to 30% more miles per gallon than similar gasoline-powered cars. In addition, because of their higher compression, diesel engines can generate a lot of torque, providing strong acceleration and additional power needed for towing.

40. While diesel vehicles have certain advantages over gasoline, they also have some disadvantages. Because diesel fuel is heavier and oilier than gasoline, it can generate more pollution. While diesel engines emit lower amounts of carbon monoxide than gasoline-powered engines, they emit more NOx.

41. Diesel fuel exhaust has been recognized by the World Health Organization to be a carcinogen for humans.[38]

42. Automakers have faced significant challenges in controlling NOx emissions sufficiently to meet environmental standards, particularly with smaller vehicles, and particularly in the United States, which has some of the strictest emission controls in the world. The website of greencongress.com explains the two types of approaches diesel automobile manufacturers have used to deal with NOx emissions:

[38] http://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf.

VW FOIA, EPA 06/20/2017 2017-FFP_031076

> Broadly, there have been two catalytic approaches used to reduce exhaust NO_x: urea-based selective catalytic reduction (SCR) and lean NO_x trap (LNT) catalysts.
>
> --The urea-SCR (urea=AdBlue) approach requires on-board storage of the reductant fluid which is introduced into the exhaust upstream of the SCR catalyst. It is then converted to ammonia which interacts with NO_x on the SCR catalyst to form water and nitrogen.
>
> --LNT technology utilizes fuel from the vehicle and advanced engine controls to enable periodic operation of the engine at rich air-to-fuel ratios to produce oxygen-depleted exhaust suitable for reducing NO_x stored on the LNT catalyst surface.[39]

43. The article indicates that Volkswagen had planned to use both technologies as of 2007, but elected to go with the LNT approach (which it referred to as TDI). As explained below, the deciding factor was apparently cost. Because of the extra equipment (including a urea tank) and technology required to clean the NOx emissions from the diesel exhaust, SCRs can add significantly to the cost of producing the engine. They also make diesel cars heavier than they otherwise would be, thus potentially decreasing fuel efficiency, torque and power.

44. Honda, which sells diesel cars in markets other than the United States, never tried to sell them here. That is because, according to Honda's research, "[t]he market would not bear the costs of doing diesel correctly." In order to meet the stringent United States emissions standards, Honda would have had to add costly emissions controls to every diesel model, which would make them more expensive than gasoline-powered competitors. "At such a high premium, customers simply wouldn't buy them."[40]

C. Volkswagen's Decision To Use TDI Technology.

45. Volkswagen has been selling cars in the United States since 1949, when it introduced the iconic Volkswagen Beetle. Although it was for many years the top-selling imported car in the United States, Japanese imports overtook Volkswagen and other European imports in

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[39] http://www.greencarcongress.com/2015/09/20150921-vw2l.html.

[40] http://mashable.com/2015/09/27/vw-dieselgate/#2VosDbcL7iqT.

the 1990s.

46. The decisive factor in the decision to use TDI technology in 2007-08 was the appointment of Winterkorn as CEO of VWAG in January of 2007. Winterkorn was involved in overseeing research and development and had that responsibility at the time he resigned as CEO. In 1995, he took over as the head of Volkswagen Group Product management and a year later, he assumed the role of Member of the Board of Management for "Technical Development" at the Volkswagen brand. He assumed a similar role when he became Chairman of the Board of Management at Audi.[41]

47. Before Winterkorn took over as VWAG's CEO on January in 2007, Volkswagen had partnered with Bosch and Daimler to explore the use of a diesel emissions control system called BlueTec.[42] BlueTec was a technology developed by the latter two companies and championed by Wolfgang Bernhard ("Bernhard"), former head of the Volkswagen brand and a former Daimler executive. BlueTec was an SCR technology; it required the use of a liquid urea tank, so that urea could be sprayed onto the emissions in order to neutralize the NOx. The urea tank not only takes up space and adds weight (disadvantages that are especially acute in the market for small, fuel-efficient cars), but also requires the owner to refill the tank, making the diesel engine more inconvenient than a traditional gasoline-powered car. When Bernhard left the company after Winterkorn took control, the BlueTec technology was scrapped for smaller vehicles. Volkswagen only began using a form of SCR technology on a few of its smaller vehicles in 2012.

48. *Automotive News* describes the sequence of events:

> *Bild am Sonntag* said the roots of the crisis were planted in 2005 when then-VW brand Chief Wolfgang Bernhard wanted VW to

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[41] *See* http://www.volkswagenag.com/content/vwcorp/content/en/the_group/senior_management/winterkorn.html.

[42] For the source of this information, *see* http://www.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?_r=0.

VW FOIA, EPA 06/20/2017 2017-FFP_031078

> develop a new diesel engine for the U.S. market. Bernhard recruited Audi engineer Rudolf Krebs who developed a prototype that performed well in tests in South Africa in 2006, the paper said.
>
> Bernhard and Krebs argued that the only way to make the engine meet U.S. emission standards was to employ in the engine system an AdBlue urea solution used on larger diesel models such as the Passat and Touareg, according to the report.
>
> This would have added a cost of 300 euros ($335 in today's U.S. dollars) per vehicle -- a sum that VW finance officials said was too much at a time when a companywide cost-cutting exercise was under way.
>
> Bernhard left VW in January 2007 before the diesel engine went into production. Krebs was moved to another role when Martin Winterkorn became VW Group and brand CEO in 2007.
>
> Winterkorn, Audi's former CEO, asked Audi development boss Ulrich Hackenberg and Audi engine boss Wolfgang Hatz to move to VW's Wolfsburg headquarters and continue development work on the engine, *Bild am Sonntag* said.
>
> The engine then ended up in VW Group diesels with its engine software manipulated to fool diesel emissions tests in the U.S.[43]

Hatz and Hackenberg, as noted above, were two of the executives whom VWAG recently suspended.

49. Engineers at Volkswagen had been looking at an alternative to BlueTec technology, an alternative that ultimately evolved into the TDI "Common Rail" system. In 2006, Richard Dorenkamp, head of Volkswagen's diesel engine development, gave a presentation in Detroit. He described the TDI system Volkswagen engineers developed and how it could be used in small cars and meet increasing US demands for fewer emissions.[44] Volkswagen's TDI Clean Diesel pollution

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[43] http://www.autonews.com/article/20150927/COPY01/309279989/bosch-warned-vw-about-illegal-software-use-in-diesel-cars-report-says. Winterkorn was generally very concerned about the costs associated with developing eco-friendly automotive engines. As he said at the 2014 Paris auto show, "[c]limate protection is not available free of charge. Every gram of reduction in [tailpipe] C02 costs us 100 million euros. Every gram!" http://blog.caranddriver.com/vws-winterkorn-to-greens-so-get-off-our-backs-already/.

[44] http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2006/session7/2006_deer_dorenkamp.pdf.

control technology differed from the SCR technology used by other manufacturers to control NOx emissions. The greencarcongress.com article cited earlier describes it in detail. Instead of having a urea tank, the TDI Clean Diesel cars technology used a trap to collect NOx. While saving the space, weight and cost required by the urea tank in the SCRs, Volkswagen's TDI Clean Diesel technology--when it was operational--required additional use of fuel, thus degrading both gas mileage and performance. The trap was controlled by a computer module that could save fuel by allowing more pollutants to pass through the exhaust system.

50. In June of 2007, six months after Winterkorn took over as CEO of VWAG, Volkswagen issued a report entitled "Power Train and Fuel Strategy--The Path To The Future."[45] It stated:

> In the first stage on the path to this independence, it will be important to utilize existing fossil fuels as efficiently as technically possible. Volkswagen is putting its stamp on this phase with vehicles such as the BlueMotion models, a universally fuel-efficient fleet of TDI engines, highly efficient and unique TSI engines, successful natural gas vehicles (EcoFuel) and a lineup of models that still leaves room for automotive dreams. Very soon these fundamental technologies will be further refined. **New powertrains, including an engine concept developed for use in the USA, under the working title "BlueTDI", are already in the prototype stage. These engines will fulfill the toughest emissions laws in the world – even the so-called "Tier2 Bin5" in California, one of the most stringent emissions standards in the world.** (Emphases added).[46]

51. Volkswagen had planned to introduce the Jetta TDI Clean Diesel in the United States earlier than it eventually did. In November of 2007, it was reported as follows:

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[45] It can be found at http://www.volkswagenag.com/content/vwcorp/info_center/en/themes/2007/06/powertrain_and_fuel_strategy.html.

[46] In 2008, five VWAG engineers published a two-part article in the May and June issues of *MTZ* magazine saying they had resolved the issue of how to best control emissions and could now meet California standards through the use in part of a new on-board diagnostics system. Similarly, Achim Freitag, a testing engineer in Volkswagen's diesel development department, touted the new engine in a speech given later that year. *See* http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions/.

VW FOIA, EPA 06/20/2017 2017-FFP_031080

> A problem with the emissions system in Volkswagen's new Jetta TDI will delay the launch of the diesel sedan for about six months. The car is critical to VW's plans to get back on track in the United States.
>
> VW spokesman Keith Price confirmed that the delay will be announced this week at the Los Angeles auto show. Price would not give specifics about the technical problem, but he said it has been fixed.
>
> The technical changes engineers made to solve the problem mean the car must go through emissions testing and validation again, Price said.
>
> VW dealers have been without a new diesel car to sell since last spring. Production of the new model, which will be sold in all 50 states, was scheduled to start in January. The car will be built in Puebla, Mexico.
>
> U.S. sales originally were expected to begin in early spring, Price said. Now sales won't start until later in the summer."
>
> "Sure, they're disappointed," Price said of dealers who have learned of the delay.
>
> Price said there is a lot of pent-up demand from loyal VW diesel buyers for the next- generation Jetta, which has a new engine built in Germany and a new diesel fuel injection system.
>
> "They're disappointed, but they see the point that this car has to be perfect," Price said of the dealers, adding, "They recognize the importance of this not only for their stores, but for the VW brand."
>
> A fleet of about 40 Jetta TDIs is undergoing testing as part of the validation procedure.[47]

52. What apparently happened is that the TDI technology failed initially to withstand United States emissions testing. The decision was made to delay the launch of the vehicle and activate the algorithm that functioned as a defeat device in the software management system. This is consistent with the timing of the letter from Bosch described above that raised the illegality of such a tactic. It is also consistent with recent revelations that appeared in the October 4 issue of *Bild am Sonntag*:

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[47] http://www.cleanmpg.com/forums/showthread.php?t=7254.

> An internal review at Volkswagen AG shows the decision to install software that reduces diesel emissions in testing was made just before serial production of the company's EA 189 engine [used in many of the Class Vehicles], German tabloid Bild am Sonntag said.
>
> Bild said the software was first installed in its diesel engines in 2008, shortly before the EA 189 was mass produced. The move was taken because there was no way at the time to reconcile meeting emission standards within the targeted cost of the engine, the tabloid said in an advance release of the article to be published Sunday. Otherwise the company would have had to abandon the introduction of the engine, development of which was begun in 2005, the newspaper said.[48]

53. The 2009 Model Year TDI Jetta was introduced and passed the Tier 2 Bin 5 emissions test with flying colors. A Reuters article describes its successful launch:

> Volkswagen had heavily marketed what it called "clean diesel" engines starting in 2008 with the 2009-model Jetta TDI. It appeared to have found a sweet spot between high-performance and fuel-efficiency with a zippy, fun-to-drive car that topped 40 miles per gallon in highway driving. Named "Green Car of the Year" at the Los Angeles auto show in 2008, the Jetta TDI was seen as a breakthrough in a country where diesel passenger cars occupy a tiny niche compared with Europe, where they are about half of the market.
>
> "It's not your grandfather's diesel," Krause said in a September 2008 presentation to U.S. regulators, according to a video of the remarks.
>
> [Norbert] Krause [head of VWoA's environmental office until 2009] and other VW officials promised a diesel that would meet pollution laws in all states, including California where diesel engines had long been associated with smog and cancer-causing soot.
>
> By that point, VW and other automakers had lobbied for almost a decade for regulators to give diesel another chance. In 2000, VW and other companies with an interest in promoting diesel, including Mazda, formed the Diesel Technology Forum to lobby for increased use in the United States as a way to reduce reliance on imported oil. In 2005, an energy bill signed by President George W. Bush offered tax credits for diesel buyers. That gave the first wave of diesel Jetta buyers an income tax credit of $1,300 each.

[48] http://www.marketwatch.com/story/vw-began-using-emissions-software-in-2008-report-2015-10-04.

> In 2009, after the new Jetta went on sale, VW dealers initially sold out, including in California where regulations had effectively shut the market to diesels earlier in the decade.[49]

54. As noted in the article, *Green Car Journal* gave it the 2009 Green Car of the Year award and gave the TDI Audi A3 the 2010 Green Car of the Year Award.[50] Those awards have been rescinded in light of the present scandal.[51] The TDI Clean Diesels were a resounding success and VWoA sold many units.[52] As recently as its 2014 sustainability report, VWAG crowed about how "[t]he Volkswagen Group has a long tradition of resolute commitment to environmental protection" and how it intended to "put our creative powers to good use for the benefit of the people and the environment."[53]

55. At conferences and in published papers, Volkswagen extolled the efficiency and low emissions of its Clean Diesel technology.[54] And commentators agreed. One stated that Volkswagen was "the only company to have mastered the new emissions regulations using a compact, inexpensive treatment system. It allowed them to roll out diesel engines in one small car after another at relatively low prices."[55] Volkswagen's competitors had long wondered how Volkswagen could produce a clean diesel engine at such an affordable price. As Robert Lutz,

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[49] http://uk.reuters.com/article/2015/09/24/uk-usa-volkswagen-deception-insight-idUKKCN0RO2J720150924.

[50] https://en.m.wikipedia.org/wiki/Green_Car_of_the_Year.

[51] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[52] The chronicle of its United States sales is found here: http://www.ibtimes.com/volkswagen-diesel-scandal-heres-how-bad-volkswagen-sales-were-company-was-caught-2114603.

[53] http://www.autoblog.com/2015/09/30/vw-stripped-of-green-car-of-the-year-awards-for-jetta-a3-diesel/.

[54] *See, e.g.*, http://www.sae.org/events/gim/presentations/2009/norbertkrause.pdf; http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf.

[55] http://www.pbs.org/wgbh/nova/next/tech/volkswagen-diesel-emissions.

VW FOIA, EPA 06/20/2017 2017-FFP_031083

former vice chairman of General Motors Corporation, recounted: "I kept asking our engineers: 'What's wrong with you guys? VW seems able to do it.' I said, 'Are they magicians or something?' The engineers said they couldn't answer that question."[56] Now, they have their answer. Volkswagen cheated.

56. The competitive advantages of cheating on emissions have now become clear. "Manipulating emissions results allowed Volkswagen to keep down engine costs in a 'clean diesel' strategy that was popular in Europe and at the heart of a drive to improve U.S. results."[57] As an article in the *New York Times* put it, "[d]isabling the emissions controls brought major advantages, including much better mileage--a big selling point in Volkswagen's push to dominate in America."[58] These sales were part of the reason VWAG was able to surpass Toyota as the world's biggest automaker in 2015, as noted above. And they were sales built upon lies.

57. This systemic attitude of winning at all costs in spite of noncompliance with national environmental regulations is part of the corporate culture of Volkswagen, as explained at length in a September 24, 2015 *New York Times* article:[59]

> There is a long tradition of scandal and skulduggery in the auto industry, but few schemes appear as premeditated as Volkswagen's brazen move to use sophisticated software to circumvent United States emissions standards.
>
> That such a thing could happen at Volkswagen, Germany's largest company and the world's largest automaker by sales — 202.5 billion euros last year — has mystified consumers and regulators around the world. But given Volkswagen's history, culture and

[56] http://www.freep.com/story/money/cars/2015/09/26/vw-cheat-emissions-diesel- engine-fallout/72612616/.

[57] http://www.reuters.com/article/2015/09/30/us-volkswagen-emissions-plan-idUSKCN0RT0OL20150930.

[58] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[59] http://www.nytimes.com/2015/09/25/business/international/problems-at-volkswagen-start-in-the-boardroom.html?_r=1.

corporate structure, the real mystery may be why something like this didn't happen sooner.

"The governance of Volkswagen was a breeding ground for scandal," said Charles M. Elson, professor of finance and director of the John L. Weinberg Center for Corporate Governance at the University of Delaware. "It was an accident waiting to happen." The company, founded by the Nazis before World War II, is governed through an unusual hybrid of family control, government ownership and labor influence. Even by German standards, "Volkswagen stands apart," said Markus Roth, a professor at Philipps-University Marburg and an expert in European corporate governance. "It's been a soap opera ever since it started."

****

I spoke this week to a longtime former senior Volkswagen executive, who agreed that a scandal, especially one involving emissions, was all but inevitable at Volkswagen. He cited the company's isolation, its clannish board and a deep-rooted hostility to environmental regulations among its engineers.

The former executive, who spoke on the condition of anonymity because he now works at a competing global automaker, said that Wolfsburg, where Volkswagen is based in Lower Saxony and the city with the highest per capita income in Germany, is even more remote and isolated than Detroit was in its heyday. "The entire economy is automotive," he said. "People have a completely uncritical view of cars and their impact on the environment because they all make a living from the industry."

****

The Volkswagen board has been especially slow to move on environmental issues, investing less in electric and hybrid engine technology than industry leaders.

"There's an attitude among the German public that it's very unfair for the U.S. to target the auto industry over emissions," Professor Roth said. "If you have electric cars and a coal-fired plant producing the electricity, you gain nothing."

The former Volkswagen executive said Volkswagen's engineer-driven culture takes the notion even further. He said the engineers felt that the politicians were guilty of rank hypocrisy, especially in the United States, also grumbling that electric cars make no sense as long as power plants are burning fossil fuels.

"There's an attitude of moral superiority there," he said. "The engineers think they know best."

That Volkswagen is nonetheless obliged to obey applicable

> environmental laws, he said, is a notion likely to fall on deaf ears in Wolfsburg, especially compared to demands to be No. 1 in sales. (The motive for the software evasion is widely believed to have been to increase sales of diesel-powered cars in the United States.)

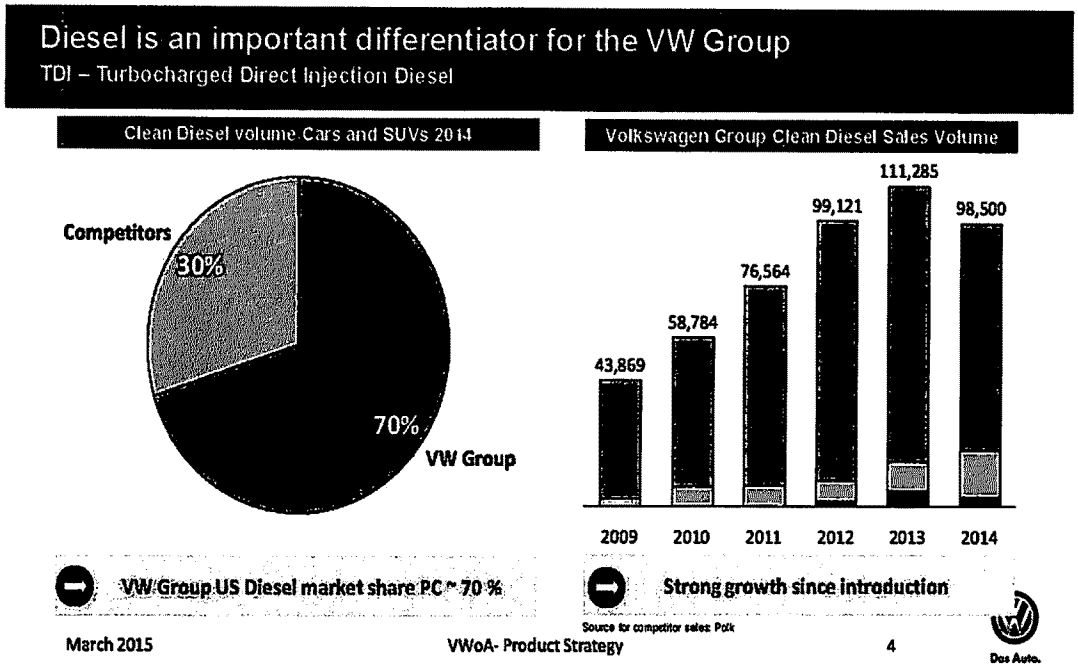
Thus, executives and engineers at Volkswagen were clearly unhappy with United States automotive emissions standards and were all too willing to sacrifice those standards (and their obligations under United States antitrust laws) in order to ensure that their company became the number one automaker in the world. The current scandal involving Volkswagen Clean Diesel TDI vehicles is a direct result of that arrogant intention to flout United States environmental laws. It is also a direct result of what has been described by one German executive as Volkswagen's "uniquely awful" corporate governance.[60]

D. The Clean Diesel Car Market.

58. Volkswagen's illegal conduct in this country occurred in the Clean Diesel passenger car market in the United States (the "Clean Diesel Car Market"), which can be viewed as a market of its own or as a submarket of passenger cars sold in this country. This fact was confirmed in a presentation by Douglas Skorupski ("Skorupski"), Manager of Power Train Strategy for VWoA, given to the Diesel Technology Forum ("DTF") in March of 2015:

[60] http://www.cnbc.com/2015/10/04/volkswagens-uniquely-awful-governance-at-fault-in-emissions-scandal.html.

VW FOIA, EPA 06/20/2017 2017-FFP_031086



59. Thus, VWoA clearly views clean diesel cars as a distinct market and Volkswagen's TDI technology as a factor that allowed it to obtain a monopoly share of that market.[61] It distinguished Clean Diesel cars from gasoline/electric hybrid cars based on superior performance:

[61] The presentation can be found at http://cleandieseldelivers.com/media/Douglas-Skorupski-VWoA_DTF_March2015.pdf. Bosch has similarly identified a distinct Clean Diesel car category: http://www.low-carbonfuels.com/pdfs/acte2011presentations/Day1/Breakout1/LightDuty/ACT2011-Breakout1-FreitagAlexPresentation150.pdf. And the EPA has noted that "Clean diesel" refers to a three-part emissions control system that combines cleaner diesel fuel, advanced engines and effective emissions control technology.

"[o]ne way Volkswagen aimed to achieve its lofty goal was by betting on diesel-powered cars — instead of hybrid-electric vehicles like the Toyota Prius--promising high mileage and low emissions without sacrificing performance."[62] Similarly, a survey conducted by Strategic Vision for Volkswagen found that customers of diesel and hybrid vehicles are very different and there is "very little crossover from one to the other." [63] The same article noted that Clean Diesel TDI and hybrid buyers differed demographically; the latter were "were just 51 percent male, 78 percent of them were married, 89 percent had no kids in the household, and their average age was 61", while the former "included far more men than women[,] [f]ewer of them were married, but more of them had children in the house, and they were fully 17 years younger, with an average age of 44." Likewise, a Volkswagen Clean Diesel IQ survey found that diesel car customers are highly aware of the benefits of clean diesel technology in contrast to hybrid and gasoline car customers. Furthermore, 94% of diesel customers will purchase clean diesel cars again while only 26% of hybrid and gasoline car customers will consider clean diesel cars for their next purchase.[64] All of this indicates little cross-elasticity of demand between hybrid vehicles and Clean Diesel vehicles.

60. Indeed, the major European competitors of Volkswagen in the Clean Diesel Car Market belong, along with Volkswagen, to an organization that is devoted to extolling the benefits of Clean Diesel cars.[65]

61. BloombergBusiness noted that consumers are willing to pay a substantial premium

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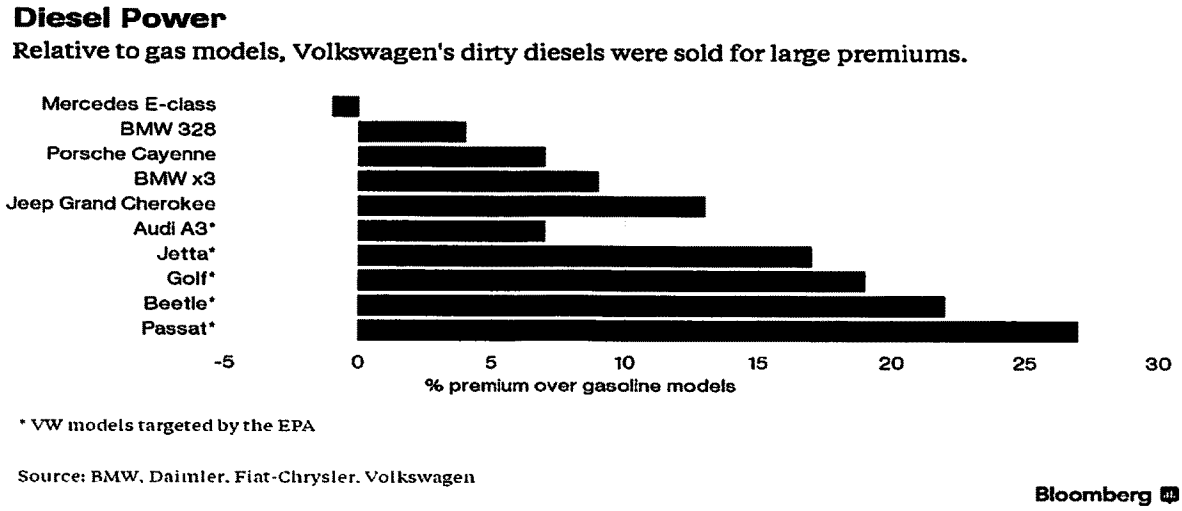
[62] http://mobile.nytimes.com/2015/09/27/business/as-vw-pushed-to-be-no-1-ambitions-fueled-a-scandal.html?referer.

[63] http://www.greencarreports.com/news/1080201_vw-diesel-buyers-hybrid-buyers-both-want-fuel-economy-but-beyond-that.

[64] http://www.autosphere.ca/fleetdigest/2013/04/01/volkswagen-surveys-diesel-drivers/. *See also* http://www.cmu.edu/gdi/docs/diesel-and.pdf (noting many key differences between diesel and hybrid car customers).

[65] http://www.clearlybetterdiesel.org/index.html#cleanDiesel.

for Clean Diesel vehicles over those of its competitors.[66]



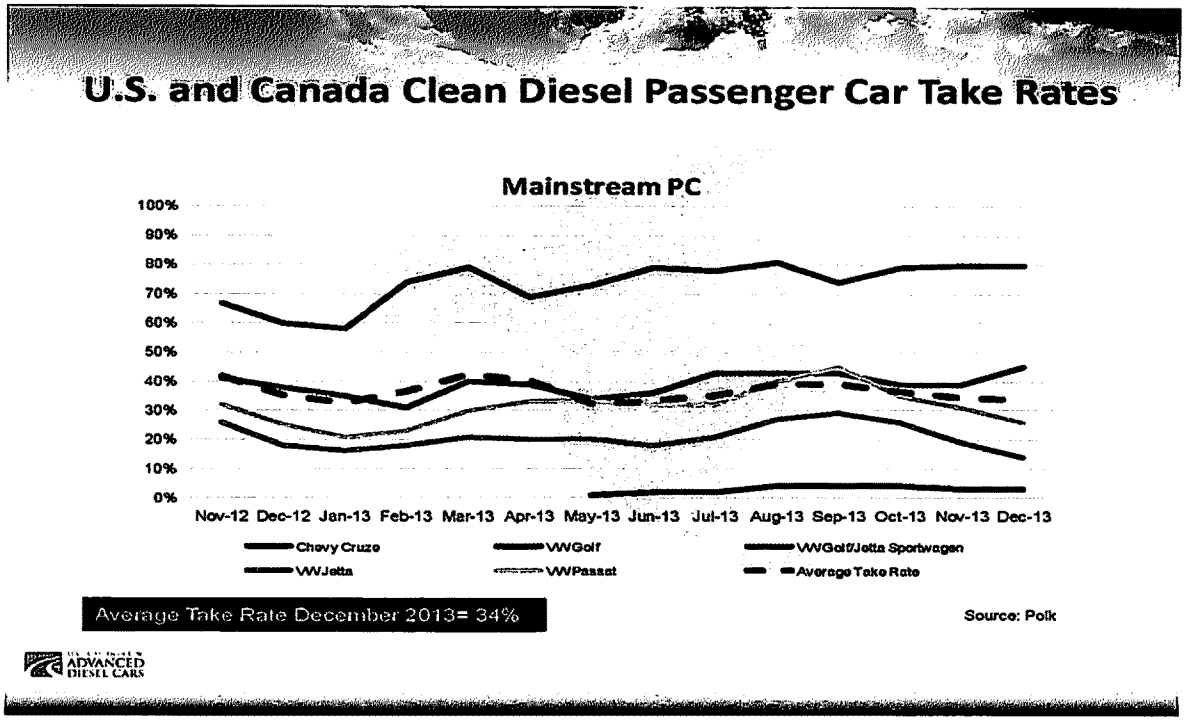
62. As the BloombergBusiness article goes on to explain:

> The math on diesel has never been tidy. The additional mileage is great, but unless one drives a lot, it doesn't really cover the added expense for the engine and for the fuel itself. At current gas prices, the diesel premium on the Passat—some $5,755—would buy enough gas to drive the gas-burning model for about 88,000 miles. **For the majority of diesel drivers, the factor that probably swung the decision was the apparent environmental benefit. The green aspect was the fulcrum.** (Emphases added).

Thus, Volkswagen's false claims about its TDI technology were a driving factor in the premium prices it charged consumers for such technology. As noted above, VWAG has taken full responsibility for the "economic damage" caused by its illegal conduct.

[66] http://www.bloomberg.com/news/articles/2015-09-23/volkswagen-s-other-diesel-ruse-premium-pricing.

63. A chart contained in a presentation made by CMW Research at the March 2015 DTF conference[67] underscores the differences in take rates between Volkswagen Clean Diesel cars and those made by its competitors:



64. The price premium for Clean Diesel vehicles is also reflected in this chart showing the price differentials between gasoline-powered models and Clean Diesel models of Volkswagen's own cars:

Clean Diesel Price Premium				
Mode	**Base**	**Mid-Level**	**Top-Level**	**Average**
VW Jetta	$2,860.00	$1,570.00	$1,030.00	$1,820.00
VW SportWagen	$5,570.00	$1,680.00	$0.00	$2,416.67
VW Golf	$2,400.00	$1,000.00	$1,000.00	$1,466.67
VW Golf	$2,950.00	$1,000.00	$1,000.00	$1,650.00
VW Beetle	$4,635.00	$4,920.00	$0.00	$3,185.00
VW Beetle	$4,080.00	$530.00	$700.00	$1,770.00
VW Passat	$5,755.00	$2,845.00	$2,135.00	$3,578.33

[67] http://cleandieseldelivers.com/media/Take-Rate-Slides-March-2014.pdf.

Audi A3	$2,300.00	$2,300.00	$2,300.00	$2,300.00
Average	$3,818.75	$1,980.63	$1,020.63	$2,273.33

E. Volkswagen's False Advertising.

65. Volkswagen, as part of its plan to increases sales and market share in the United States, increased its emphasis on diesel-powered cars and began marketing these cars heavily to the United States public beginning in 2008. It emphasized the TDI Clean Diesel cars' environment-friendly engine, excellent gas mileage, and high-quality performance. In one advertisement (which, as of this writing, was available on Audi's website after the scandal surfaced and is attached as Exhibit 5 to the Complaint),[68] for example, Volkswagen claimed:

> Getting more from less. Audi pioneered TDI® clean diesel engines to deliver more torque, lower fuel consumption and reduce CO2 emissions, compared to equivalent gasoline engines. The result of this revolutionary engineering delivers remarkable performance, while achieving increased fuel economy.

66. Another advertisement by VWAG for Clean Diesel cars asserts that

> This ain't your daddy's diesel. Stinky, smoky, and sluggish. These old diesel realities no longer apply. Enter TDI Clean diesel. Ultra-low-sulfur fuel, direct injection technology, and extreme efficiency. We've ushered in a new era of diesel.[69]

This internet advertisement is attached as Exhibit 6 to the Complaint.

67. Volkswagen's advertising relentlessly touted the supposed fuel efficiency and environmental features of its Clean Diesel TDI vehicles. In 2009, Volkswagen introduced its "Meet the Volkswagens" campaign, which promoted "fuel efficiency, green credentials, cost of ownership and safety," and compared Volkswagen's diesel passenger cars to its competitors. According to Tim Ellis, Volkswagen's marketing chief, the goal of this advertising campaign was to "grow the brand in the U.S."[70] This campaign, among other things, included social media links

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68 https://web.archive.org/web/20150928180733/http://www.audiusa.com/technology/efficiency/tdi

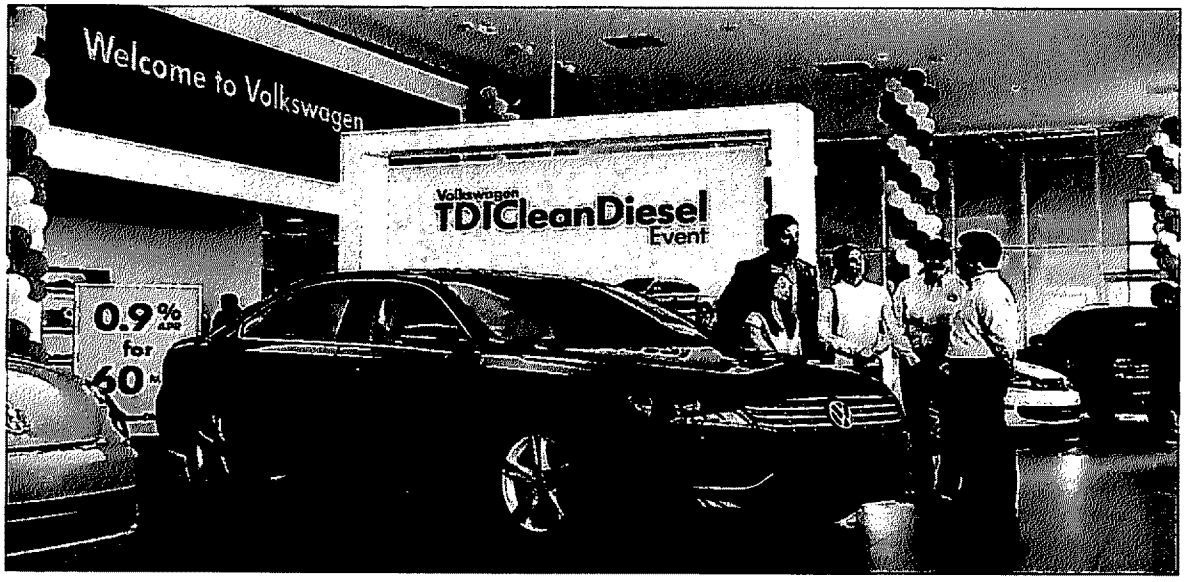
69 https://web.archive.org/web/20150330110301/http://www.vw.com/features/clean-diesel/.

70 http://abcnews.go.com/Business/story?id=7493781.

to a blog (tdi.vw.com/tdi), which focused on Volkswagen's TDI clean diesel model.

68. Between 2011 and 2013, Volkswagen spent more than $2.9 billion annually on advertising world-wide; many of those advertising dollars were directed at the United States public. Volkswagen issued hugely popular videos featuring the Golden Sisters, who purported to debunk the myths about polluting diesel cars.[71] Other videos that were highly successful included a "Truth or Dare" effort started in 2009 that was about "debunking the myths on clean diesel and fueling the passion of existing diesel owners"; a 2009 Audi video that proclaimed "diesel, no longer a dirty word"; and a Passat "being a Mom" video, all of which can be viewed on the *New York* magazine website.[72] Another well-known video showed German engineers of TDI Clean Diesel vehicles earning their "angel's wings."[73]

69. Volkswagen also used point-of-purchase displays at the showrooms of Volkswagen Authorized Dealers such as the one depicted below:



[71] http://blog.caranddriver.com/vws-hilarious-new-tdi-diesel-ads-return-excellent-viral-mileage/.

[72] http://nymag.com/daily/intelligencer/2015/09/vws-clean-diesel-ads-now-make-us-feel-dirty.html.

[73] https://www.youtube.com/watch?v=fwkPEza9FPw.

70. As VWoA's Mark Barnes put it, the TDI Clean Diesel cars were "fantastic power train[s]" with "very good fuel economy." Yet "[i]t's also good for the environment because it puts out 25% less greenhouse gas emission than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So a very very clean running engine. Clean enough to be certified in all 50 states."[74]

71. In television and print advertisements and in social media, Volkswagen strived to present its Clean Diesel TDIs as the environmentally-friendly, fuel-efficient, fun-to-drive and reasonably priced passenger car. As noted above, Volkswagen's sham advertising campaign was a success. Unfortunately, all of these accolades were based on a sham perpetrated by Volkswagen for seven years.

F. Volkswagen's Defeat Device.

72. As noted above, Volkswagen's defeat device is described as a "sophisticated software algorithm" that detects when the car is undergoing emissions testing. The algorithm used information about how the car was being steered, how long the engine ran and atmospheric pressure to "precisely track" the conditions that corresponded to a federal emissions test, according to the EPA. During emissions testing, the software "turns on" the car's full emissions control system in order to pass the test. Under normal driving situations, however, these emissions control systems are ***turned off***, allowing the cars to spew as much as 40 times the allowable amount of NOx into the air. As an EPA spokesman noted, the defeat device was "particularly difficult for us to detect."[75] This ruse went undetected for seven years, although as noted above, Bosch and one

[74] http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10.

[75] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagons-deception-the-recall-that-never-fixed-any-cars/. A useful timeline of how the scandal came to light is provided on the website of Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/.

of VWAG's own engineers complained about it to the company.

73. One technology blog has described Volkswagen's defeat device as follows:

> The method by which Volkswagen diesel cars were able to thwart emissions tests and spew up to 40X the nitrogen oxide levels set by the Environmental Protection Agency was relatively simple. It was more likely no more than a single line of code used to detect when an emissions test was being performed and place the emissions system in an alternate mode — something as simple as a software "on/off" switch. Volkswagen AG CEO Martin Winterkorn, who stepping down as the result of his company's scandal, has said he had no knowledge of the emissions cheat, but software dev/test audit trails are almost certain to pinpoint who embedded the code and who authorized it. You can actually see who asked the developer to write that code," said Nikhil Kaul, a product manager at test/dev software maker SmartBear Software. "Then if you go upstream you can see who that person's boss was...and see if testing happened...and, if testing didn't happen. So you can go from the bottom up to nail everyone."[76]

74. As also noted above, 482,000 vehicles were described as affected, with over 50,000 in the state of California.[77]

75. In 2013 and again in 2014, the International Council for Clean Transportation ("ICCT") published studies showing serious discrepancies between laboratory and in-use emissions of certain cars, including VW TDI Diesel cars used in Europe.[78] A decision was made to test American Clean Diesel cars to show that they were success stories; the opposite turned out to be the case. The ICCT, in conjunction with researchers at and West Virginia University's Center for Alternative Fuels, Engines and Emissions ("CAFEE") conducted on-road emissions tests on three vehicles sold in the United States: a 2013 TDI Passat, a 2012 TDI Jetta, and a BMW X5

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[76] http://developers.slashdot.org/story/15/09/24/1423225/how-did-volkswagen-cheat-emissions-tests-and-who-authorized-it.

[77] http://www.latimes.com/business/autos/la-fi-hy-california-dmv-vw-diesel-20150921-story.html. This number excludes unregistered vehicles.

[78] http://theicct.org/sites/default/files/publications/ICCT_LabToRoad_20130527.pdf; http://www.theicct.org/sites/default/files/publications/ICCT_LaboratoryToRoad_2014_Report_English.pdf)

SUV. These researchers found that for the Passat and Jetta, emissions were far higher than the emissions generated in the laboratory by CARB. The Jetta exceeded United States NOx emissions standard by 15 to 35 times, and the Passat by five to 20 times. In laboratory testing by CARB, in contrast, these same vehicles complied with United States NOx emissions standards. The CAFEE report is attached as Exhibit 7 to the Complaint. ICCT brought the information to the attention of CARB and the EPA, who commenced their own investigations and contacted Volkswagen. Volkswagen chalked the discrepancies up to "various technical issues and unexpected in-use conditions", but agreed in December of 2014 to recall approximately 500,000 vehicles in order to apply a "software patch."[79]

76. After the remediation, CARB in May of 2015 tested a 2012 TDI Passat on the road and in the laboratory. It found some improvement in in-use NOx emissions, but not enough. An article in the *Philly Voice* describes what happened next.

> On July 8, CARB shared its results with VW, but there was no change in Volkswagen's position. Some officials privately questioned whether Volkswagen was deliberately violating the federal Clean Air Act by installing defeat devices -- software programmed to switch engines to a cleaner mode during official emissions testing, according to a person involved in the process.
>
> During normal driving, the software then shuts off, enabling cars to emit as much as 40 times the legal limit of pollutants.
>
> In early August, Oliver Schmidt, who followed [Norbert] Krause and preceded [Stuart] Johnson in VW's U.S. engineering and environmental office, attended a conference in Traverse City, Michigan and told regulators Volkswagen stood by its conclusions that the problem was technical, people involved said.[80]

77. Then, on August 21, there was a complete reversal. The *Philly Voice* article goes on to describe what happened:

> After more than a year of stonewalling investigators, Volkswagen stunned two senior officials with the U.S. Environmental Protective Agency and California's environmental watchdog by admitting the automaker hacked its own cars to deceive U.S.

[79] http://www.cnbc.com/2015/09/24/.

[80] http://www.phillyvoice.com/year-stonewalling-volkswagen-stunned-regulators/.

> regulators about how much their diesel engines pollute.
>
> That disclosure on Aug. 21, confirmed by two people with knowledge of the exchange, shows Volkswagen buckled to pressure from environmental regulators almost a month earlier than the scandal was made public. The admission to regulators came after a year during which VW officials insisted to regulators that tests on its diesel cars showing a spike in pollution levels on the road were in error.
>
> ****
>
> At first, regulators were surprised that Volkswagen would make its confession at the conference, held in Pacific Grove, California. Minutes before Christopher Grundler, director of the EPA's transportation and air quality office, was to deliver a 9 a.m. speech to the conference, a Volkswagen representative told him about the deception. At the same meeting, representatives of the California Air Resources Board, a state agency that had been pushing VW hard, were also given a verbal notice of the deception, people with knowledge of the events said.
>
> Volkswagen declined to comment on the sequence of events described to Reuters. It isn't clear which VW representative delivered the news of the deception to Grundler and the CARB. Stuart Johnson, head of VW's engineering and environmental office in the United States, was registered to attend the Aug. 21 conference, which was organized by the University of California, Davis. Johnson, who still works for VW in Auburn Hills, Michigan, did not respond immediately to a request for comment.

78. Volkswagen was faced with the threat that the EPA it would not certify any of its 2016 models for sale in the United States until the questions surrounding the emissions discrepancies were answered. Volkswagen admitted that it relied upon a "second calibration" in the vehicles that was intended to run only during certification testing. This second calibration was triggered when a highly sophisticated software algorithm determined – after measuring factors like the position of the steering wheel, the vehicle's speed, pedal movement, and even barometric pressure – that the car was being tested. Then it would configure the engine to reduce emissions of NOx. As David Clegern of CARB explained, "[w]e met with VW on several occasions and they continued to dispute our data, so we'd return to the lab. Over time, VW had no other explanations left, and it was our lab staff who actually got VW to admit that there was, in fact, a defeat device."[81]

[81] http://www.foxnews.com/leisure/2015/09/22/for-7-years-vw-software-thwarted-pollution-regulations/.

As another CARB spokesperson told the *Washington Post*, "[t]hey basically ran out of excuses."[82]

79. The scandal surfaced on September 18, 2015, when CARB and the EPA announced that VWAG, Audi and VWoA had illegally installed emissions testing "defeat devices" in the aforementioned vehicles. *See* Appendices 1 and 2. The EPA found violations of 42 U.S.C. §§7522(a), 7522(a)(1) and 7522(a)(3)(B), as well as 40 C.F.R. §§86.1854-12(a)(3)(ii) and 86.1854-12(a). The EPA identified the following affected vehicles:

Model Year	EPA Test Group	Make and Model(s)
2009	9VWXV02.035N	VW Jetta, VW Jetta Sportwagen
2009	9VWXV02.0U5N	VW Jetta, VW Jetta Sportwagen
2010	AVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2011	BVWXV02.0U5N	VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2012	CVWXV02.0U4S	VW Passat
2013	DVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2013	DVWXV02.0U4S	VW Passat
2014	EVWXV02.0U5N	VW Beetle, VW Beetle Convertible, VW Golf, VW Jetta, VW Jetta Sportwagen, Audi A3
2014	EVWXV02.0U4S	VW Passat
2015	FVGAV02.0VAL	VW Beetle, VW Beetle Convertible, VW Golf, VW Golf Sportwagen, VW Jetta, VW Passat, Audi A3

80. As noted above, Horn of VWoA admitted that Volkswagen was dishonest with both customers and regulators and Huber of VWAG called the matter a "moral and political disaster."

[82] http://www.washingtonpost.com/news/wonkblog/wp/2015/09/22/anatomy-of-volkswagonsdeception-the-recall-that-never-fixed-any-cars/.

81. Volkswagen has ordered its dealers to cease selling the Class Vehicles[83] and has set aside a minimum of 6.5 billion Euros ($7.2 billion) to deal with the fallout from this catastrophe, which it now concedes involved 11 million vehicles worldwide. An internal memorandum issued on September 22 details this:

Wolfsburg, 22 September 2015

Volkswagen AG has issued the following information:

Volkswagen is working at full speed to clarify irregularities concerning a particular software used in diesel engines. New vehicles from the Volkswagen Group with EU 6 diesel engines currently available in the European Union comply with legal requirements and environmental standards. The software in question does not affect handling, consumption or emissions. This gives clarity to customers and dealers.

Further internal investigations conducted to date have established that the relevant engine management software is also installed in other Volkswagen Group vehicles with diesel engines. For the majority of these engines the software does not have any effect.

Discrepancies relate to vehicles with Type EA 189 engines, involving some eleven million vehicles worldwide. A noticeable deviation between bench test results and actual road use was established solely for this type of engine. Volkswagen is working intensely to eliminate these deviations through technical measures. The company is therefore in contact with the relevant authorities and the German Federal Motor Transport Authority (KBA – Kraftfahrtbundesamt).

To cover the necessary service measures and other efforts to win back the trust of our customers, Volkswagen plans to set aside a provision of some 6.5 billion EUR recognized in the profit and loss statement in the third quarter of the current fiscal year. **Due to the ongoing investigations the amounts estimated may be subject to revaluation.**
Earnings targets for the Group for 2015 will be adjusted accordingly.

Volkswagen does not tolerate any kind of violation of laws whatsoever. It is and remains the top priority of the Board of Management to win back lost trust and to avert damage to our customers. The Group will inform the public on the further progress of the investigations constantly and transparently.

82. Volkswagen has indicated it will initiate a recall and remediation of the Class Vehicles, but there is no "fix" that can be achieved that would not result in lesser mileage per gallon or degraded performance, two of the key attributes on which TDI Clean Diesel cars were sold.

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[83] *See* http://pics3.tdiclub.com/data/3209/stop-sale-note3.pdf.

> Experts Reuters spoke to indicate that two potential fixes could be needed for the two types of emissions control systems featured on 482,000 cars in the U.S., complicating the recall and refit process. Some experts opined that just a software solution could make the affected vehicles compliant with EPA regulations, reducing the performance characteristics of the engines in the process, while others suspect that a hardware solution may be needed for older vehicles without the urea injection system.
>
> A couple of experts warned that the potential solution could involve significantly increased consumption of urea, necessitating fill-ups at more frequent intervals such as every 5,000 miles, in addition to reducing the performance of the engines.[84]

The same point was made by the West Virginia AG in a complaint filed on October 2 against Volkswagen for civil penalties. It is attached as Exhibit 8. In that complaint, the West Virginia AG notes that "Volkswagen will not be able to comply with the EPA [recall] order to make the Affected Vehicles comply with emissions standards without substantially degrading their performance and fuel efficiency to a level below that advertised by Volkswagen, and below that experienced by consumers prior to, or when they purchased their vehicles." Thus, there is no valid "cure" for Volkswagen's conduct.

83. Nor can any recall cure the tarnished reputation of Volkswagen's TDI Clean Diesel vehicles and the substantial diminution of their resale value. The Kelley Bluebook has reported that prices for used Volkswagen diesel cars have declined by 21% in the last few weeks, reflecting the aftermath of Dieselgate.[85] Thus, customers not only overpaid when they bought the Class Vehicles, but have suffered a significant diminution of the resale value of their vehicles. Indeed, a survey of 460 fleet buyers in the United Kingdom revealed that 49% of them were reconsidering their contracts with Volkswagen in the aftermath of the Dieselgate revelations.[86]

84. As noted above, the Executive Committee of the Board that accepted his retirement

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[84] http://autoweek.com/article/car-news/vw-diesel-emissions-fix-may-require-2-solutions.

[85] http://www.latimes.com/business/autos/la-fi-hy-auto-sales-20151001-story.html.

[86] http://www.dailymail.co.uk/money/news/article-3258793/VW-scandal-deepens-revealed-half-company-car-buyers-ditch-embattled-firm.html.

said that it "recognizes the economic damage caused" as well as the "loss of trust" among customers. No recall and supposed remediation can correct that.

85. A survey of vehicle owners conducted by AutoPacific[87] further reveals consumer disgust with Volkswagen. Only one in four have a positive opinion of Volkswagen, compared to three in four before the scandal. The corresponding figures for Audi were 29%, as opposed to 69%. Sixty-four percent of the survey respondents say they do not trust Volkswagen.

86. But the illegal conduct by Volkswagen has not just resulted in economic damage and loss of consumer trust. It has caused **the death of dozens of people in the United States over the last seven years and degraded the health of many more**. On October 3, Associated Press ("AP") laid out the facts.[88] AP calculated exhaust pollution year by year, starting with the ten to 40 times emissions level estimate by the EPA and then factored in mileage and car number totals from the Kelley Blue Book. It came up with a range of NOx pollution caused by the Class Vehicles and then took it to scientists who modeled mortality rates, which were confirmed by a dozen experts in emissions, risk and public health, none of whom were environmental advocates or representatives of automobile manufacturers. The results are depicted in the chart that follows.

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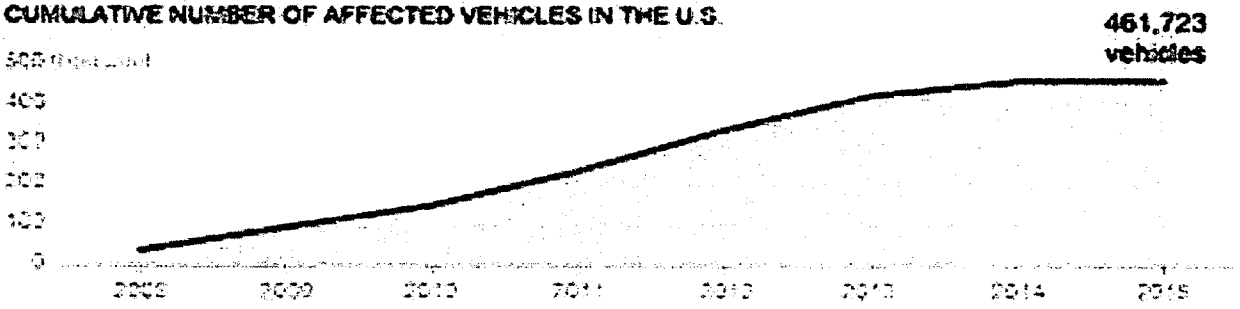
[87] http://www.autopacific.com/news-app/story.248/title.volkswagen-s-reputation-takes-big-hit-with-vehicle-owners-autopacific-predicts-tough-road-ahead.

[88] http://bigstory.ap.org/article/a6925f0af82e44aaa1a1ed4b55d030f6/ap-analysis-dozens-deaths-likely-vw-pollution-dodge.

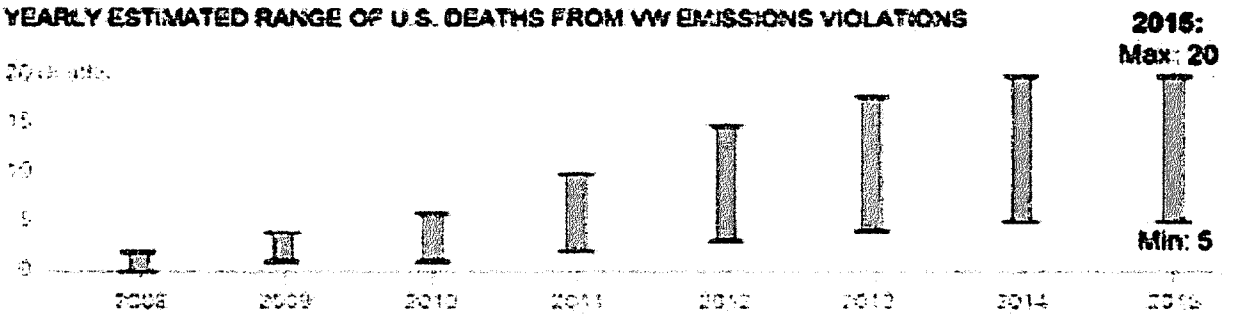
Calculating human toll of VW emissions problems

U.S. pollution resulting from Volkswagen's dodging of emissions tests is enough to have caused dozens of deaths since 2008. An AP analysis calculated upper and lower limits of pollution using the number of affected vehicles each year and average mileage. Scientists used that data in epidemiological computer models to estimate a range of deaths.

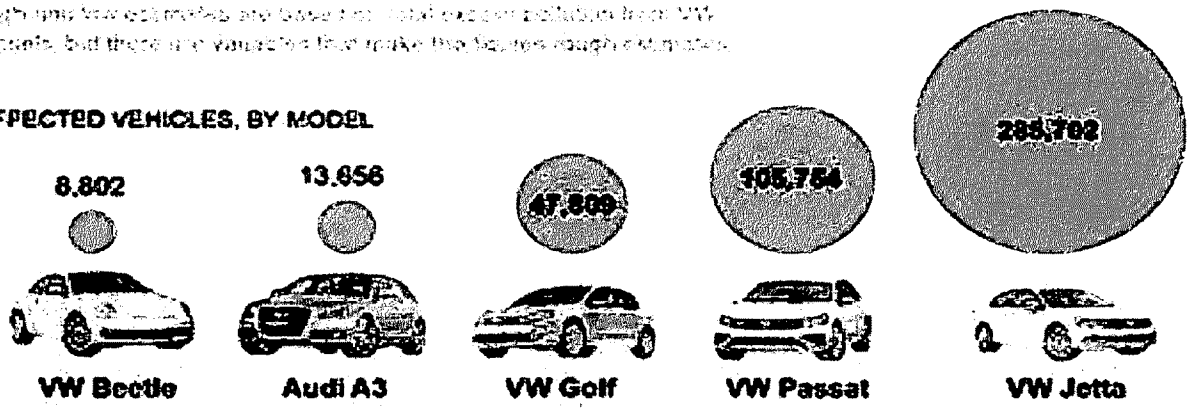
CUMULATIVE NUMBER OF AFFECTED VEHICLES IN THE U.S.



YEARLY ESTIMATED RANGE OF U.S. DEATHS FROM VW EMISSIONS VIOLATIONS



AFFECTED VEHICLES, BY MODEL



87. As the AP article notes, the Class Vehicles spewed enough NOx over the course of seven years to significantly degrade the environment in urban areas. Eric Schneiderman, the New York AG has said that "[t]he stakes could not be higher for the health and safety of our communities who, if Volkswagen's own admissions are true, have for years been breathing air containing excess pollution from their vehicles."[89] Harris County Texas (where the City of Houston is located) has already sued Volkswagen for $100 million in harm to air quality.[90]

88. As noted in the *Minneapolis Star-Tribune* in a follow-up piece on the AP story:

> Computer software allowed VW diesel cars to spew between 10 to 40 times more nitrogen oxides (NOx) than allowed by regulation, making this "clearly a concern for air quality and public health," said Janet McCabe, acting air quality chief for the U.S. Environmental Protection Agency.
>
> Nitrogen oxides mostly form smog — that murky, dirty air that makes it hard to see and for some people to breathe — but also amplify a deadlier, larger problem: tiny particles of soot. Numerous medical studies show those tiny particles cause about 50,000 deaths a year in the United States, mostly from heart problems.
>
> Nitrogen oxides can travel hundreds of miles, so pollution spewed in Pittsburgh can be felt on the East Coast, [Carnegie Mellon environmental engineer Professor Peter] Adams said.
>
> Experts calculate how much pollution costs society by looking at the value of lost lives. In this case, Adams and other said the lost lives — valued at $8.6 million apiece — overwhelm other costs such as lost work days or hospital costs. The overall annual cost of the extra pollutants from the VW diesels ranged from $40 million to $170 million, environmental engineering professors calculated. "Even the small increase in NOx from VW diesel emissions is likely to have worsened pollution along the roadways where they have traveled, and affected the lives of hundreds of thousands of people," said Dan Greenbaum, president of the Health Effects Institute in Boston.

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[89] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

[90] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

> "To say millions of people of people are breathing poor air as the result of that is not off the mark," said Greenbaum, who runs the institute that is funded by both the EPA and the auto industry to serve as an independent arbiter of the science.[91]

89. The revelation of the scandal has led to numerous consequences in the United States. The DOJ is conducting a criminal probe of Volkswagen.[92] AGs in 30 states have initiated their own investigation.[93] A Texas judge has issued a temporary restraining order preventing the Class Vehicles from being sold within the state. *See* Exhibit 9 to the Complaint. The Subcommittee of Oversight & Investigations of the Energy & Commerce Committee of the United States House of Representatives has initiated an investigation and sent letters to Volkswagen and the EPA.[94] Horn has said he will testify before the committee on October 8.[95] Fred Upton, the chairman of the full committee, has stated that "[t]he very notion of a carmaker intentionally violating our environmental laws is beyond belief....[R]eports of Volkswagen selling cars with devices aimed at skirting the law cannot, and will not be tolerated. Attempting to deceive regulators and customers is a double whammy of betrayal."[96] Nearly 200 private lawsuits have been filed, many of them class actions. Among those class actions, most involve class claims for individual statewide classes, as opposed to federal claims for nationwide classes.

90. Outside the United States, several countries are investigating Volkswagen's

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[91] http://www.startribune.com/ap-analysis-dozens-of-deaths-likely-from-vw-pollution-dodge/330512421/.

[92] http://www.wsj.com/articles/u-s-justice-department-conducts-criminal-probe-of-volkswagen-sources-say-1442869059.

[93] http://www.law360.com/articles/707229/volkswagen-faces-multistate-probe-over-emissions-fraud.

[94] http://energycommerce.house.gov/press-release/committee-leaders-request-documents-volkswagen-investigation-continues.

[95] http://www.detroitnews.com/story/business/autos/foreign/2015/10/01/vw-congress/73159518/.

[96] http://energycommerce.house.gov/press-release/suboversight-schedules-volkswagen-hearing-october-8.

conduct.[97] Switzerland has banned the sale within its borders of certain Volkswagen TDI Diesel cars sold in Europe.[98] Prosecutors in Paris have launched an investigation for suspected "aggravated" deception of affected vehicles sold in France; French Environment Minister Segolene Royal called Volkswagen's conduct "a form of theft from the taxpayer and the state."[99] The Italian antitrust authority has also commenced an investigation, saying "Volkswagen's claims about emissions and certifications in advertising campaigns and information brochures distributed by dealers might have induced consumers to make an error in their choice."[100]

91. As noted above, Volkswagen has set aside $7.2 billion to deal with the costs of the scandal. That will not be nearly enough. James E. Tierney, a former AG in Maine, has been quoted as saying that the costs to Volkswagen might be "'incalculable,' with each false advertisement to consumers, for example, carrying a potential penalty. 'This product was designed to operate illegally, and that is very serious.'"[101]

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[97] https://en.m.wikipedia.org/wiki/Volkswagen_emissions_violations.

[98] http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models.

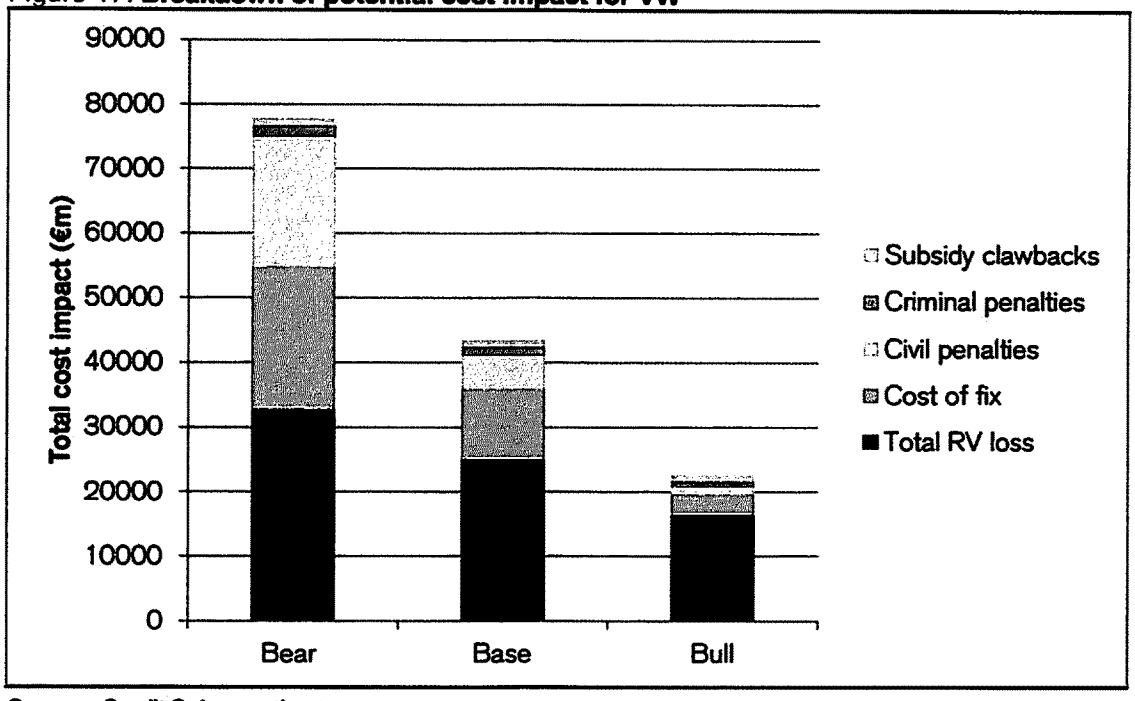
[99] http://www.dailymail.co.uk/news/article-3257720/Paris-prosecutors-latest-launch-investigation-potential-fraud-Volkswagen-emissions-cheating-scam.html.

[100] http://www.morningstar.com/news/dow-jones/TDJNDN_201510023140/italy-antitrust-body-opens-case-against-volkswagen-over-emissions.html.

[101] http://mobile.nytimes.com/2015/10/03/business/us-states-jumping-into-investigation-of-vw-emissions-deception.html?_r=0&referer=https://www.google.com/.

92. Nonetheless, some attempts at calculation have been made. On October 2, Credit Suisse disseminated an analysis showing Volkswagen's anticipated costs in a "bull" scenario (where events turned out favorably to it), a "base" scenario, and a "bear" scenario (where events turned out unfavorably).[102] The "bull" scenario was $25.6 billion in costs, while the "bear" scenario was $87.1 billion. The analysis is summarized in the following chart:

Figure 17: **Breakdown of potential cost impact for VW**



Source: Credit Suisse estimates

As can be seen, costs associated with criminal and civil penalties make up a significant portion of the differing amounts. Credit Suisse also predicts that Volkswagen's stock may decline another 20%.

VI. CLASS ACTION ALLEGATIONS.

93. Plaintiffs bring this action both on behalf of themselves, and as a class action pursuant to Federal Rules of Civil Procedure 23(a) and (b)(3), on behalf of the following class (the

[102] http://www.businessinsider.com/credit-suisse-volkswagen-shares-could-fall-another-20-2015-10?r=UK&IR=T.

VW FOIA, EPA 06/20/2017 2017-FFP_031105

"Class").

> All persons and entities who purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. Excluded from the Class are Defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.

The Class includes subclasses of persons located in California and Virginia. These will be referred to herein as the "California Subclass" and the "Virginia Subclass."

94. Plaintiffs do not know the exact number of Class and Subclass members but believe based on published reports that there are more than 482,000 Class members, geographically dispersed throughout the United States such that joinder of all class members is impracticable. The identity of Class members can be determined from the internal records of Volkswagen.

95. Plaintiffs' claims are typical of the claims of the Class and Subclasses in that Plaintiffs purchased or leased a Class Vehicle from a Volkswagen Authorized Dealer in the United States. All Class and Subclass members were damaged by the same wrongful conduct of Defendants and their co-conspirators as alleged herein, and the relief sought is common to the class.

96. Common questions of law and fact predominate over any individual questions. These questions include, but are not limited to:

- Whether Volkswagen unlawfully acquired a monopoly in the Clean Diesel Car Market;
- Whether the Clean Diesel Car Market is a properly defined product market for purposes of Section 2 of the Sherman Act;
- Whether Volkswagen's acquisition and/or maintenance of a monopoly in the Clean Diesel Car Market had the effect of increasing to supracompetitive levels the retail prices of Class Vehicles;
- Whether Volkswagen violated the CAA and applicable regulations;
- Whether Volkswagen violated California Pollution Control laws and applicable

regulations;

- Whether Volkswagen's conduct violated RICO;
- Whether the Volkswagen RICO Enterprise as defined herein is a cognizable RICO enterprise;
- Whether Volkswagen committed federal mail and wire fraud, thus establishing predicate acts under RICO:
- Whether Volkswagen engaged in a pattern of racketeering activity;
- Whether Plaintiffs and Class members were injured in their business or property, and, if so, what is the appropriate measure of their damages;
- Whether Volkswagen misrepresented the environmental impact of its Class Vehicles;
- Whether Volkswagen misrepresented the Class Vehicles' emission standards compliance, fuel efficiency or performance;
- Whether Volkswagen violated the Magnuson-Moss Warranty Act;
- Whether Volkswagen violated California's Consumer Legal Remedies Act;
- Whether Volkswagen violated California's Unfair Competition Law;
- Whether Volkswagen violated California's False Advertising Law;
- Whether Volkswagen violated Virginia's Consumer Protection Law;
- Whether Volkswagen committed fraudulent concealment;
- Whether Volkswagen was unjustly enriched;
- Whether Plaintiffs and the other members of the Class and Subclasses were injured by Defendants' conduct, and, if so, the appropriate classwide measure of damages for Class members; and
- The scope of any injunctive and other equitable relief to which Plaintiffs and the other members of the Class and Subclasses are entitled.

97. These and other questions of law and fact are common to the Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_031107

predominate over any questions affecting only individual Class members.

98. Plaintiffs' claims are typical of the claims of the Class and Subclasses because Plaintiffs purchased a Class Vehicle from a Volkswagen Authorized Dealer in the United States.

99. Plaintiffs will fairly and adequately represent the interests of the Class and Subclasses in that they have no conflict with any other members of the Class and Subclasses. Furthermore, Plaintiffs have retained competent counsel experienced in antitrust, class action, and other complex litigation.

100. Defendants have acted on grounds generally applicable to the Class, thereby making final injunctive relief appropriate with respect to the Class and Subclasses as a whole.

101. This class action is superior to the alternatives, if any, for the fair and efficient adjudication of this controversy. Prosecution as a class action will eliminate the possibility of repetitive litigation. There will be no material difficulty in the management of this action as a class action. The prosecution of separate actions by individual Class and Subclass members would create the risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

CAUSES OF ACTION

FIRST CLAIM

Violation of the Section 2 of the Sherman Antitrust Act (Monopolization) (15 U.S.C. § 2).

102. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

103. The relevant product market for purposes of Plaintiffs' claims under Section 2 of the Sherman Act is the Clean Diesel Car Market, which, as noted above, consists of: (a) the product market of Clean Diesel passenger cars and (b) a geographic market consisting of the United States. All diesel fuel sold in the United States during the relevant period is "clean diesel fuel", with 97% less sulfur than the diesel sold in the 1970s. Similarly, all diesel cars sold in the United States since 2007 (which have had to meet the same emission standards as gasoline engines) have advanced engines and emissions control technology that make the diesel engines cleaner than in

VW FOIA, EPA 06/20/2017 2017-FFP_031108

the past, are able to take advantage of the clean diesel fuel, and use exhaust systems that further reduce diesel engine emissions.

104. As Volkswagen's own market research and market research by others described above have demonstrated, clean diesel cars are not in the same relevant market as gasoline or even hybrid cars of similar size and class. Diesel engines require the use of a different and more expensive fuel than gasoline-powered engines, can travel much greater distances on a single tank of fuel, and are more expensive. Unlike hybrid or electric vehicles, diesel-powered vehicles do not have to be plugged in, can travel greater distances without refueling or plugging in, and -- particularly with more recent compression technology like the Volkswagen's TDI engines -- have greater torque, acceleration, and towing power. In addition, the demographics of the clean diesel buyers are distinct from those of hybrid buyers; they are more likely to be male, younger, and less likely to have children.

105. At all relevant times, Volkswagen has been a competitor in the Clean Diesel Car Market, and has maintained significant market share. As the chart presented by Skorupski of VWoA depicted above demonstrates, Volkswagen's share of the Clean Diesel Car Market has been 70% or more during the entire relevant period.

106. Barriers to entry in the Clean Diesel Car Market are high. In addition to the barriers to entry and expansion posed by Volkswagen's anticompetitive conduct, as described in this Complaint, other barriers to entry include: high research and development costs, high costs of making diesel engines that are EPA- and CARB-compliant, and high capital costs.

107. Consumers, experts and commentators in the automotive industry, and the automobile manufacturers themselves, including Volkswagen, all recognize the Clean Diesel Car market as distinct from markets including gasoline, hybrid, or electric cars.

108. Volkswagen has monopoly power in the Clean Diesel Car Market.

109. Through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class, Volkswagen has willfully acquired and/or maintained its

VW FOIA, EPA 06/20/2017 2017-FFP_031109

monopoly of the Clean Diesel Car Market. This conduct has harmed competition in that market, and has caused injury to every person that purchased or leased a Class Vehicle. The purchase or lease price was higher than it would have been in a competitive market; the supply and selection of products was lower than it would have been in a competitive market; innovation has been stifled; and the number and effectiveness of competitors in that Market has been diminished by unlawful means.

110. As a result of this violation of law, the price of Class Vehicles was higher than it otherwise would have been.

111. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

112. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of section two the Sherman Act (15 U.S.C. § 2).

113. Plaintiffs are buyers of Class Vehicles in the Clean Diesel Car Market; they are thus direct participants in the monopolized market. Volkswagen issues warranties directly to Class Vehicle buyers. The Volkswagen Authorized Dealers[103] obtain Class Vehicles from Volkswagen (through its American subsidiaries) that are certified to be EPA- and/or CARB-compliant and, as noted above, have visible stickers to that effect. The emissions testing that is used to justify those certifications is undertaken by VWoA in the United States.[104] Class Vehicles so labeled are

[103] In a recent recall notice unrelated to Dieselgate, Volkswagen has indicated that it has 652 authorized dealers in the United States. https://media.vw.com/doc/1456/volkswagen_issues_voluntary_recall-tiguan_label_recall_release-17883691505565f01ccc4bb.pdf. Their names and addresses can be identified through Volkswagen's records. The Volkswagen Authorized Dealers have a 12-person National Dealer Advisory Council that interacts closely with VWoA on such issues as company management.

[104] http://www.manufacturing.net/news/2015/10/vw-pollution-test-site-under-scrutiny-amid-emissions-cheating-scandal.

displayed on the showroom floors of Volkswagen Authorized Dealers. The false certifications by Volkswagen were one of the critical elements of its unlawful scheme of monopolization. The Volkswagen Authorized Dealers were agents of Volkswagen for the purpose of disseminating these false certifications and representations by Volkswagen to customers in order to induce them to purchase TDI Clean Diesel vehicles. In addition, Volkswagen (through its American subsidiaries) sets the Manufacturer's Suggested Retail Price ("MSRP") for Class Vehicles, which includes the premium for the TDI Clean Diesel technology described herein. While Volkswagen Authorized Dealers could charge customers a price less than the MSRP (such as when Volkswagen provides rebates or short-term retail promotions), that lesser price is nonetheless keyed off the MSRP and still contains a portion of the premium for the sham TDI Clean Diesel technology. This case involves retail prices for Class Vehicles paid by consumers like plaintiffs, who are participants in the relevant market and who pay more for those vehicles because of Volkswagen's illegal monopolistic practices.

SECOND CLAIM

Violation of Section 2 of the Sherman Antitrust Act (Attempted Monopolization) (15 U.S.C. § 2).

114. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

115. Volkswagen has acted with specific intent to monopolize the Clean Diesel Car Market as described above through the anticompetitive use of the defeat device and its deception of the EPA, CARB, Plaintiffs, and the Class.

116. There was and is a dangerous probability that Volkswagen will succeed in its attempt to monopolize the Clean Diesel Car Market because Volkswagen controls a large percentage of that market and has the ability to and actually did exclude competitors through the anticompetitive conduct described in this Complaint.

117. Volkswagen's conduct has harmed competition in the Clean Diesel Car Market, making the supply and selection of available Clean Diesel Cars lower than it would be in a competitive market.

VW FOIA, EPA 06/20/2017 2017-FFP_031111

118. There is no legitimate business justification for the conduct described in this Complaint which has facilitated Volkswagen's monopolization of the Clean Diesel Car Market.

119. The anticompetitive conduct described in this Complaint has caused injury to the business or property of Plaintiffs and members of the Class and is in violation of the Sherman Act (15 U.S.C. § 2).

THIRD CLAIM

Violation of the Racketeer Influenced and Corrupt Organizations Act ("RICO") (18 U.S.C. §§ 1962(c), 1964).

120. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

121. Each Plaintiff is a "person" within the meaning of 18 U.S.C. § 1964(c), and each has sustained injury to his or her business or property as a result of Volkswagen's conduct described in this Complaint.

122. Each Defendant is a "person" within the meaning of 18 U.S.C. § 1961(3).

123. Defendants violated 18 U.S.C. §1962(c) by participating in or conducting the affairs of the Volkswagen RICO Enterprise through a pattern of racketeering activity.

124. For the past seven years, Volkswagen has engaged in a deliberate, pre-meditated and continuous effort to deceive Plaintiffs, members of the Class, and federal and state regulators into believing that the Class Vehicles are environmentally-friendly, fuel-efficient, and EPA- and CARB-compliant. Unknown to Plaintiffs, Class members and federal and state regulators, Volkswagen installed pollution control defeat devices into the Class vehicles that turned off the pollution controls when the cars were in normal operating mode.

125. Plaintiffs and Class members had no way of knowing that these systems were disabled by Volkswagen. Pursuant to the CAA, Volkswagen was required to equip its cars with on-board diagnostic systems that trigger a dashboard "check engine" light that alerts the driver of a possible pollution control device malfunction. The Class Vehicles' diagnostic systems did not trigger this "check engine light," because the defeat device was designed to evade EPA and CARB pollution controls.

VW FOIA, EPA 06/20/2017 2017-FFP_031112

126. In dozens of advertising campaigns and statements and in certifications of EPA and CARB compliance Volkswagen has falsely represented the Class Vehicles' "green credentials" and performance.

127. Volkswagen engaged in a common course of conduct and conspiracy with the common purpose of defrauding Plaintiffs and members of the Class into purchasing Class Vehicles at artificially inflated prices.

The Volkswagen RICO Enterprise.

128. Volkswagen conducted the affairs of an association-in-fact enterprise (the "Volkswagen RICO Enterprise") through a pattern of racketeering activity, in violation of 18 U.S.C. § 1962(c).

129. The enterprise engaged in and continues to engage in interstate commerce, and its activities affect interstate commerce.

130. The Volkswagen RICO Enterprise is an association-in-fact enterprise comprised of the Defendants and Volkswagen Authorized Dealers in the United States. Each participant in the Enterprise played a designated, well-defined role in the affairs of the Volkswagen RICO Enterprise.

131. Volkswagen designed, manufactured, and sold to Volkswagen Authorized Dealers the Class Vehicles containing the defeat devices that are the subject of this Complaint. Volkswagen developed the advertising campaigns that misrepresented to Plaintiffs and Class members the true nature of the Class Vehicles, which were not, contrary to Defendants' misrepresentations, environmentally-friendly, fuel-efficient, or EPA- or CARB-compliant. Volkswagen deceptively certified the Class Vehicles as EPA- and CARB-compliant. And Volkswagen lied to CARB and EPA officials about the full nature and extent of the problem.

132. The Volkswagen Authorized Dealers that sold and leased the Class Vehicles to Plaintiffs and members of the Class were a critical element of the Volkswagen RICO Enterprise. Volkswagen sold the Class Vehicles to Volkswagen Authorized Dealers, who then sold or leased

VW FOIA, EPA 06/20/2017 2017-FFP_031113

them to Plaintiffs and members of the Class. Whether or not the Volkswagen Authorized Dealers knew that the Class Vehicles contained defeat devices that made Volkswagen's advertisements and representations false, the Volkswagen Authorized Dealers displayed those advertisements and repeated those misrepresentations. Indeed, Volkswagen required Volkswagen Authorized Dealers to display and repeat those misrepresentations in the Volkswagen and Audi Standard Dealer Agreements.

133. The Volkswagen RICO Enterprise has an ascertainable structure and purpose beyond the scope and commission of Volkswagens' predicate acts and conspiracy to commit such acts. The Enterprise is separate and distinct from Defendants, and functions as a continuing unit. The members of the Enterprise have distinct and separate roles and responsibilities.

134. At all relevant times, Volkswagen operated, controlled or managed the Volkswagen RICO Enterprise. Volkswagen's participation was critical for the success of the scheme to defraud because Volkswagen manufactured the Class Vehicles, designed and installed the defeat devices, and concealed those devices from Plaintiffs, Class members and regulatory authorities.

135. Section 1961(1)(B) of RICO defines "racketeering activity" as any act indictable under 18 U.S.C. §§1341 (mail fraud) and 1343 (wire fraud), among other statutes. As described in this Complaint, Volkswagen's conduct violated both of these laws.

136. Volkswagen conducted the affairs of the Volkswagen RICO Enterprise through a "pattern of racketeering activity," as defined by 18 U.S.C. §1961(5) by committing at least two acts of racketeering activity, *i.e.*, indictable violations of 18 U.S.C. §§1341 and 1343, within the past ten years. In fact, Volkswagen has committed dozens of acts of racketeering activity. Each racketeering act was related, had a similar purpose, involved the same or similar participants and method of commission, had similar results and impacted similar victims, including the Plaintiffs and members of the Class.

137. Defendants' multiple acts of racketeering activity were related to each other and amount to continued racketeering activity, and therefore constitute a "pattern of racketeering

VW FOIA, EPA 06/20/2017 2017-FFP_031114

activity" as defined in 18 U.S.C. §1961(5).

Predicate Act Violations of 18 U.S.C. §§1341 and 1343.

138. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1341 (mail fraud), placed in post offices and/or in authorized repositories, matter and things to be sent or delivered by the U.S. Postal Service, caused matter and things to be delivered by commercial interstate carriers, and received matter and things from the U.S. Postal Service and/or commercial interstate carriers, including, but not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

139. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §1343 (wire fraud), transmitted and received by wire, matter and things, which include, but are not limited to, advertising materials, marketing and sales materials, correspondence, contracts, sales and leasing documents, Certificates of Compliance, communications with the EPA, CARB, and other regulatory officials, and other materials relating to the Class Vehicles sold and leased to Plaintiffs and Class members.

140. For the purpose of executing the fraudulent scheme described in this Complaint, Volkswagen, in violation of 18 U.S.C. §§1341 and 1343, made numerous material misrepresentations about the Class Vehicles' environmental impact, fuel efficiency, and EPA- and CARB-compliance, and made many material omissions of fact, including concealing that the cars contained defeat devices that rendered them non-compliant with applicable emissions standards. Volkswagen made these misrepresentations and omissions with the intent and effect of inducing Plaintiffs to rely on such misrepresentations and omissions.

141. Defendants' misrepresentations, omissions of material facts, acts of concealment, and failures to disclose, were knowing and intentional, and made for the purpose of deceiving

VW FOIA, EPA 06/20/2017 2017-FFP_031115

Plaintiffs and Members of the Class into purchasing and leasing Class Vehicles.

142. Defendants either knew or recklessly disregarded the fact that the misrepresentations and omissions described above and incorporated herein were material, and Plaintiffs and Class members relied on the misrepresentations and omissions as set forth above.

143. Volkswagen's affirmative and deliberate misrepresentations regarding the Class Vehicles' environmental friendliness, fuel efficiency and performance, and omission of the true facts, were material factors in inducing Plaintiffs and Class members to purchase and lease the Class Vehicles. Plaintiffs and Class members relied on those misrepresentations and omissions and would have not purchased or leased the vehicles in their absence, or, at a minimum, would have paid significantly less than they did.

144. Each act of deception, as described in this Complaint, constitutes a violation of 18 U.S.C. §§1341 (mail fraud) or 1343 (wire fraud), and constitutes an act of "racketeering activity" as defined in 18 U.S.C. §1961(5).

145. As a result, Plaintiffs and Class members have been injured in their business and property within the meaning of 18 U.S.C. §1964(c). Plaintiffs' and Class members' damages include, but are not limited to: purchasing or leasing Class Vehicles that they would not otherwise have purchased or leased; paying more for Class Vehicles than they would have otherwise paid if they had known the true facts concerning the defeat devices; and purchasing Class Vehicles, the value of which has been severely diminished, thus reducing their residual and/or resale value.

146. Volkswagen's RICO violations directly and proximately caused injury to the business and property of Plaintiffs and Class members, and Plaintiffs and Class members are entitled to three times their actual damages, as well as injunctive and other equitable relief, plus their costs and reasonable attorneys' fees.

FOURTH CLAIM

Violation of the Magnuson-Moss Warranty Act (15 U.S.C.§ 2301 *et seq.*)

147. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

148. Plaintiffs and the Class bring this claim under the Magnuson-Moss Warranty Act, 15 U.S.C. § 2301 *et seq.*

149. The Class Vehicles are consumer products as defined in 15 U.S.C. §2301(1).

150. Volkswagen is a supplier and warrantor as defined in 15 U.S.C. §2301(4), (5).

151. Plaintiffs and the Class received written warranties as defined in 15 U.S.C. §2301(6)(A) and/or (B), which Volkswagen has breached.

152. Plaintiffs and the Class are "consumers" as defined in 15 U.S.C. §2301(3). They are consumers because they bought a Class Vehicle and are entitled to enforce both written and implied warranties.

153. Pursuant to 15 U.S.C. § 2310(e), Plaintiffs and the Class are not required to provide Defendants notice of this class action and an opportunity to cure until the time the Court determines the representative capacity of Plaintiffs pursuant to Fed.R.Civ.P. 23.

154. Volkswagen is liable to Plaintiffs and the Class pursuant to 15 U.S.C. § 2310(d)(l) because it breached its written warranties.

155. Further, in connection with the sale of the Class Vehicles, Volkswagen gave an implied warranty under the Act. As part of that implied warranty, Volkswagen warranted that the Class Vehicle complied with all applicable federal and state regulations, including emission regulations. Volkswagen breached the implied warranty of merchantability.

156. Plaintiffs and the Class are entitled to damages caused by Volkswagen's breaches of the warranties, including economic damages based upon either a return of Plaintiffs' and Class Members purchase price; and/or the difference between the price paid for the Class Vehicle as warranted and the actual value of the Class Vehicle as delivered, and consequential damages.

157. In addition, Plaintiffs and the Class are entitled to reasonable attorneys' fees and costs as determined by the Court.

VW FOIA, EPA 06/20/2017 2017-FFP_031117

FIFTH CLAIM

Violations of the Consumers Legal Remedies Act (California Civil Code § 1750 *et seq.*)

158. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

159. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

160. This cause of action is brought pursuant to the California Consumers Legal Remedies Act ("CLRA"), Civil Code §1750, *et seq*. Plaintiffs bring this action on their own behalf and on behalf of the California Subclass, all of whom are similarly situated consumers within the meaning of Civil Code §1781.

161. The acts and practices described in this Complaint were intended to result in the sale of goods, specifically a motor vehicle, in consumer transactions. Volkswagen has violated, and continue to violate California Civil Code § 1770, subdivisions (a)(9), (a)(7), (a)(16), and (a)(5) by:

- Representing to consumers purchasing the Class Vehicles that these vehicles' emissions, fuel efficiency and high performance are as advertised and publicized.
- Representing in their advertising emissions, environmental, fuel efficiency and performance characteristics for the Class Vehicles that are false.

162. Plaintiffs Bourn, Watson, and Verner and the California Subclass members have suffered harm as a result of these violations.

163. Plaintiffs Bourn, Watson, and Verner and California Subclass members have suffered harm as a result of Volkswagen's unlawful conduct because they purchased the Class Vehicles believing, based on Volkswagen's representations, that the Class Vehicles had certain characteristics that made them environmentally friendly, fuel efficient and high performance, when in fact these vehicles cannot have these fuel efficient and performance standards because their emissions do not comply with federal and state laws and regulations. These misrepresentations also resulted in higher purchase prices for the Class Vehicles and the subsequent revelation

VW FOIA, EPA 06/20/2017 2017-FFP_031118

concerning the "defeat devices" will result in lower resale value.

164. Volkswagen concealed from Plaintiffs Bourn, Watson, and Verner accurate information concerning the emissions standards, fuel efficiency and performance of the California Subclass Vehicles.

165. Volkswagen's misrepresentations and omissions described in the preceding paragraphs were intentional, or alternatively, made without the use of reasonable procedures adopted to avoid such errors.

166. Volkswagen, directly or indirectly, has engaged in substantially similar conduct with respect to Plaintiffs Bourn, Watson, and Verner and to each member of the California Subclass.

167. Unless Volkswagen is enjoined from engaging in such wrongful actions and conduct in the future, members of the consuming public will be further damaged by Volkswagen's conduct.

168. Plaintiffs Bourn, Watson, and Verner and the Class are entitled to equitable relief on behalf of the members of the California Subclass in the form of an order, pursuant to Civil Code §1780, subdivision (a)(2)-(5), prohibiting Volkswagen from continuing to engage in the above-described violations of the CLRA. Plaintiffs Bourn, Watson, and Verner and the California Subclass further seek reasonable attorneys' fees under Civil Code §1780(e).

SIXTH CLAIM

Violation of California Unfair Competition Law (Cal. Bus. & Prof. Code § 17200, *et seq.*)

169. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

170. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

171. California Business & Professions Code §17200, *et seq.* prohibits acts of "unfair competition" which is defined by California Business & Professions Code § 17200 as including

VW FOIA, EPA 06/20/2017 2017-FFP_031119

any "any unlawful, unfair or fraudulent business act or practice ...."

172. Volkswagen has violated and continues to violate California Business & Professions Code §17200's prohibition against engaging in "unlawful" business acts or practices, by, inter alia, the following:

- Violating the CAA and applicable regulations;
- Violating California's Air Pollution Control laws and applicable regulations;
- Violating the Sherman Act;
- Violating RICO;
- Violating the Magnuson-Moss Act;
- Violating the CLRA; and
- Violating California's False Advertising Law.

173. Volkswagen also acted fraudulently and unfairly for purposes of section 17200. Volkswagen's misrepresentations and omissions regarding the Class Vehicles' emissions, environmental standards, fuel efficiency, and performance in their advertising, public statements and marketing were a material factor in inducing Plaintiffs Bourn, Watson, and Verner to purchase their Class Vehicle. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's unlawful business acts and practices and California Subclass members have suffered harm when each was required to pay a purchase price for their Class Vehicles which they never would have purchased if the true facts were known; or paid a price in excess of what a California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Vehicles.

174. As a result of Volkswagen's violations of the California Business & Professions Code §17200, *et seq.*, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution for the inflated sale price of the Vehicles.

VW FOIA, EPA 06/20/2017 2017-FFP_031120

175. Plaintiffs Bourn, Watson, and Verner and California Subclass members also seek an order enjoining Volkswagen from continuing their unlawful business practices and from such future conduct.

SEVENTH CLAIM

Violation of the California False Advertising Law (Cal. Bus. & Prof. Code § 17500, *et seq.*)

176. Plaintiffs Bourn, Watson, and Verner incorporate by reference each preceding and succeeding paragraph.

177. Plaintiffs Bourn, Watson, and Verner bring this Claim on behalf of the California Subclass.

178. Volkswagen violated California's False Advertising Law, Business & Professions Code §17500, *et seq.*by using false and misleading messages regarding the environmental friendliness, emissions, fuel efficiency and performance of the Class Vehicles in television, print, and Internet advertising.

179. These representations and/or omissions have deceived and are likely to deceive Plaintiffs Bourn, Watson, and Verner, the California Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiffs Bourn and Watson's decision to purchase their Class Vehicle. Had Plaintiffs Bourn, Watson, and Verner known the actual facts, they would not have purchased the Class Vehicles and/or paid more than they would have had Volkswagen accurately disclosed the Class Vehicles' true characteristics.

180. Volkswagen directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the California Subclass.

181. Plaintiffs Bourn, Watson, and Verner suffered injury in fact and lost money and/or property as a result of Volkswagen's false and misleading advertising and California Subclass members suffered harm when each was required to pay a purchase price in excess of what a

VW FOIA, EPA 06/20/2017 2017-FFP_031121

California Subclass member would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics and in the form of decreased resale value of the Class Vehicles.

182. As a result of Volkswagen's violations, Plaintiffs Bourn, Watson, and Verner and California Subclass members are entitled to equitable relief in the form of full restitution of all monies paid for the sales price of the Vehicles, diminished value of the Class Vehicles, and/or disgorgement of the profits derived from Volkswagen's false and misleading advertising.

183. Plaintiffs Bourn, Watson, and Verner also seek an order enjoining Volkswagen from such future conduct.

EIGHTH CLAIM

Violation of the Virginia Consumer Protection Act (Va. Code Ann. §§59.1-196, *et seq.*)

184. Plaintiff Schumacher incorporates by reference each preceding and succeeding paragraph.

185. Plaintiff Schumacher brings this Claim on behalf of the Virginia Subclass, which is cognizable in this Court pursuant to *Shady Grove Orthopedic Assocs., P.A. v. Allstate Ins. Co.*, 559 U.S. 393 (2010).

186. Defendants are "persons" within the meaning of Va. Code Ann. §59.1-200(A).

187. Volkswagen violated the Virginia Consumer Protection Act, which prohibits "...(5) misrepresenting that goods or services have certain quantities, characteristics, ingredients, uses, or benefits; (6) misrepresenting that goods or services are of a particular standard, quality, grade, style, or model; ... (8) advertising goods or services with intent not to sell them as advertised ...; [and] (14) using any other deception, fraud, false pretense, false promise, or misrepresentation in connection with a consumer transaction[.]" Va. Code Ann. §59.1-200(A).

188. These representations and/or omissions have deceived and are likely to deceive Plaintiff Schumacher, the Virginia Subclass, and consumers across the country in connection with their decision to purchase Class Vehicles. Volkswagen's representations and/or omissions were material and constituted a substantial and material factor in Plaintiff Schumacher's decision to

VW FOIA, EPA 06/20/2017 2017-FFP_031122

purchase their Class Vehicle. Had Plaintiff Schumacher and Virginia Subclass members known the actual facts, they would not have purchased the Class Vehicles and/or would have paid less for them.

189. Volkswagen, directly and indirectly, has engaged in substantially similar conduct with respect to each Plaintiff and to each member of the Virginia Subclass.

190. Plaintiff Schumacher and Virginia Subclass members suffered injury in fact and lost money and/or property as a result of Volkswagen's Violations of the Virginia Consumer Protection Act. Plaintiff Schumacher and Virginia Subclass members suffered harm when each was required to pay a purchase price in excess of what they would have paid if Volkswagen had accurately disclosed the Class Vehicles' characteristics; they also suffered harm in the form of decreased resale value of the Class Vehicles.

191. As a result of Volkswagen's violations, Plaintiff Schumacher and Virginia Subclass members are entitled to three times the amount of actual damages or $1000, whichever is greater, as well as costs and attorneys' fees. Va. Code Ann. §§59.1-204(a), (b).

NINTH CLAIM
Unjust Enrichment

192. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

193. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of unjust enrichment, as there are no true conflicts (case-dispositive differences) among various states' laws of unjust enrichment.

194. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

195. Volkswagen received and retained a benefit from the Plaintiffs and inequity has resulted.

196. Volkswagen benefitted through its unjust conduct, by selling Class Vehicles subject

VW FOIA, EPA 06/20/2017 2017-FFP_031123

to the misrepresentation that they were EPA- and/or CARB-compliant and by failing to disclose its use of a defeat device in these vehicles.

197. Plaintiffs, were charged a premium based on this misrepresentation, overpaid for these vehicles as a result, and/or would not have purchased these vehicles at all had their noncompliance with federal and state emissions laws been disclosed.

198. It is inequitable for Volkswagen to retain these benefits.

199. Plaintiffs do not have an adequate remedy at law.

200. As a result of Volkswagen's conduct, the amount of its unjust enrichment should be disgorged, in an amount to be proven at trial.

TENTH CLAIM
Unjust Enrichment

201. Plaintiffs incorporate by reference each preceding and succeeding paragraph.

202. Plaintiffs bring this claim for unjust enrichment on behalf of the nationwide Class under the common law of fraudulent concealment, as there are no true conflicts (case-dispositive differences) among various states' laws of fraudulent concealment.

203. In the alternative, Plaintiffs bring this claim on behalf of the nationwide Class under Virginia law, because the Defendants' United States operations are headquartered in Virginia and Virginia has the most significant relationship to the issues and facts relevant to this claim.

204. Volkswagen concealed and suppressed the material facts that the Class Vehicles did not comply with federal and state emissions laws and were spewing illegal amounts of NOx when they were represented to be EPA- and/or CARB-compliant. It also concealed and suppressed the material fact that the Class Vehicles were equipped with a defeat device that prevented their proper testing under laboratory conditions for compliance with federal and state emissions laws and regulations.

205. Volkswagen took the various steps described herein to effectuate that concealment, such as false advertising and in false statements of compliance with federal and state emissions

VW FOIA, EPA 06/20/2017 2017-FFP_031124

laws and regulations affixed to each of the Class Vehicles

206. Volkswagen took steps to ensure that its employees did not reveal these concealed facts to federal and state environmental regulators.

207. Volkswagen had a duty to disclose the concealed information because it:

- Had exclusive and/or far superior knowledge and access to the facts than Plaintiffs and Class Members, and it knew the facts were not known to or reasonably discoverable by Plaintiffs and the Class;
- Intentionally concealed the foregoing from Plaintiffs; and
- Made incomplete representations about the compliance of the Class Vehicles with federal and state emissions laws and regulations, while purposefully withholding material facts from Plaintiffs that contradicted these representations.

208. These omitted and concealed facts were material because they would be relied on by a reasonable person purchasing, leasing or retaining the Class Vehicles, and because they directly impact the price paid for the Class Vehicles and their resale value. Whether the Class Vehicles comply with federal and state emissions laws and regulations is a material concern to a consumer. Plaintiffs and Class Members trusted Volkswagen not to sell or lease them vehicles that were non-compliant.

209. Volkswagen concealed and suppressed these material facts to falsely assure purchasers and consumers that the Class Vehicles complied with federal and state emissions laws and regulations, as represented by Volkswagen and reasonably expected by consumers.

210. Volkswagen actively concealed and/or suppressed these material facts, in whole or in part, to protect its profits and to avoid recalls that would hurt the brand image of the Class Vehicles and cost Volkswagen money. Volkswagen concealed these facts at the expense of Plaintiffs and the Class.

211. Plaintiffs and the Class were unaware of these omitted material facts, and would not have acted as they did if they had known of the concealed and/or suppressed information.

VW FOIA, EPA 06/20/2017 2017-FFP_031125

212. Had they been aware of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and Volkswagen's callous disregard for those laws and regulations, Plaintiffs and the Class either would have paid less for their Class Vehicles or would not have purchased or leased them at all. Plaintiffs did not receive the benefit of their bargain as a result of Volkswagen's fraudulent concealment.

213. Because of the concealment and/or suppression of the facts, Plaintiffs and the Class sustained damage because they own vehicles that diminished in value as a result of Volkswagen's concealment of, and failure to timely disclose, the non-compliance of the Class Vehicles with federal and state emissions laws and regulations.

214. The value of all Class members' Class Vehicles has diminished as a result of Volkswagen's fraudulent concealment of the non-compliance of the Class Vehicles with federal and state emissions laws and regulations and has made any reasonable consumer reluctant to purchase any of the Class Vehicles, let alone pay what otherwise would have been fair market value for the vehicles.

215. Accordingly, Volkswagen is liable to the Class for their damages in an amount to be proven at trial.

216. Volkswagen's acts were done maliciously, oppressively, deliberately, with intent to defraud, and in reckless disregard of Plaintiffs' and the Class's rights and well-being, and with the aim of enriching Volkswagen. Volkswagen's conduct, which exhibits the highest degree of reprehensibility, being intentional, continuous, placing others at risk of death and injury, and affecting public safety, warrants an assessment of punitive damages in an amount sufficient to deter such conduct in the future, which amount is to be determined according to proof.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that the Court enter judgment on their behalf and on behalf of the Class and the California and Virginia Subclasses, and:

A. Order the appointment of an independent External Compliance Monitor to monitor

VW FOIA, EPA 06/20/2017 2017-FFP_031126

Volkswagen's compliance with federal and state environmental laws;

B. Order Volkswagen to pay a portion of its annual net profits into an independent fund administered by third parties approved by the Court who can disburse the funds to non-profit organizations that seek to monitor, educate people about, and/or remediate the deleterious environmental effects of vehicular diesel fuel emissions;

C. Order that this action may proceed as a class action, with Plaintiffs as the designated Class representatives for the Class; Plaintiffs Bourn, Watson, and Verner as designated Class representatives for the California Subclass; Plaintiff Schumacher as designated Class representative for the Virginia Subclass, and Plaintiffs' counsel as Class and Subclass Counsel;

D. Adjudge and decree that Volkswagen has violated the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, the CLRA, California's Unfair Competition Law, California's False Advertising Law; the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment and that Plaintiffs and the members of the Class and the California and Virginia Subclasses have been injured in their business and property as a result of Volkswagen's violations;

E. Order that Plaintiffs and the members of the National Class and California Subclass recover damages sustained by them, to the extent provided by law, and that a judgment in favor of Plaintiffs and the Class and the California and Virginia Subclasses be entered against Volkswagen in an amount to be trebled in accordance with such laws;

F. To the extent provided by law, enjoin and restrain Volkswagen, its subsidiaries, affiliates, successors, transferees, assignees and the respective officers, directors, partners, agents, and employees thereof and all other persons acting or claiming to act on their behalf from continuing to violate the CAA, California Pollution Control laws, the Sherman Act, RICO, the Magnuson-Moss Act, CLRA, California's Unfair Competition Law, California's False Advertising Law, the Virginia Consumer Protection Act, and the common law of unjust enrichment and fraudulent concealment;

VW FOIA, EPA 06/20/2017 2017-FFP_031127

G. Order Volkswagen to pay restitution or damages to Plaintiffs and members of the Class and the California and Virginia Subclasses and to disgorge the profits unlawfully acquired and retained by Volkswagen;

H. Award Plaintiffs and members of the Class and the California and Virginia Subclasses pre-judgment and post-judgment interest, and order that such interest be awarded at the highest legal rate from and after the date of service of the initial complaint in this action;

I. Award Plaintiffs and members of the Class and the California and Virginia Subclasses their costs of this suit, including reasonable attorneys' fees as provided by law; and

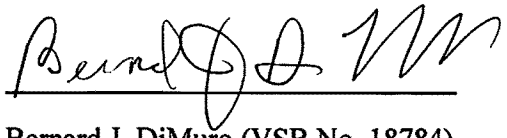
J. Order such other or further relief as may be just and proper.

IX. JURY TRIAL DEMAND.

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiffs demand a trial by jury of all of the claims asserted in this Complaint so triable.

DATED: October 6, 2015

Respectfully submitted,

By: 

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Counsel for Plaintiffs and the Putative Class and Subclasses

VW FOIA, EPA 06/20/2017 2017-FFP_031129

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: McCabe, Janet
Sent: Sun 10/11/2015 3:28:20 PM
Subject: call monday

Would sometime in the 12-1:30 timeframe work for us to talk on monday? Another alternative is early (ie 8 AM). If you'll be up and about by then anyway and that works better, it's fine for me. But I don't want you to forgo a leisurely morning on a holiday...

Several items on my list--

--RFS matters (upcoming WH, USDA discussions, my latest conversation with Gina)

--VW: is someone following up to set up another meeting with Rosekind et al on recalls and VW? And Cynthia raised an issue with me friday night I need to talk to you about.

--your SES ratings for your ODs. As I said in my prior note, I concurred with your recommendations, but you had indicated a desire to talk about them, and I'd like that too.

Others?

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: energy@morningconsult.com
Sent: Sun 10/11/2015 6:01:36 PM
Subject: Morning Consult Energy: Week in Review & What's Ahead

By Deirdra O'Regan

Week in Review

Lifting the oil export ban

The House passed a bill that would lift the 40-year-old ban on U.S. crude oil exports. The 261-159 vote was widely welcomed by Republicans, who have increased their push for repealing the 1975 law. However, the White House threatened to veto any legislation that would repeal the ban. The House vote occurred during a week that saw surging oil prices, with front-month West Texas Intermediate futures breaking above $50 per barrel on Thursday for the first time since July.

Toxic Substance Control Act

Senate efforts to update the Toxic Substance Control Act, which is widely viewed as weak and outdated, hit some roadblocks. The pending measure, which has 60 cosponsors, is considered a landmark piece of legislation that would bolster the Environmental Protection Agency's ability to review and regulate toxic chemicals. The bill was set to pass by voice vote until Sen. Richard Burr (R-N.C) and Sen. Kelly Ayotte (R-N.H.) said they would not let the bill move forward without an amendment to reauthorize the Land and Water Conservation Fund.

VW scandal

Volkswagen's top U.S. executive faced a grilling from the House Energy and Commerce Committee, where he apologized for the installation of so-called "defeat devices" to cheat emissions tests. Michael Horn denied it was a "corporate decision" and blamed the actions of a few rogue employees. He also told committee members it is likely to take at least two years to rectify the damage and repair the almost 500,00 vehicles affected in the United States.

Elsewhere, the House passed a bill that would expedite the review of energy projects on Native American lands. In the Senate, a procedural vote failed to advance the fiscal year 2016 energy and water appropriations bill.

What's Ahead

Both the House and Senate are in recess this week.

Efforts to repeal the crude oil export ban are likely to continue to dominate the energy agenda in Congress. Senate Republicans have expressed interest in coming up with incentives to win more Democratic support now that the House has already passed its bill, H.R. 702.

When the Senate passes its TSCA bill, a version of the legislation is expected to make its way quickly to President Obama's desk since the House overwhelmingly passed a related measure in April.

The fallout and recriminations from Volkswagen's emissions-cheating scandal will continue to play out publicly. The Senate Finance Committee is opening an investigation into Volkswagen's clean-car tax breaks, and the company is already under investigation by the Environmental Protection Agency and the Justice Department.

Mark Your Calendars (All Times Eastern)

Monday
Federal holiday – no events scheduled.

Tuesday
Association for Demand Response and Smart Grid conference @ 8:00 a.m.
Wilson Center discussion on climate change opinions in the U.S. and Canada @ 9 a.m.
Environmental and Energy Study Institute briefing on the PREPARE Act @ 10:30 a.m.

Wednesday
Association for Demand Response and Smart Grid conference @ 8:00 a.m.
AWEA Wind Energy Finance & Investment seminar @ 12 p.m.
Environmental Law Institute seminar and webinar on the Clean Power Plan @ 12:30 p.m.
Wilson Center panel on expectations and reality at COP 21 @ 3 p.m.

Thursday
AWEA Wind Energy Finance & Investment seminar @ 8 a.m.
Federal Energy Regulatory Commission meeting @ 10 a.m.
Environmental Law Institute seminar and webinar on Chevron deference after Perez, Burwell and Michigan v. EPA @ 2 p.m.

Friday
No events scheduled.

Morning Consult Energy Top Reads

1) Supporters of ending the oil-export ban eye a deal
Devin Henry, The Hill

2) White House issues veto threat for House oil export bill
Roberta Rampton and Timothy Gardner, Reuters

3) GOP Confronts Its Future as Debt Ceiling, Budget Loom
Will Dobbs-Allsopp, Morning Consult

4) Better Plants' Potential Cumulative Cost Savings
U.S. Department of Energy

5) McConnell looks to pick a fight with Dems over energy
John Siciliano, Washington Examiner

6) G.E. to Spin Off New Energy Technologies in One Company
Diane Cardwell, The New York Times

7) Oil jumps $2, breaking range as supply seen ebbing
Karolin Schaps and Aaron Sheldrick, Reuters

8) Oil Industry Gaining in Push for Repeal of U.S. Ban on Petroleum Exports
Eric Lipton and Clifford Krauss, The New York Times

9) Energy Snapshot of the Week
International Energy Agency

10) US continues to distance itself as the world leader of natural gas
Chris Pedersen, Platts

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To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: energy@morningconsult.com
Sent: Sun 10/11/2015 6:05:39 PM
Subject: Morning Consult Energy: Week in Review & What's Ahead

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To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Mon 10/12/2015 11:25:30 AM
Subject: Energy Department report highlights regional energy sector climate risks

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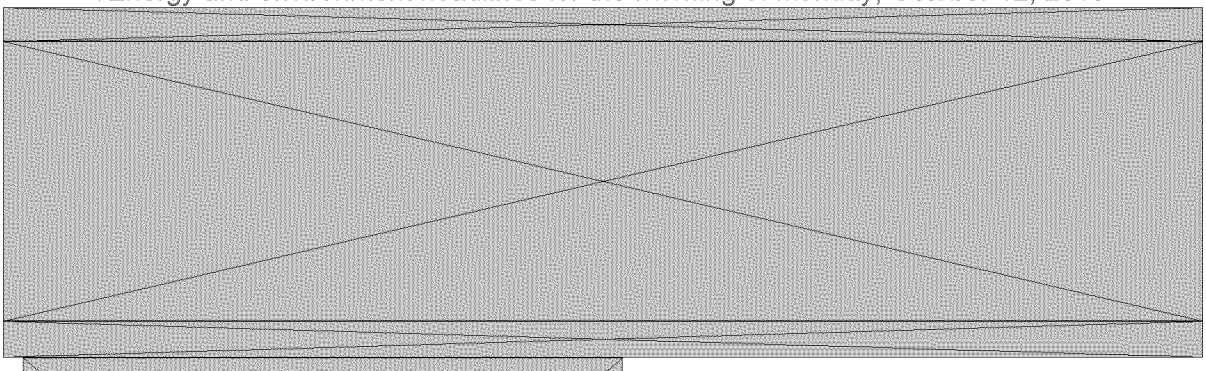
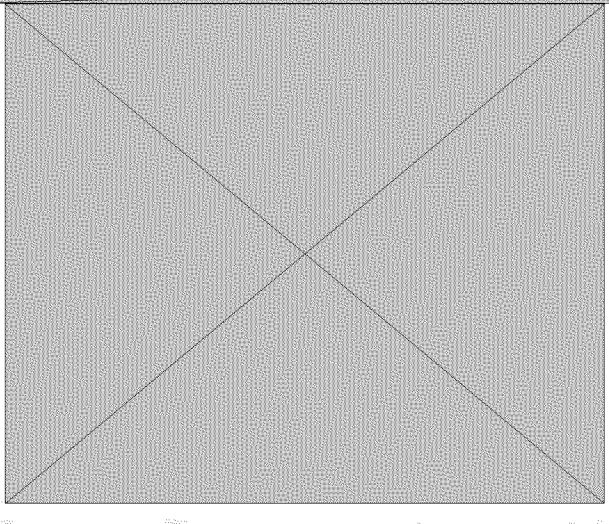
Energy and environment headlines for the morning of Monday, October 12, 2015





Energy Department report highlights regional energy sector climate risks

By Kevin Rogers

A new Energy Department report concludes that climate change -- and the worsening droughts, intense storms and rising temperatures that come with it -- poses a threat to energy production and infrastructure across the U.S., and calls for proactive action to identify risks and boost resilience.

The report released Friday by the department assessed climate risks to the energy sector

across nine regions and examined power generation, electricity transmission, biofuel manufacturing and oil and gas development.

It expands on a 2013 report from the agency, with updates to reflect the findings of the department's Quadrennial Energy Review, which outlined policy proposals to improve energy sector reliability.

"To address the harsh impacts of climate change and extreme weather, we need innovative solutions that will make our energy sector more resilient, more flexible, and more efficient, as we build a cleaner, more climate-friendly energy system," Energy Secretary Ernest Moniz said in a statement.

Specifically, the report concluded that oil and gas operations in the Southeast, Southern Great Plains and Alaska were the most at risk for climate impacts from stronger storm systems and sea level rise.

Nationwide, flooding, storm surges and rising temperatures could threaten the transport of a number of fuels, including oil, natural gas, coal and bioenergy. The report surmised that flooding could damage pipelines, while heat waves could damage rail lines.

"Some energy infrastructure assets have already suffered damage or disruption in services from a variety of climate-related impacts, such as higher temperatures, rising sea levels, and more severe weather events," the report said.

In regard to electric generation and supply, the report concluded that western states reliant on hydropower are increasingly vulnerable to shifts in snowpack and melting patterns due to increased temperature. Thermoelectric power may also prove vulnerable to rising temperatures and reduced water availability nationwide, the report said.

The grid is also vulnerable to a number of climate-related impacts nationwide, including wildfires, flooding and storms that could damage or disrupt electric transmission. Across the nation, the report projected that electric capacity could be stretched as warmer temperatures would drive a surge in electricity demand.

Drought and wildfire could also hurt the bioenergy and biofuels sector in the Midwest and Plains regions, as rising temperatures would decrease crop yields for ethanol and advanced and cellulosic fuels.

The department did acknowledge some potential benefits to the energy sector, including new opportunities for Arctic drilling, longer growing seasons, expanded shipping opportunities and reductions in energy use for winter heating.

The report touted the administration's efforts to slash greenhouse gas emissions, as well as the Energy Department's efforts designed to improve energy infrastructure reliability, but concluded that much of the work would lie with local governments and the private sector to make the necessary upgrades.

Specifically, the report called for stronger investment in low-carbon power generation, improving operation efficiency and reliability, siting new infrastructure in less vulnerable areas and improving technology to make infrastructure more resilient.

"Efforts to improve climate resilience are underway in every region, but the severe challenges posed by climate change could overwhelm current resilience efforts unless more comprehensive and accelerated approaches are adopted," the report said. "Smart decisions today will help to provide a robust and resilient energy system for tomorrow."

Quick Links

US gasoline prices dip half a cent over past 2 weeks: Survey

Qatar energy minister says oil prices have bottomed out

Series of small earthquakes recorded in northern Oklahoma

Prosecutors play back ex-coal CEO's phone calls at trial

VW diesel cars recalled in China, sales halted in Singapore

County says partial settlement reached in West, Texas blast

Plan to shift power to natural gas clears Puerto Rico hurdle

Development banks boost funding to fight climate change

Glencore puts copper mines in Australia, Chile on sale

Shell: Militants attack Nigerian flow station, kill guard

Former Chinese state oil boss convicted of corruption

Russia resumes gas supply to Ukraine

Utilities to comply with EPA on carbon

Lawsuits a fight for survival, says coal chief Murray

Ailing yieldcos a sign of trouble in renewable financing

Energy storage a new frontier for California businesses

Oklahoma earthquake regulation could be challenged in court

Oil gains on OPEC comments

Energy Transfer to keep growing after absorbing Williams: CEO

N.D. energy conference to focus on industry outlook

Greenpeace, Enel chiefs form unlikely alliance

Struggling battery firm shuts door on China deal

UK pushes Russia's Fridman to sell off North Sea assets

Upcoming Events

US gasoline prices dip half a cent over past 2 weeks: Survey

By The Associated Press

CAMARILLO, Calif. (AP) — The average price of gasoline has dropped half a cent over the past two weeks, to $2.34 a gallon.

Industry analyst Trilby Lundberg reported Sunday that prices have fallen 52 cents in the past 17 weeks, but the latest cut is the smallest so far.

She said a moderate hike in the cost of crude oil has nudged up wholesale prices, so retailers have stopped cutting their street prices.

Lundberg said consumers could start to see higher gas prices if crude prices continue to jump.

More

Qatar energy minister says oil prices have bottomed out

By The Associated Press

DOHA, Qatar (AP) — Qatar's energy minister says he believes that oil prices have bottomed

out ahead of an expected meeting of OPEC members and other oil producers later this month.

Energy and Industry Minister Mohammed bin Saleh al-Sada said in a statement Sunday that rising global demand and a lack of new supplies coming to market would help put a floor under prices.

Al-Sada also says that low prices have prompted oil companies to cut their spending on capital investments by nearly 20 percent this year, and that the cuts could lead to production shortfalls down the road.

Oil prices have plunged by more than half since the summer of 2014, with U.S. benchmark oil prices sending Friday at $49.63 a barrel.

Series of small earthquakes recorded in northern Oklahoma

By The Associated Press

CUSHING, Okla. (AP) — A series of small earthquakes have been recorded across northern Oklahoma following two moderate earthquakes in the area on Saturday.

The U.S. Geological Survey reported that nine quakes ranging in magnitude from 2.5 to 3.7 were recorded between 5:07 p.m. Saturday and 5:27 a.m. Sunday. No injuries or damage were reported. Geologists say damage is not likely in quakes below magnitude 4.0.

The latest seismic activity comes after a 4.5 magnitude temblor Saturday afternoon near Cushing and a 4.4 magnitude quake Saturday morning southwest of Medford.

Cushing is where the world's most important crude oil storage hub is located and it is used to settle futures contracts traded on the New York Mercantile Exchange. Cushing Emergency Management Director Bob Noltensmeyer said Sunday that no significant damage was found, only "shattered nerves."

More

Prosecutors play back ex-coal CEO's phone calls at trial

By Jonathan Matisse

CHARLESTON, W.Va. (AP) — Former Massey Energy CEO Don Blankenship lamented a push by his board to cap his salary at $12 million, called the group "so unappreciative," and said at least a quarter of his wealth was tied up in his company's stock, according to phone calls he secretly recorded in his office.

On Friday in Charleston federal court, prosecutors played back four calls and a memo from 2009 — the first round of several they'll present to a jury in Blankenship's criminal trial.

Blankenship faces charges of conspiring to break mine safety laws and lying to financial regulators about safety practices at Upper Big Branch Mine, in southern West Virginia. A 2010 explosion killed 29 miners there in the worst mine disaster in four decades.

Prosecutors have hand-picked recordings to make a case that the wealthy coal baron prioritized profits over safety at his mines, had huge windfalls when Massey did well, and lost millions after the mine explosion. They are also looking to paint Blankenship as a micromanager who was closely involved with Upper Big Branch's day-to-day operations.

More

VW diesel cars recalled in China, sales halted in Singapore

By Joe McDonald

BEIJING (AP) — Singapore has suspended sales of Volkswagen diesel vehicles, adding to the German automaker's woes in the wake of an emissions cheating scandal.

Earlier Monday, Volkswagen said it was recalling 1,950 diesel vehicles in China to correct engine software that the company admits cheated on emissions tests.

Data from the company's Singapore office said that cheating software was found on 650 Singapore-registered vehicles.

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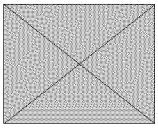

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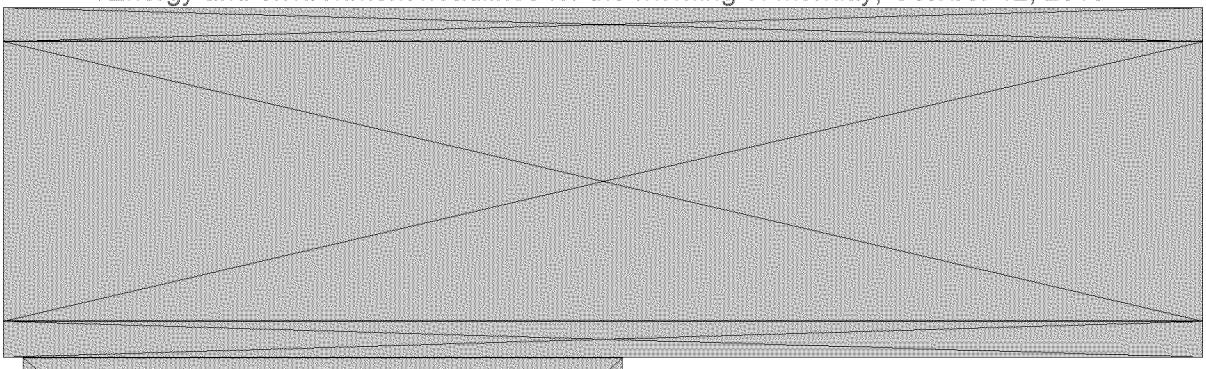

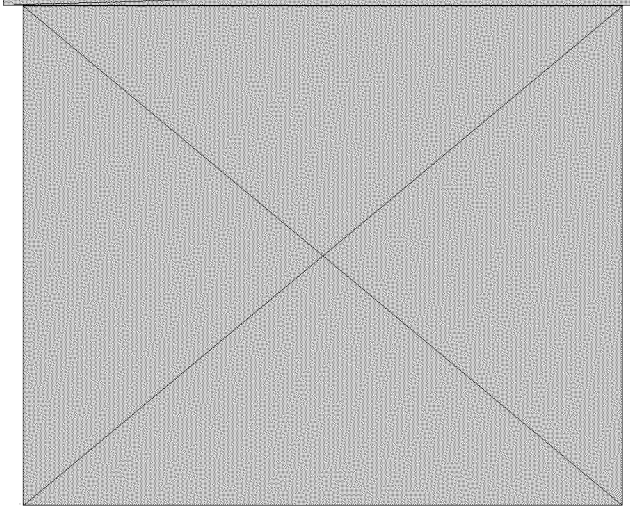

Energy Department report highlights regional energy sector climate risks

By Kevin Rogers

A new Energy Department report concludes that climate change -- and the worsening droughts, intense storms and rising temperatures that come with it -- poses a threat to energy production and infrastructure across the U.S., and calls for proactive action to identify risks and boost resilience.

The report released Friday by the department assessed climate risks to the energy sector

across nine regions and examined power generation, electricity transmission, biofuel manufacturing and oil and gas development.

It expands on a 2013 report from the agency, with updates to reflect the findings of the department's Quadrennial Energy Review, which outlined policy proposals to improve energy sector reliability.

"To address the harsh impacts of climate change and extreme weather, we need innovative solutions that will make our energy sector more resilient, more flexible, and more efficient, as we build a cleaner, more climate-friendly energy system," Energy Secretary Ernest Moniz said in a statement.

Specifically, the report concluded that oil and gas operations in the Southeast, Southern Great Plains and Alaska were the most at risk for climate impacts from stronger storm systems and sea level rise.

Nationwide, flooding, storm surges and rising temperatures could threaten the transport of a number of fuels, including oil, natural gas, coal and bioenergy. The report surmised that flooding could damage pipelines, while heat waves could damage rail lines.

"Some energy infrastructure assets have already suffered damage or disruption in services from a variety of climate-related impacts, such as higher temperatures, rising sea levels, and more severe weather events," the report said.

In regard to electric generation and supply, the report concluded that western states reliant on hydropower are increasingly vulnerable to shifts in snowpack and melting patterns due to increased temperature. Thermoelectric power may also prove vulnerable to rising temperatures and reduced water availability nationwide, the report said.

The grid is also vulnerable to a number of climate-related impacts nationwide, including wildfires, flooding and storms that could damage or disrupt electric transmission. Across the nation, the report projected that electric capacity could be stretched as warmer temperatures would drive a surge in electricity demand.

Drought and wildfire could also hurt the bioenergy and biofuels sector in the Midwest and Plains regions, as rising temperatures would decrease crop yields for ethanol and advanced and cellulosic fuels.

The department did acknowledge some potential benefits to the energy sector, including new opportunities for Arctic drilling, longer growing seasons, expanded shipping opportunities and reductions in energy use for winter heating.

The report touted the administration's efforts to slash greenhouse gas emissions, as well as the Energy Department's efforts designed to improve energy infrastructure reliability, but concluded that much of the work would lie with local governments and the private sector to make the necessary upgrades.

Specifically, the report called for stronger investment in low-carbon power generation, improving operation efficiency and reliability, siting new infrastructure in less vulnerable areas and improving technology to make infrastructure more resilient.

"Efforts to improve climate resilience are underway in every region, but the severe challenges posed by climate change could overwhelm current resilience efforts unless more comprehensive and accelerated approaches are adopted," the report said. "Smart decisions today will help to provide a robust and resilient energy system for tomorrow."

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CAMARILLO, Calif. (AP) — The average price of gasoline has dropped half a cent over the past two weeks, to $2.34 a gallon.

Industry analyst Trilby Lundberg reported Sunday that prices have fallen 52 cents in the past 17 weeks, but the latest cut is the smallest so far.

She said a moderate hike in the cost of crude oil has nudged up wholesale prices, so retailers have stopped cutting their street prices.

Lundberg said consumers could start to see higher gas prices if crude prices continue to jump.

More

Qatar energy minister says oil prices have bottomed out

By The Associated Press

DOHA, Qatar (AP) — Qatar's energy minister says he believes that oil prices have bottomed

out ahead of an expected meeting of OPEC members and other oil producers later this month.

Energy and Industry Minister Mohammed bin Saleh al-Sada said in a statement Sunday that rising global demand and a lack of new supplies coming to market would help put a floor under prices.

Al-Sada also says that low prices have prompted oil companies to cut their spending on capital investments by nearly 20 percent this year, and that the cuts could lead to production shortfalls down the road.

Oil prices have plunged by more than half since the summer of 2014, with U.S. benchmark oil prices sending Friday at $49.63 a barrel.

Series of small earthquakes recorded in northern Oklahoma

By The Associated Press

CUSHING, Okla. (AP) — A series of small earthquakes have been recorded across northern Oklahoma following two moderate earthquakes in the area on Saturday.

The U.S. Geological Survey reported that nine quakes ranging in magnitude from 2.5 to 3.7 were recorded between 5:07 p.m. Saturday and 5:27 a.m. Sunday. No injuries or damage were reported. Geologists say damage is not likely in quakes below magnitude 4.0.

The latest seismic activity comes after a 4.5 magnitude temblor Saturday afternoon near Cushing and a 4.4 magnitude quake Saturday morning southwest of Medford.

Cushing is where the world's most important crude oil storage hub is located and it is used to settle futures contracts traded on the New York Mercantile Exchange. Cushing Emergency Management Director Bob Noltensmeyer said Sunday that no significant damage was found, only "shattered nerves."

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Prosecutors play back ex-coal CEO's phone calls at trial

By Jonathan Matisse

CHARLESTON, W.Va. (AP) — Former Massey Energy CEO Don Blankenship lamented a push by his board to cap his salary at $12 million, called the group "so unappreciative," and said at least a quarter of his wealth was tied up in his company's stock, according to phone calls he secretly recorded in his office.

On Friday in Charleston federal court, prosecutors played back four calls and a memo from 2009 — the first round of several they'll present to a jury in Blankenship's criminal trial.

Blankenship faces charges of conspiring to break mine safety laws and lying to financial regulators about safety practices at Upper Big Branch Mine, in southern West Virginia. A 2010 explosion killed 29 miners there in the worst mine disaster in four decades.

Prosecutors have hand-picked recordings to make a case that the wealthy coal baron prioritized profits over safety at his mines, had huge windfalls when Massey did well, and lost millions after the mine explosion. They are also looking to paint Blankenship as a micromanager who was closely involved with Upper Big Branch's day-to-day operations.

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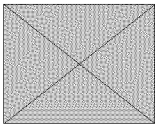

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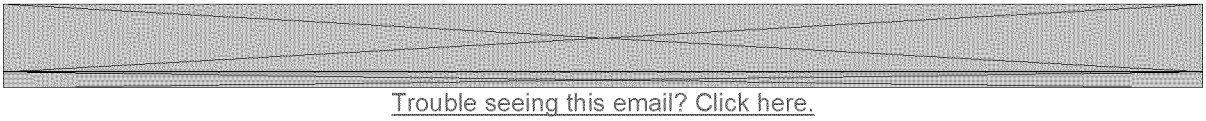

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Sent: Mon 10/12/2015 1:06:04 PM
Subject: I got Byron's message from Friday

And will call you this am.
David G

Sent from my iPad

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Geanacopoulos, David
Sent: Mon 10/12/2015 2:40:38 PM
Subject: left a message on your office line.

Please call back at your convenience at 703-364-7240 or Ex. 6

David Geanacopoulos

Executive Vice President, General Counsel

Volkswagen Group of America, Inc.

2200 Ferdinand Porsche Drive

Herndon, Virginia 20171

703-364-7240

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From: Automotive News
Sent: Mon 10/12/2015 6:30:09 PM
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VW credit rating cut by S&P; further cuts are possible

VW's credit rating was cut one level today by Standard & Poor's, which said the German carmaker's cheating on U.S. diesel-emissions tests indicates management weaknesses that may lead to a further debt downgrade.

THE VW DIESEL CRISIS

VW seeks $3.4 billion in savings from suppliers, report says

VW wants to extract $3.41 billion in price cuts from its suppliers as part of a broader cost-cutting program to help mitigate the costs of the emissions scandal that has rocked the company, a German newspaper reported.

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Former Fiat N.A. chief Stoicevich leaves FCA

FCA deal finally gives UAW an organizing carrot

BLOG: DAVID BARKHOLZ

The Fiat Chrysler executive who, until last week, was overseeing the struggling Fiat brand in North America, has resigned. Jason Stoicevich, 36, resigned Oct. 7, Automotive News has learned. An FCA spokesman confirmed the resignation, which had not been announced this morning.

A copy of the new deal that UAW workers demanded of Fiat Chrysler Automobiles – and their own leaders – is that the UAW finally has something worthwhile to sell to employees at nonunion U.S. transplants.

BLOG: DAVID SEDGWICK

Tesla a disrupter? Uber is the real threat, Nissan N.A. exec says

Ferrari heir, steered away from racing, will end up a billionaire

THE VW DIESEL CRISIS

Winterkorn to step down from remaining VW Group posts, report says

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VW's culture under Winterkorn fueled by fear and respect

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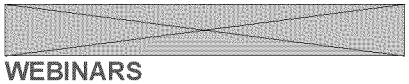

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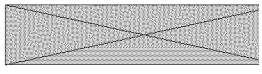

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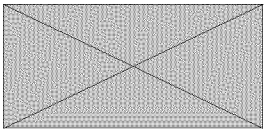

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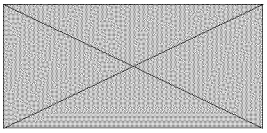

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Kanner & Whiteley

King & Spalding

Kirkland & Ellis

Latham & Watkins

Mayer Brown

McDermc Will

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Morgan Lewis

Morvillo Abramow

Nelson Mullins

Nossama

LLP

Paul Weiss

Perkins Coie

Quinn Connor

Reed Smith

Robins Kaplan

Sedgwick LLP

Seyfarth Shaw

Sidley Austin

Simpson Thacher

Skadden

Stearns Weaver

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The Calwell Practice

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California
Public
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Retireme
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Teachers
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Pacific
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Carlyle
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LP

Eastman Chemical Co.

Exxon Mobil Corporati

Facebool

Florida Bar Associati

Freedom Industries Inc.

General Motors

Goldman Sachs Group Inc.

Google Inc.

Great American Insurance Company

Korean Air Lines Co. Ltd.

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MasterCa Incorpora

Microsoft Corporati

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NL Industries Inc.

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Robert Bosch GmbH

Salt River Project

Sierra Club

Specialty Restaura Corp.

Stryker Corporati

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The

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Volkswag

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Agency

Fish and
Wildlife
Service

Illinois

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Perkins Coie

Simpson Thacher

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Bonnett Fairbourn

Bryan Cave

Burleson LLP

Cahill Gordon

Cleary Gottlieb

Cowan DeBaets

Cravath Swaine

Davis Polk

Dechert

Finnegan

Golenbock Eiseman

Goodwin Procter

Greenberg Traurig

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Hinshaw & Culbertson

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Kanner & Whiteley

King & Spalding

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Latham & Watkins

Mayer Brown

McDermott Will

Meyer Glitzenstein

Morgan Lewis

Morvillo Abramowitz

Nelson Mullins

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To: Kaul, Meetu[Kaul.Meetu@epa.gov]
From: The Washington Post
Sent: Tue 10/13/2015 11:54:47 AM
Subject: The Daily 202: 9 questions for the Democratic debate -- Will Bernie lose his temper? Will Hillary connect? Will O'Malley get a moment?

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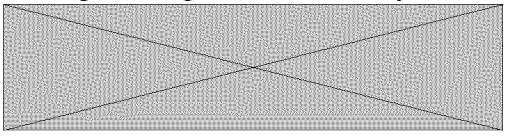
The stage for tonight's debate at the Wynn Las Vegas is ready. (Photo by Joe Raedle/Getty Images)



THE BIG IDEA:

Good morning from the West Coast. Here are nine things I'll be watching during tonight's Democratic debate, which begins at 8:30 p.m. Eastern on CNN and runs two hours:

Will there be fireworks? Without **Donald Trump**, tonight surely will be much less entertaining than the first two GOP debates. There are unlikely to be personal attacks during the first showdown between **Hillary Clinton** and **Bernie Sanders**. As Philip Rucker previews on the front page of today's Post, both candidates have signaled that they will wear VELVET GLOVES: "Each plans to focus on his or her own policy proposals and backgrounds, drawing comparisons with each other wherever appropriate but avoiding the kind of direct attacks that have been so prominent in the Republican race."

But how hard does CNN try to orchestrate a Hillary pile-on? Producers want good television and ratings. If the two leading candidates do not go after each other aggressively, watch for moderator **Anderson Cooper** to try goading the three underdog candidates who will also be on stage into taking shots at them. Former Maryland Gov. **Martin O'Malley**, former Virginia Sen. **Jim Webb** or ex-Rhode Island Gov. **Lincoln Chafee** could come out swinging at the Democratic frontrunner and putative nominee. But if they pass, then it will fall upon the questioners to push Hillary on her private e-mail server, as well as

her leftward lurch on the Trans-Pacific Partnership, the Keystone XL Pipeline and Wall Street reform.

Cooper insists he won't tee up fights. "I'm always uncomfortable with that notion of setting people up in order to kind of promote some sort of a face-off," Cooper said on CNN's "Reliable Sources."

I don't buy that. But it's also possible that CNN will use the other two questioners, **Dana Bash** and CNN en Español anchor **Juan Carlos Lopez**, to play the bad cop to Cooper's good cop. And CNN's **Don Lemon**, reading questions submitted through Facebook, could pinch hit.

Anderson Cooper is the lead moderator of tonight's debate. (Reuters/Jason Redmond)

How does Clinton handle Sanders without being too dismissive? Let's remember that Hillary is a very talented debater. She fared well in her two dozen showdowns with **Barack Obama.** Her relentless message discipline suits itself to this medium, and she has real gravitas coming from 25 years spent on the public stage. A lot of what people have heard about her recently was translated through the media filter; she comes across better in person than in defensive soundbytes.

Hillary seeks to look presidential and electable tonight, but she does not want to look stiff. While getting into an argument with her foes isn't advisable, staying above the fray might make her look entitled. The key for Clinton is to show some energy and fire while also highlighting her experience. It's a tricky balancing act, but pre-debate expectations are pretty low. So she should be able to pretty easily exceed them.

Bernie Sanders in Tucson Friday night (AP Photo/Rick Scuteri)

Will Bernie lose his temper? Sanders does not suffer fools and risks coming across as unlikable if he gets snarly. Back in Vermont, past rivals say it is relatively easy to get under the senator's skin. Bernie is not prepping through mock debates, and he's not used to mixing it up with critics.

Does Sanders, who is not even a registered Democrat, come across as outside the mainstream? On "Meet the Press" this weekend, Sanders said "no" when asked if he is a capitalist. "I'm a

democratic socialist," he reiterated.

Bernie is also on the wrong side of the Democratic base when it comes to both guns and immigration. He voted for background checks but has opposed an assault weapons ban, blaming his rural state's love of firearms. Bowing to organized labor, and concerned about pressure on wages, he's dubious of allowing more immigrants into the United States. Both are flashpoints that he could get pressed on from the left. If there are multiple follow-ups over his past votes on these issues, Sanders might get flustered.

Obama 2008 strategist David Axelrod notes in an op-ed that Sanders has not talked much about "flesh-and-blood human beings" and their stories. "One listens to Sanders' jeremiads and is reminded of the old adage about liberals who 'love humanity and hate people,'" Axelrod wrote for CNN.com. "The debate is an opportunity for Sanders to present a more empathetic side — less grumpy old man and more caring advocate. Sanders also almost certainly will field questions about his youthful writings as a left-wing polemicist, which seem a little crazy now, probably even to him."

Can Sanders make inroads with minority voters? A CNN/ORC poll published yesterday showed that he's only getting 4 percent among African-Americans in South Carolina. Clinton led with 59 percent of South Carolina's black voters, who make up more than half the Democratic primary electorate in the state with the first Southern primary. Clinton crushed him 49 to 18 percent and, in Nevada, 50 percent to 34 percent. Sanders does well with white voters, which is why he's led in Iowa and New Hampshire polls, but there are doubts he can thrive past the first two states on the nominating calendar.

Does O'Malley get a post-debate bounce? It's hard to foresee the Maryland governor becoming even less of a factor in the Democratic contest. A Washington Post-University of Maryland poll published yesterday showed that he's getting just 4 percent among Democratic primary voters in his home state! (Hillary leads in Maryland with 43 percent, followed by **Joe Biden** at 26 percent and Sanders at 20 percent.)

No one has pushed harder for more debates than O'Malley. If he does not have a breakout performance, his money struggles will become

more acute and it will be harder to woo early state activists. "If he gives a mediocre performance, he's done," a Democratic operative with ties to the Maryland governor told The Post's John Wagner.

Does Jim Webb show up? The ex-Virginia senator is the biggest wildcard because you never know what you're going to get. Since announcing his candidacy, he's done very little campaigning. But Webb, the former Army secretary and Vietnam veteran, has a very impressive resume that could allow him to go toe-to-toe with the ex-secretary of state on foreign policy. He could criticize Clinton on Syria, Iran and possibly her vote to go into Iraq, which he opposed. As for his strategy: "Eisenhower didn't yap about D-Day in advance," a Webb spokesman told Time.

Jim Webb in Iowa this summer (Photo by Melina Mara/The Washington Post)

Does tonight make Joe Biden more or less likely to run? The vice president has no public events on his calendar today, but you can bet he'll be watching the debate from his home at the Naval Observatory. To help gin up excitement, CNN not only announced that Biden pre-qualified for the debate. Even after his team said he wouldn't attend, CNN made a show of having a sixth podium at the ready in case he changes his mind.

If Clinton does really well, quelling the doubts of some of her anxious supporters, Biden is less likely to jump into the race. If the debate is a jumble, joining the fray will certainly seem more attractive.

Welcome to The Daily 202,
PowerPost's morning newsletter.
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With contributions by Elise Viebeck.

—

WHILE YOU WERE SLEEPING:

Hillary Clinton made a surprise appearance at a union protest in front of the Trump Hotel in Las Vegas yesterday afternoon (Photo by Joe Raedle/Getty Images)

— Clinton's private server was very vulnerable to external hacking, according to fresh details reported by the Associated Press. "Clinton's server appeared to allow users to connect openly over the Internet to control it remotely, according to detailed records compiled in 2012. Experts said the Microsoft remote desktop service wasn't intended for such use without additional protective measures, and was the subject of U.S. government and industry warnings at the time over attacks from even low-skilled intruders. Records show that Clinton additionally operated two more devices on her home network in Chappaqua, New York, that also were directly accessible from the Internet. One contained similar remote-control software that also has suffered from security vulnerabilities, known as Virtual Network Computing, and the other appeared to be configured to run websites."

Ultra Orthodox ZAKA volunteers clean up the scene of a bus attack this morning in Jerusalem. (Photo by Kobi Gideon/GPO via Getty Images)

— Two people were killed and at least 16 were injured in a stabbing attack on a Jerusalem bus, as the latest round of violence between Israelis and Palestinians escalated. Witnesses said the perpetrator was a Palestinian who was killed by police when the bus driver escaped and notified them. Israeli police said two attackers were involved: one with a knife and the other with a gun. Since last month, seven Israelis and 27 Palestinians have been killed in the violence.

— Insurgents fired two shells at the Russian embassy in the Syrian capital as hundreds of pro-government supporters gathered outside the compound to thank Moscow for its intervention in Syria, an AP reporter who was at the event reports: "It was not immediately clear if there were casualties. Opposition fighters in the suburbs of the capital have targeted the embassy in the past but it was not clear if Tuesday's attack targeted the rally."

Army Sgt. Bowe Bergdahl, left, and defense lead counsel Eugene Fidell, center, look on as Maj. Gen. Kenneth Dahl is questioned during a hearing in Texas last month. Bergdahl, who left his post in Afghanistan and was held by the Taliban for five years, is charged with desertion and misbehavior before the enemy. (AP Photo/Brigitte Woosley)

— Bowe Bergdahl's lawyer is attacking John McCain for possibly interfering with military justice. "A day after the disclosure of an Army

lawyer's recommendation that Sgt. Bowe Bergdahl face neither jail time nor punitive discharge for walking off his Army outpost in Afghanistan in 2009, Senator John McCain, chairman of the committee that oversees promotions of senior military commanders, said that Sergeant Bergdahl was 'clearly a deserter' and that he would convene a hearing if the sergeant was not punished," the New York Times' Richard A. Oppel Jr. reports. "Mr. McCain's statement drew a sharp rebuke on Monday from Sergeant Bergdahl's lawyer, partly because the four-star Army general who will ultimately decide the fate of Sergeant Bergdahl is considered likely someday to face a hearing for his next job before Mr. McCain's committee. Sergeant Bergdahl's lawyer, Eugene R. Fidell, accused Mr. McCain of improperly seeking to influence the outcome of a major military prosecution."

GET SMART FAST:

1. **Iran** has reportedly convicted **Jason Rezaian**, The Post's Tehran correspondent, who was charged with espionage and has been in prison there for 14 months. But Iran didn't reveal his sentence, and Rezaian could face 10 to 20 years. The secrecy around the verdict suggests that the Islamic Republic may still be pressing for a prisoner swap of three Iranian-Americans in exchange for 19 Iranian prisoners being held in the U.S. for circumventing sanctions. Post Executive Editor Martin Baron called the verdict "an outrageous injustice" and "contemptible.")Read Baron's full statement here.)
2. **Zimbabwe** will not charge the Minnesota dentist who killed **Cecil the Lion**. The country's Environment Minister said **Walter Palmer's** hunting papers were in order, and therefore he could not be charged, per Reuters.
3. A 37-year-old mom will become the third ever woman to complete the **Army** Ranger School course today. (Dan Lamothe)
4. "A federal judge has concluded that officials at U.S. **Customs and Border Protection** manipulated the federal hiring system to create jobs for a group of politically connected, unqualified candidates — but he exonerated a senior personnel official because she was unaware of the misconduct," per Lisa Rein.
5. The **Supreme Court** will hear oral arguments this morning on whether their 2012 ruling that ended automatic life sentences for juveniles applies retroactively to those sentenced, in some cases, decades before the court's 2012 decision, BuzzFeed previews.

6. New academic research argues that our conception of **DNA** is wrong. Instead of a double helix, some scientists have imaged supercoiled DNA, revealing that its shape is much more dynamic and that it wiggles and morphs into different shapes. (I4U News)
7. Paramount Pictures and **Leonardo DiCaprio's** production company have optioned the rights to make a movie about a book being written on the **Volkswagen** emissions scandal. (AP)
8. **Turkey's** government says **ISIS** is the prime suspect in suicide bombings that killed at least 97 people in Ankara over the weekend. Prime Minister Ahmet Davutoglu said the attacks were intended to influence the outcome of November elections. (Reuters)

POWER PLAYERS IN THE NEWS:

1. **Jeb Bush** will roll out a plan for repealing and replacing Obamacare in New Hampshire today. His approach includes a tax credit for purchasing health plans and upping limits on contributions to health savings accounts. (Sean Sullivan writes up an outline from the campaign)
2. Rep. **Bill Flores** (R-Texas) e-mailed colleagues to say he intends to run for House speaker, but he'll step aside if **Paul Ryan** decides to enter the race. (Texas Tribune's Abby Livingston)
3. Rep. **Keith Ellison** (D-Minn.) endorsed **Sanders** at a pre-debate rally in Las Vegas, the second member of Congress to do so. (John Wagner)
4. Aerosmith frontman **Steven Tyler** sent a cease-and-desist letter asking **Donald Trump** to stop playing "Dream On" at campaign events. (Boston Globe)
5. **Trump** said in New Hampshire yesterday that he and his rich friends should "voluntarily" forgo their Social Security benefits. "I have friends that are worth hundreds of millions and billions of dollars and get Social Security. They don't even know the check comes in," he said at a No Labels forum. (Wall Street Journal)
6. **David Kochel,** one of Bush's top campaign strategists, has been diagnosed with acute lymphoblastic leukemia. (Bloomberg)
7. **Chris Christie** called Obama a "weakling" and threatened to shoot down Russian planes conducting airstrikes in Syria if he was president. "My first phone call would be to **Vladimir [Putin]**, and I'd say, 'Listen, we're enforcing this no-fly zone,'" the New Jersey governor said on MSNBC. "And I mean we're enforcing it against

anyone, including you. So don't try me. Don't try me. Because I'll do it."

8. North Carolina Attorney General **Roy Cooper,** a Democrat, formally launched his campaign aimed at unseating Republican Gov. **Pat McCrory.** The announcement at a community college was long expected but sets the stage for a marquee race of 2016. (Raleigh News and Observer)
9. **Ted Cruz** says he's raised $1 million in the first 9 days of the fourth quarter. We should get Q3 numbers from Jeb and several remaining candidates in the next 72 hours…

WAPO HIGHLIGHTS:

— **"Hope fades on Obama's vow to bring troops home before presidency ends," by Greg Jaffe:** "In meeting after meeting this spring and summer, President Obama insisted that the last American troops in Afghanistan would return home by the end of his presidency, definitively ending the longest war in American history. … Then in August, Gen. Martin E. Dempsey, the outgoing chairman of the Joint Chiefs of Staff, came in with one more plan to maintain a counterterrorism force of as many as 5,000 troops in Afghanistan to prevent a reemergence of al-Qaeda and to battle Islamic State fighters seeking a foothold in the country. Dempsey's plan was a quick, back-of-the-envelope exercise, according to senior administration officials. This time, though, Obama didn't dismiss it. 'I think that's an argument that can be made to the American people,' Obama said, according to a senior administration official who took part in the meeting.
… Afghanistan has been the one constant that spans his two terms in office. As an inexperienced president, Obama decided to send more than 50,000 American troops into Afghanistan. … In early October, Obama summed up one of the biggest lessons he's taken from America's interventions in these fractured societies. 'What we've learned over the last 10, 12, 13 years is that unless we can get the parties on the ground to agree to live together in some fashion, then no amount of U.S. military engagement will solve the problem,' Obama said."

Cheryl Mills (Ron Sachs/AP Images)

— **"While at State, Clinton chief of staff held job negotiating with Abu Dhabi," by Rosalind S. Helderman:** "During her first four months

at State, Mills also held another high-profile job: She worked part time at New York University, negotiating with officials in Abu Dhabi to build a campus in that Persian Gulf city. At State, she was unpaid, officially designated as a temporary expert-consultant — a status that allowed her to continue to collect outside income while serving as chief of staff. She reported that NYU paid her $198,000 in 2009, when her university work overlapped with her time at the State Department, and that she collected an additional $330,000 in vacation and severance payments when she left the school's payroll in May 2009. The arrangement, which Mills discussed for the first time publicly in an interview with The Washington Post, is another example of how Clinton as secretary allowed close aides to conduct their public work even as they performed jobs benefiting private interests. Another key Clinton aide, Huma Abedin, spent her last six months as Clinton's deputy chief of staff in 2012 simultaneously employed by the Clinton Foundation, the family's global charity, and a consulting company with close Clinton connections. Similarly, Mills remained on the Clinton Foundation's unpaid board for a short time after joining State." Read Roz's Q&A with Mills.

Alexander Butterfield in D.C. this weekend (Photo by Nikki Kahn/The Washington Post)

— Bob Woodward's new book about Nelson Butterfield — who disclosed Nixon's secret White House taping system — goes on sale today. David E. Hoffman writes a story about one of the highlights in "The Last of the President's Men": "Nixon believed that years of aerial bombing in Southeast Asia to pressure North Vietnam achieved 'zilch' even as he publicly declared it was effective and ordered more bombing while running for reelection in 1972, according to a handwritten note from Nixon disclosed in (Bob's) book. … Nixon's private assessment was correct, Woodward writes: The bombing was not working, but Nixon defended and intensified it in order to advance his reelection prospects. The claim that the bombing was militarily effective 'was a lie, and here Nixon made clear that he knew it,' Woodward writes."

Manuel Roig-Franzia tells the story of how Butterfield and Nixon came to collaborate on the book: In 2011, Butterfield visited Woodward's home in South Annapolis, Md., and the two "hit it off." Woodward's wife, Elsa, realized the story would best be told in a book.

SOCIAL MEDIA SPEED READ:

— ZIGNAL VISUAL: Clinton is a more polarizing figure than the other Democratic candidates, particularly on social media, where strong criticism from conservative sites and tweeters makes up a large portion of the chatter about her candidacy. Sanders, meanwhile, is buoyed by liberal net-roots support. The chart below from our analytics partners at Zignal Labs tracks the sentiment of all Twitter mentions by state over the last week. The blue states are states where Sanders has a higher positive sentiment. Red states are ones where Clinton's sentiment is higher than her Democratic rival. The darker the color, the wider the gap between the two:

While Sanders rivals Clinton's traffic on Twitter, **the former Secretary of State continues to dominate traditional media, particularly broadcast television, where Sanders has had a hard time breaking through.** That suggests that tomorrow might be the first time that many Americans will actually see Sanders in action.

According to Facebook, the five most talked about issues in the U.S. from Sept. 10 through Oct 10 were: Religion, Guns, The Economy, Homeland Security and Terrorism and Racial Issues. Via Facebook, below is the volume of conversation on the social network about each candidate. The interactions figure includes not only the activity on the candidate's page, but all of the likes, posts, comments and shares about that candidate from throughout the Facebook ecosystem in the U.S.:

–Pictures of the day:

Debbie Wasserman Schultz (D-Fla.) snapped a photo of the debate arena in Las Vegas. The DNC chair has incensed liberal activists by allegedly uninviting her own vice chair, Tulsi Gabbard, after she called for more debates. Gabbard, a Hawaii congresswoman, said the message was conveyed to her chief of staff by the chief of staff for Wasserman Schultz, who is widely perceived as pro-Hillary. The DNC publicly denied it, but Sanders' campaign offered Gabbard a ticket.

(dwstweets)

House Majority Leader Kevin McCarthy (R-Calif.) posted a photograph of he and his wife, Judy, at a family wedding over the weekend:

(repkevinmccarthy)

Jason Chaffetz, still running for Speaker, shared a photo of his airport dinner:

(jasoninthehouse)

The Clintons celebrated their 40th wedding anniversary on Sunday:

(hillaryclinton)

–Tweets of the day:

A spokesman for Paul Ryan lowered expectations for news in the Speaker's race this week:

(@brendanbuck)

Lincoln Chafee issued a predictably dull statement ahead of the debate. "I'm already nodding off," tweeted Madeline Marshall, a video journalist with the Wall Street Journal:

(@bencjacobs)

Chafee also shared this photo of himself preparing for the debate:

(lincchafee)

Rep. Marcia Fudge (D-Ohio) called for Cuyahoga County prosecutor Timothy McGinty to hand the case of Tamir Rice, a 12-year-old who was shot to death by police, to a grand jury. McGinty's office released two reports concluding that the shooting death was "reasonable," drawing criticism from activists and Rice's family:

(@RepMarciaFudge)

While many people celebrated Columbus Day, Charlie Rangel (D-N.Y.) noted that Monday was also Indigenous Peoples Day:

(@cbrangel)

Sen. John Cornyn (R-Texas) criticized California for becoming the second state to automatically register voters:

(@JohnCornyn)

Former Rep. John Dingell (D-Mich.) thanked medical staff after his recent hospital stay:

(@JohnDingell)

— Instagrams of the day:

Sen. Angus King (I-Maine) wound up on the Maine coast after a weekend of RVing:

(senangusking)

Rep. David Cicilline (D-R.I.) walked in the Columbus Day parade in Newport, R.I.:

(repdavidcicilline)

—

GOOD READS FROM ELSEWHERE:

Paul Ryan is too liberal for some on the right. (Andrew Harrer/Bloomberg)

— New York Times, "Latest Unease on Right: Ryan is too far left," by Jennifer Steinhauer: "Far-right media figures, relatively small in

number but potent in their influence, have embarked on a furious Internet expedition to cover Representative Paul D. Ryan in political silt. … He is being criticized on issues ranging from a 2008 vote to bail out large banks to his longstanding interest in immigration reform to his work on a bipartisan budget measure. On Sunday night, the Drudge Report — a prime driver of conservative commentary — dedicated separate headlines to bashing Mr. Ryan on policy positions. … The influence of conservative websites has enraged members who were once considered right of center themselves, and who are desperately trying to keep Mr. Ryan from getting spooked. 'Anyone who attacks Paul Ryan as being insufficiently conservative is either woefully misinformed or maliciously destructive,' said Representative Tom Cole, Republican of Oklahoma. 'His critics are not true conservatives. They are radical populists who neither understand nor accept the institutions, procedures and traditions that are the basis of constitutional governance.'"

— **Politico, "A 'cancer' on the Clinton candidacy," by Glenn Thrush and Annie Karni:** "Indeed, from the minute news of Clinton's secret personal email server broke this past March, she had reacted by lashing out at her enemies—and repeatedly demanding of her inner circle, 'How do we get past this?' Neither the campaign nor the candidate have definitively answered that question, and the months of indecision, uncertainty and mounting legal threat have left Clinton, for the second time in her two presidential campaigns, a deeply vulnerable front-runner. From the start, the email controversy—and her campaign's handling of it—has been an exercise in exasperation, according to people involved in the effort. The wiry and wily John Podesta, Clinton's campaign chairman, thought right away that she needed to dump everything out in public as quickly as possible to avoid the deadly drip-drip-drip. 'We need to throw the facts to the dogs, and let 'em chew on it,' Podesta told the candidate. But Clinton's answer—and that of her lawyer David Kendall and her former State Department chief of staff Cheryl Mills—was a 'no' when Podesta and other advisers asked for some details. Foggy Bottom needed to review the emails, they were told, and besides, half of them, the ones deemed 'personal,' had already been deleted … 'Why does the other side always know more than we do?' an aide pointedly asked Kendall during one call early in the unfolding email drama. But little more was forthcoming, according to a longtime Clinton adviser who recounted the incident."

— Associated Press, "Panama condo owners to Donald Trump: You're Fired!" by Jeff Horowitz: "The directors of the Trump Ocean Club met July 28 on urgent business. They needed to fire Donald Trump. The building's residents and condo owners had invested in the namesake, a 70-story waterfront tower along Panama Bay, on the strength of Trump's reputation. But during the four years that Trump Panama Condominium Management LLC had managed the property, Central America's largest building, a team installed by the Trump family was accused of running up more than $2 million in unauthorized debts, paying its executives undisclosed bonuses and withholding basic financial information from owners. … The Trump Organization sent its response days later. 'Your letter is a complete sham,' wrote the Trumps' top lawyer, Alan Garten. He accused the board of ingratitude and criminal trespassing. After refusing to accept being fired, Garten declared that Trump's company was quitting – and demanded a $5 million termination fee."

— USA Today, "ISIL Death Toll at 20,000, but stalemate continues," by Tom Vanden Brook: "The U.S.-led bombing campaign has killed an estimated 20,000 Islamic State fighters, an increase from the 15,000 the Pentagon reported in July, according to a senior military officer. … But despite the higher number of casualties and the airstrikes' erosion of morale among ISIL fighters, the militant group continues to draw new fighters to Iraq and Syria. The overall force, the first official said, remains about where it was when the bombing started: 20,000 to 30,000 fighters."

— (Oregon) Statesman Journal, "Kitzhaber breaks his silence," by Carol McAlice Curry: "Former Gov. John Kitzhaber ended nearly eight months of silence this week to criticize Portland-based media outlets for creating a frenzied atmosphere of falsehoods that ended with his resigning his unprecedented fourth term in mid-February. But he said that Sept. 9 and Sept. 13 admissions by The Oregonian newspaper that it had run 'an untrue news story that put me and my administration in a false light' have compelled him to speak publicly for the first time since his resignation to 'weigh in on the discussion' … 'Although I was not contacted concerning the retraction, the admission by The Oregonian that it knowingly and materially altered a public document and inserted false information into a direct quote to support a predetermined narrative exposes a troubling pattern, which includes both factual errors and the selective mischaracterization of public records,' Kitzhaber

wrote.

HOT ON THE LEFT

Confederate flag supporters indicted in clash with black partygoers. From the New York Times: "In an unusual legal maneuver, the district attorney in (a) suburb of Atlanta has won indictments against 15 supporters of the Confederate battle flag, accusing them of violating the state's anti-street gang ordinance during a confrontation with black partygoers in July, the district attorney said on Monday. Prosecutors say that members of the group, which calls itself 'Respect the Flag,' threatened a group of African-Americans participating in an outdoor party on July 25."

HOT ON THE RIGHT

Sheldon Adelson warms to Marco Rubio. From Politico: "One of the Republican Party's most sought-after contributors is leaning increasingly toward supporting Marco Rubio — and the Florida senator is racing to win the backing of other uncommitted megadonors who have the potential to direct tens of millions of dollars his way and alter the contours of the Republican primary fight. Last week, during a campaign swing through Las Vegas, Rubio held a meeting in Adelson's offices … Adelson, seated at the head of his conference table, heaped praise on Rubio's performance."

DAYBOOK:

— What's happening today on the campaign trail: Besides the Democratic debate… In Iowa, Rand Paul campaigns in Davenport, Dubuque, Fayette, Waverly and Cedar Falls while live streaming his full day on Facebook. Elsewhere in the state, Ted Cruz makes stops in Keokuk, Burlington and Mt. Pleasant; Mike Huckabee speaks in Iowa City and Bobby Jindal attends an event in Decorah. In New Hampshire, Jeb Bush delivers his speech about repealing ObamaCare in Manchester and speaks to town halls in Keene and Lebanon. Also in the Granite State: Lindsey Graham is stopping in Derry, Bedford, Concord and Newport, while John Kasich campaigns in Bow, Tilton and Littleton.

— On the Hill: The Senate and House are in recess.

— At the White House: President Obama meets with Attorney General Loretta Lynch.

QUOTE OF THE DAY: "How about having the military focusing on hunting down and killing the bad guys…instead of treating it as this crucible for social justice innovations?" — Ted Cruz on Monday in Iowa, referring to the integration of transgender soldiers.

NEWS YOU CAN USE IF YOU LIVE IN D.C.:

— "Cloudy skies and scattered showers arrive thanks to a fast cool front. This un-fair weather friend should mainly affect the morning, but we could see a brief moderate shower or two in the afternoon also in between breaks of sunshine. Temperatures warm to the lower to middle 70s as winds blow from the southwest at just 5 to 10 mph," reports the Capital Weather Gang.

— Channing D. Phillips won the nomination to be U.S. attorney for Washington, D.C. The first thing he needs to do: wrap up the office's troubled five-year probe of ex-District Mayor Vincent Gray.

— Redskins Coach Jay Gruden criticized his own play-calling in the team's 25-19 overtime loss to Atlanta.

— The New York Mets beat the Los Angeles Dodgers, 13-7, in Game 3 of the National League Division Series.

VIDEOS OF THE DAY:

President Obama gave some advice to Kanye West on running for president during a San Francisco fundraiser:

(The Huffington Post)

Grammy award winner Pharrell told Ellen Degeneres that "it's Hillary time":

(@HillaryClinton)

Rand Paul drove through Iowa listening to "The White Stripes":

(@RandPaul)

Finally, in tragic news, a month-old baby giraffe collapsed at the Fresno Zoo during a preview of the exhibit.

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: EnergyGuardian
Sent: Tue 10/13/2015 12:09:11 PM
Subject: Think tank urges alternative fuel incentives for EPA truck standards

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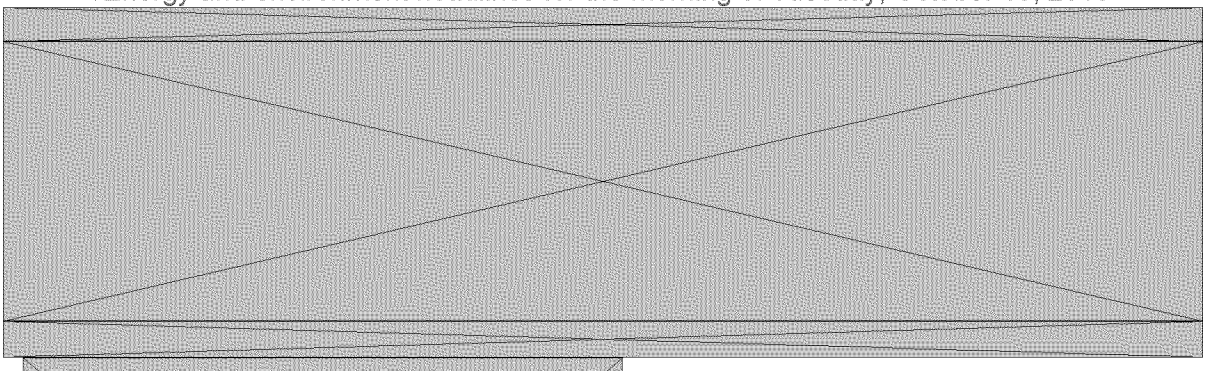
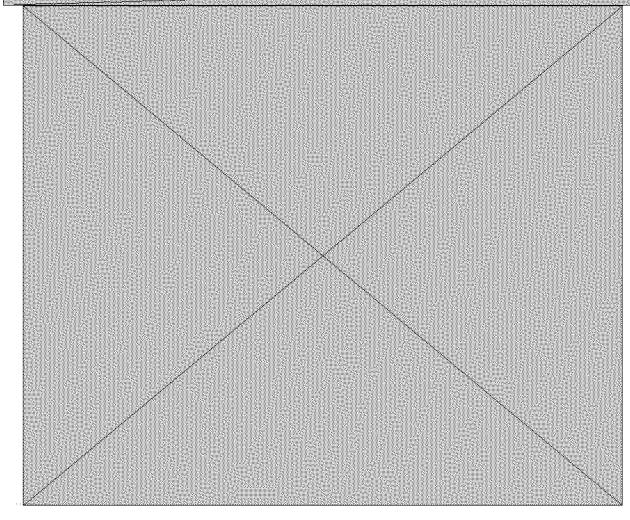
Energy and environment headlines for the morning of Tuesday, October 13, 2015





Think tank urges alternative fuel incentives for EPA truck standards

By Kevin Rogers

Proposed rules aimed at improving truck efficiency could save the sector up to 800,000 barrels of oil per day by 2040, but they could be made stronger by including incentives for alternative fuels consistent with the federal government's light-duty program, a think tank argues in a new analysis.

The policy brief, released by Securing America's Future Energy (SAFE), a think tank

focused on reducing transportation-sector oil use, concluded that the rules, which would apply to large freight vehicles, buses, vocational trucks and pickups, would be technologically feasible and cost-effective for the industry and result in significant fuel savings.

But the group warned that the rules, as written, could undercut wider adoption of cleaner vehicle technologies unless changes were made to provide more incentives for their use.

The rules, proposed in June by the Environmental Protection Agency and the National Highway Traffic Safety Administration, would be phased in from 2019 to 2027. They seek to make 2027 model year trucks 24 percent more fuel efficient than those sold in 2018. For smaller vehicles the rules would seek emissions reductions of 16 percent on the same timeline.

They build on the Phase 1 standards for trucks, which apply to model years 2014 to 2018. The regulations are authorized by the Corporate Average Fuel Economy program, adopted in 1975 to reduce vehicle fuel consumption.

The agencies estimated that the rules would cost $25 billion to implement but would save the industry $230 billion over the lifetime of the program. The agencies also said the standards would cut 1 billion metric tons of carbon dioxide emissions and save 1.8 billion barrels of oil over the lifetime of the vehicles.

SAFE estimated that the program, as proposed, would slash the sector's oil demand by 20 percent by 2040, representing a 7.5 percent decrease in overall U.S. fuel use.

However, it called on the agencies to take stronger steps to reduce overall oil reliance by incentivizing natural gas and other alternative vehicle fuels.

"Improvements in vehicle fuel efficiency alone will not insulate the U.S. economy from the volatile oil price conditions typical of the global oil market," the group said.

Specifically, the group called on the agencies to carry over an incentive from the light-duty program that would treat non-petroleum vehicles as 0.67 times more fuel efficient than oil or diesel-fueled trucks. SAFE argued that implementing such a standard would maintain an "even hand across the light and heavy-duty industries."

"If introducing an alternative-fueled vehicle into the light-duty fleet is deemed important for national and economic security, and explicit incentives are provide to promote such introduction, introduction of an AFV into the heavy-duty fleet should contribute to the same goal and be worthy of the same incentives," the group wrote. "Any other determination is arbitrary as it effectively results in differential treatment of the same fuel."

It also urged the agencies to maintain advanced technology credits currently offered under the Phase 1 standards. EPA and NHTSA have considered scrapping the credits, as the new fuel efficiency standards would likely require the use of updated technologies for

compliance.

SAFE argued that cutting the credits would hurt wider adoption of all-electric, hybrid, fuel cell and natural gas-powered trucks. The group also noted that those technologies were all incentivized under the light-duty vehicle program.

"There is simply no rational reason that heavy-duty manufacturers should be held to less flexible requirements than their light-duty counterparts," the group said.

The EPA and NHTSA finished taking comment on the proposal on October 1 and plan to finalize the standards next year.

While truck industry groups in June embraced both the environmental and fuel-saving goals of the program, some, including the American Trucking Association, voiced concern that the compliance period was too short and relied on yet untested technologies to cut emissions.

Quick Links

Energy, trade likely topics in first Democratic debate

Toyota promises better mileage and ride with Prius hybrid

Iran's parliament approves nuclear deal with world powers

Scholars seek more research on future of Colorado River

Wyoming wildfire forces hundreds of evacuations

Bosnian coal accident: 4 miners dead, 2 injured

IEA sees supply glut into 2016 on slower oil demand growth

Supreme Court to hear arguments in demand response case

More drillers may use mine water in fracking under new Pa. law

California law could push VW into diesel buyback

ERCOT prices hit $600 spike Monday

Oil recovers on bargain hunting, Chinese data

SoCal firm hopes for energy savings using Tesla batteries in buildings

Wisconsin firm selling batteries for energy storage systems in buildings

UPS more than halfway to billion-mile goal on alternative fuel

BP economist says climate concerns will keep oil in the ground

Upcoming Events

Energy, trade likely topics in first Democratic debate

By Julie Pace

WASHINGTON (AP) — Hillary Rodham Clinton says she always expected tough competition in the Democratic presidential primary. It's likely she didn't expect it would come from Bernie Sanders, the rumpled independent senator from Vermont and a self-described democratic socialist calling for "political revolution."

The surprise rivalry between Clinton and Sanders will be at the forefront as Democrats take the stage Tuesday in Las Vegas for the party's first debate of the 2016 campaign. The senator and the former secretary of state will be joined by a trio of candidates who occupy the basement of early polls, each looking to change their fortunes with a breakout moment in prime time.

For months, Clinton and Sanders have circled each other cautiously and avoided personal attacks. But in recent days, both have shown that their preference to focus on policy doesn't mean they won't find ways to jab at each other.

Sanders, who has filled arenas with crowds in the thousands and matched Clinton's fundraising take in the past three months, has cast the former secretary of state as a late-comer to the liberal positions he's held for decades on the environment, the economy, and education.

More

Toyota promises better mileage and ride with Prius hybrid

By Yuri Kageyama

TOKYO (AP) — Toyota Motor Corp. released details for its fourth-generation Prius on Tuesday, promising that improvements in the battery, engine, wind resistance and weight mean better mileage for the world's top-selling hybrid car.

It gets up to 40 kilometers a liter under Japanese tests, which translates to more than 93 miles per gallon, a 20 percent improvement from the 2015 model. In the U.S., it gets 55 mpg in combined city and highway driving, about 10 percent better.

The Prius, which debuted in 1997, goes on sale in Japan in December, and rolls out in the U.S. and other markets early next year. A price was not announced, but it's expected to stay in the same range. The Prius now starts at about $24,000 in the U.S. and 2.4 million yen ($20,000) in Japan.

A hybrid switches back and forth between a gasoline engine and an electric motor to deliver a super-efficient drive, but is increasingly being challenged by even more futuristic technologies, such as the purely electric car and the fuel cell, which are both zero emissions.

More

Iran's parliament approves nuclear deal with world powers

By Nasser Karimi

TEHRAN, Iran (AP) — Iran's parliament voted Tuesday to support implementing a landmark nuclear deal struck with world powers despite hard-line attempts to derail the bill, suggesting the historic accord will be carried out.

The bill will be reviewed by Iran's 12-member Guardian Council, a group of senior clerics who could return it to lawmakers for further discussion. However, Iran's Supreme Leader Ayatollah Ali Khamenei, who has the final say on key policies, has said it is up to the 290-seat parliament to approve or reject the deal.

Signaling the nuclear deal's likely success, a spokesman for moderate President Hassan Rouhani's administration welcomed the parliament's vote and called it a "historic decision."

"Members of parliament made a well-considered decision today showing they have a good understanding of the country's situation," Mohammad Bagher Nobakht said. "We hope to see acceleration in progress and development of the country from now on."

More

Scholars seek more research on future of Colorado River

SALT LAKE CITY (AP) — A coalition of scholars across the West is urging the federal government to partner with the National Academy of Sciences to study the future of the

Colorado River, including if climate change is leading to reduced stream flow.

Twenty-three scholars from Western universities sent a letter Tuesday to Interior Secretary Sally Jewell detailing their request for more scientific research on a host of issues related to the Colorado River.

Chief among the concerns is if there will be enough water in the river to support 36 million users in seven U.S. states and parts of Mexico over the next 50 years.

The scholars argue the federal government is relying on a projection of a 9-percent stream flow decline by 2060, while skimming over other estimates that suggest it could fall by as much as 45 percent by 2050 due to climate change.

More

Wyoming wildfire forces hundreds of evacuations

By The Associated Press

CASPER, Wyo. (AP) — A wildfire tearing through central Wyoming destroyed buildings and forced hundreds of evacuations.

The fire has burned at least 10 homes and several outbuildings, with many of the structures listed as complete losses.

A second day in a row of dry weather and strong wind Monday caused the fire to spread across more than 15 square miles of grassland near Evansville, just east of Casper.

Nobody was reported hurt but firefighters struggled to contain the flames. Some 100 firefighters and two air tankers were on the scene.

More

A message from America's Natural Gas Alliance

Clean is Powerful. Natural gas helps Georgia Power's plant generate electricity with 50% fewer emissions. Think about it.

Learn more at www.thinkaboutit.org.

Bosnian coal accident: 4 miners dead, 2 injured

By The Associated Press

KAKANJ, Bosnia-Herzegovina (AP) — A spokesman for a Bosnian coal mine says four miners died and two were injured in an overnight accident.

Arif Zekic, spokesman for the Begici-Bistrani mine in the town of Kakanj, said that 28 miners were in the pit when the accident occurred at 1 a.m. Tuesday. He said the two injured were hospitalized with non-lethal wounds, and the other miners left the pit safely.

The investigation of the accident is ongoing.

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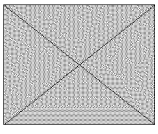

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

IEA sees supply glut into 2016 on slower oil demand growth

The International Energy Agency predicted Tuesday that continued strong output from OPEC combined with a weaker growth in oil demand will maintain a supply glut into next year, Reuters reports.

More

Supreme Court to hear arguments in demand response case

Grid operators and utilities will bring their arguments Wednesday to the U.S. Supreme Court against the Federal Energy Regulatory Commission rule requiring them to offer incentives to customers who cut electricity use during peak demand, E&E reports.

More

More drillers may use mine water in fracking under new Pa. law

A bill signed into law by Pennsylvania Gov. Tom Wolf last week clarifies the legal liabilities involved when a driller uses mine water in the hydraulic fracturing process, the Pittsburgh Post-Gazette reports.

More

California law could push VW into diesel buyback

A class action lawsuit filed in federal court in Los Angeles Monday is citing California emissions laws in demanding Volkswagen immediately buy back diesel vehicles caught up in the company's emissions testing scandal, the Los Angeles Times reports.

More

ERCOT prices hit $600 spike Monday

Real-time prices in the Electric Reliability Council of Texas' South Load Zone hit over $605 per megawatt hour around 3 p.m. Monday, averaging $73.50 earlier in the day, Platts reports.

More

Oil recovers on bargain hunting, Chinese data

Data from China showing the country imported more crude last month, alongside bargain hunting after Monday's price collapse, were helping to support oil early Tuesday. West Texas Intermediate crude rose 1.2 percent to $47.64 a barrel in electronic trading on the Nymex, while in London Brent gained 1.3 percent to $50.88, The Wall Street Journal reports.

More

SoCal firm hopes for energy savings using Tesla batteries in buildings

The Irvine Company is banking on a smart energy storage system using Tesla batteries to drive substantial energy savings in their buildings in Southern California, KABC reports.

More

Wisconsin firm selling batteries for energy storage systems in buildings

Johnson Controls Inc. is putting lithium-ion batteries into energy storage systems at the Merchandise Mart building in Chicago and in a U.S. military base in Puerto Rico, the Milwaukee Journal Sentinel reports.

More

UPS more than halfway to billion-mile goal on alternative fuel

United Parcel Service vehicles running on alternative fuel have logged more than 500 million miles, more than halfway to the company goal of hitting a billion miles by 2017, the Pittsburgh Post-Gazette reports.

More

BP economist says climate concerns will keep oil in the ground

Worries about climate change mean it's "increasingly unlikely" that the world will run through its oil reserves, BP's chief economist Spencer Dale told a conference Tuesday, Reuters reports.

More

Upcoming Events

- Oct. 13, Washington: The Environmental and Energy Study Institute to hold a briefing on the bipartisan PREPARE Act, which would reform extreme weather response and recovery efforts to save taxpayer money. Government Accountability Office Assistant Director for Natural Resources and Environment Joe Thompson to speak. 10:30 am
- Oct. 13, Washington: The Wilson Center and the Canada Institute to host a discussion on climate policy views in the U.S. and Canada. 9:00 am , Ronald Reagan Building and International Trade Center.
- Oct. 13, Washington: Office of Management and Budget Association Director for Natural Resources, Energy and Science Ali Zaidi, state regulators and industry experts to speak at the first day of the National Summit on Smart Grid and Climate Change. The summit continues through Wednesday. 9:00 am , Hyatt Regency Capitol Hill.

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: energy@morningconsult.cpro30.com
Sent: Tue 10/13/2015 12:16:58 PM
Subject: Morning Consult Energy, Presented by Southern Company: Alaska Gov. Proposes Drilling in ANWR to Fund Climate Change Programs; Volkswagen to Cut Annual Spending by $1.1 Billion

By Deirdra O'Regan

Today's Washington Brief

- Alaska Gov. Bill Walker (I) proposed an increase in oil drilling in places such as the Arctic National Wildlife Refuge (ANWR) to boost state revenue and pay for climate change-related programs. Alaska relies on oil and gas production for much of its budget, which has been hit by falling oil prices. (The Hill)

- Lower gas prices means no increase in Social Security benefits next year, which will affect more than 20 percent of Americans. Cheaper gas is stalling inflation and dragging down the annual cost-of-living index, blocking a rise in payments for only the third time in 40 years. (The Associated Press)

- A new study from Johns Hopkins University suggests that pregnant women living near fracking wells are more likely to give birth prematurely or have high risk pregnancies. An official for a petroleum industry group says the research "relies heavily on assumptions." (McClatchy DC)

Today's Business Brief

- Volkswagen AG will reduce annual investment spending for its main passenger-car brand by $1.1 billion as it tries to recover from a diesel emissions-cheating scandal. The carmaker said it will switch to a different technology for treating diesel emissions "as soon as possible." (Bloomberg News)

- U.S. oil output will drop in 2016 for the first time in eight years as producers slash spending, according to the Organization of the Petroleum Exporting Countries. OPEC slashed its U.S. oil production forecast for next year by 280,000 barrels a day, to 13.538 million barrels, consistent with U.S. Energy Information Administration predictions. (The Wall Street Journal)

- Traditional power companies are increasingly moving into small-scale solar energy. Solar panel installation grew by more than 50 percent in 2014 and is on track for another record-breaking year. (The Associated Press)

Today's Chart Review

Electricity Generation by Fuel Annual Energy Outlook 2014 Reference Case
U.S. Department of Homeland Security

Mark Your Calendars (All Times Eastern)

Tuesday
Association for Demand Response and Smart Grid conference @ 8 a.m.
Wilson Center discussion on climate change opinions in the U.S. and Canada @ 9 a.m.
Environmental and Energy Study Institute briefing on the PREPARE Act @ 10:30 a.m.

Wednesday
Association for Demand Response and Smart Grid conference @ 8 a.m.
Discussion on autonomous transportation at National Press Club @ 10 a.m.
AWEA Wind Energy Finance & Investment Seminar @ 12 p.m.
Environmental Law Institute seminar and webinar on the Clean Power Plan @ 12:30 p.m.
Wilson Center panel on expectations and reality at COP 21 @ 3 p.m.

Thursday
AWEA Wind Energy Finance & Investment Seminar @ 8 a.m.
Federal Energy Regulatory Commission meeting @ 10 a.m.
Environmental Law Institute seminar and webinar on Chevron deference after Perez, Burwell, and Michigan v. EPA @ 2 p.m.

Friday
No events scheduled.

General

Lower gas prices means no Social Security increase next year
Stephen Ohlemacher, The Associated Press

For just the third time in 40 years, millions of Social Security recipients, disabled veterans and federal retirees can expect no increase in benefits next year, unwelcome news for more than one-fifth of the nation's population. They can blame low gas prices.

Volkswagen to Cut Spending by $1.1 Billion Amid Diesel Scandal

Naomi Kresge, Bloomberg News

Volkswagen AG will reduce investment spending at its main passenger-car brand by 1 billion euros ($1.1 billion) a year and speed up other cost cuts in the wake of a diesel emissions-cheating scandal. The German carmaker will switch to a different technology for treating diesel emissions in Europe and North America "as soon as possible," the Wolfsburg, Germany-based carmaker said in a statement Tuesday.

Volkswagen Is Not The Only Manufacturer Failing To Live Up To Regulatory Test Performance
James Ayre, CleanTechnica

While Volkswagen may well be the only auto manufacturer with higher-ups arrogant enough to think that they can commit such blatant fraud forever without experiencing any repercussions, the German company is certainly not the only auto manufacturer that produces vehicles that show a large discrepancy between real-world performance and testing-cycle performance. Amongst the other manufacturers that have been shown by recent research to emit significantly more pollution during real-world operation than during testing-cycle operation are: Mercedes-Benz, Honda, Mitsubishi, and Mazda.

Here's who's been dominating the energy buying space
Cara Smith, Houston Business Journal

Private companies and private equity-backed groups were responsible for 41 percent of the purchases of exploration and production energy companies in 2014, and experts say that private equity groups were likely responsible for the lion's share of those deals. That's according to data from IHS Herold, an independent research firm that specializes in corporate transactions.

S&P 500 Futures Fall on Weak China Imports; Molson Coors Rallies
Roxana Zega, Bloomberg News

Standard & Poor's 500 Index E-mini contractsexpiring in December fell 0.4 percent to 2002.5 at 7:42 a.m in London, inching lower after China's imports extended the longest losing streak in six years. Dow Jones Industrial Average contracts lost 70 points, or 0.4 percent, to 16,971, while those on the Nasdaq 100 Index dropped 24 points, or 0.5 percent.

Oil & Natural Gas

Oil Falls to One-Week Low as IEA Counters OPEC View on Recovery
Grant Smith, Bloomberg News

Oil slid to a one-week low in New York as the IEA's prediction that the global surplus will persist next year countered OPEC's view of a recovering market. West Texas

Intermediate futures slipped 0.6 percent after Monday's 5.1 percent drop, the biggest in six weeks.

OPEC Sees U.S. Oil Output Dropping Next Year
Benoit Faucon, The Wall Street Journal

U.S. oil output will decline in 2016 for the first time in eight years as producers slash spending, the Organization of the Petroleum Exporting Countries said Monday, while the producer group continues pumping at high levels. In its closely watched monthly oil market report, OPEC slashed its U.S. oil production forecast by 280,000 barrels a day next year, to 13.538 million barrels a day, a number that includes natural gas liquids.

Johns Hopkins study links fracking and premature births
Sean Cockerham, McClatchy DC

New research from Johns Hopkins University suggests pregnant women living near fracking wells in Pennsylvania are more likely to give birth prematurely or have high risk pregnancies. "Now that we know this is happening we'd like to figure out why," said Brian Schwartz, lead researcher and a professor at the Johns Hopkins Bloomberg School of Public Health.

Cutting Staff Pay to Keep Workers
Chester Dawson And Benoît Faucon, The Wall Street Journal

As layoffs become the energy industry's main response to low oil prices, a handful of producers are aiming to trim personnel costs without pink slips by spreading the pain among their employees. Companies including Occidental Petroleum Corp. and Canadian Natural Resources Ltd. are employing hiring freezes, caps on bonuses, and even across-the-board wage cuts to preserve jobs.

Marathon Oil court victory could deter similar lawsuits, expert says
Suzanne Edwards, Houston Business Journal

A recent court victory for Houston-based Marathon Oil Corp. may curtail a pervasive category of lawsuits brought by plaintiffs living near drilling activity. On Oct. 7, a San Antonio Court of Appeals affirmed an earlier trial court decision in Marathon's favor, which will put a greater burden of proof on plaintiffs who complain that oilfield operations negatively impact their health and property.

Oil Sands Boom Dries Up in Alberta, Taking Thousands of Jobs With it
Ian Austen, The New York Times

With oil prices falling precipitously, capital-intensive projects rooted in the heavy crude mined from Alberta's oil sands are losing money, contributing to the loss of about 35,000 energy industry jobs across the province.

Phillips 66 Unveils Lower Spending Plan for 2016, Boosts Buybacks

Lisa Beilfuss, The Wall Street Journal

Phillips 66 said Monday that it has set its 2016 capital budget at $3.6 billion, down from $4.6 billion last year, and boosted its stock-buyback plan by $2 billion. The Houston-based company said the budget, excluding Phillips 66 Partners 's capital spending, is focused on its midstream business lines. The company plans to invest $2 billion there, and it said it would spend $1.2 billion on its refining segment.

Gazprom Restarts Gas Deliveries to Ukraine
Laura Mills, The Wall Street Journal

Russian state natural-gas company PAO Gazprom resumed deliveries to Ukraine on Monday, after halting exports in July, reducing the risk of disruption to supplies to the rest of Europe this winter. Deliveries were resumed after Ukraine paid $234 million of a total $500 million prepayment expected for gas in October, Gazprom chief executive Alexei Miller said.

Utilities & Infrastructure

DOE: Climate change poses a threat to grid resiliency
Robert Walton, Utility Dive

The Obama administration has released a report examining the regional impacts of climate change, finding widespread impacts to the utility industry and a potential threat to grid resiliency. DOE found electric grid operations and infrastructure in every region are vulnerable to a variety of impacts, including increasing temperatures, heavy rainfall events, wildfires and hurricanes.

Tests showed rail defect 2 months before W.Va. oil train derailed
Curtis Tate, McClatchy DC

Two separate tests in the two months prior to a fiery oil train derailment in West Virginia earlier this year showed the presence of a rail defect, according to a report on the incident. But neither the railroad nor the contractor who did the tests followed up on the results in December 2014 and January 2015, and the rail broke under a 107-car CSX train loaded with Bakken crude oil.

Renewables

Big utilities enter market for small rooftop solar
Ray Henry and Susan Montoya Bryan, The Associated Press

Traditional power companies are getting into small-scale solar energy and competing for space on your rooftop. The emerging competition comes as utilities and smaller solar installers fight over the future of the U.S. energy system.

Loss of tax credit puts North Carolina solar industry under a cloud
Steve DeVane, The Fayetteville Observer

State and local officials worry that an end this year to tax credits for solar farms could halt or significantly curtail an industry that has helped build the tax base and generate economic activity in job-hungry rural areas. Any reduction in the industry could hit especially hard in the Cape Fear region, which is home to dozens of solar farms.

Coal

California pension funds to drop coal-mining companies
Chris Megerian, Los Angeles Times

Gov. Jerry Brown on Thursday signed legislation forcing California's pension systems, the two largest public funds in the country, to divest from coal companies. The measure, SB 185 by state Senate leader Kevin de León (D-Los Angeles), requires the funds to sell their holdings in companies that derive at least half of their revenue from mining coal used to generate electricity.

The Fall of King Coal
Tim Murphy, Mother Jones

Don Blankenship earned his way to this summit by reducing many of the nearby mountaintops to heaps of gravel and harvesting the bituminous seams inside them to nearly triple his company's revenue. Heavyset and balding, with a slug of a mustache and anthracite eyes, he was a harsh taskmaster whose cutthroat management style transformed what was once a modest family business into the region's largest coal producer.

Prices mostly unchanged as US OTC thermal coal market shut out again
Jim Levesque, Platts

The US over-the-counter thermal coal market was shut out Friday for the second time this week and the 18th time in 2015 as no physical or financial trades were seen or reported. The inactivity kept prices mostly unchanged.

Nuclear

America's newest nuke plant shows why nuclear power is dying in the U.S.
Michael Hiltzik, Los Angeles Times

Shortly after New Year's Day, the Tennessee Valley Authority is expected to bring its newest nuclear power plant online. The TVA says Watts Bar Unit 2 in Spring City,

Tenn., about 50 miles north of Chattanooga, will be fully modern and superlatively safe — "the nation's first new nuclear generation of the 21st century," the utility says.

Climate

Alaska gov: More drilling needed to fund climate change programs
Devin Henry, The Hill

Alaska Gov. Bill Walker (I) says the state needs to drill more oil to mitigate the impact of climate change. Alaska has no sales or income tax and relies on oil and gas production for much of its operating budget.

UN climate science head calls for carbon pricing
Timothy Cama, The Hill

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To: Giles-AA, Cynthia
Subject: Morning Consult Energy, Presented by Southern Company: Alaska Gov. Proposes Drilling in ANWR to Fund Climate Change Programs; Volkswagen to Cut Annual Spending by $1.1 Billion

By Deirdra O'Regan

Today's Washington Brief

- Alaska Gov. Bill Walker (I) proposed an increase in oil drilling in places such as the Arctic National Wildlife Refuge (ANWR) to boost state revenue and pay for climate change-related programs. Alaska relies on oil and gas production for much of its budget, which has been hit by falling oil prices. (The Hill)

- Lower gas prices means no increase in Social Security benefits next year, which will affect more than 20 percent of Americans. Cheaper gas is stalling inflation and dragging down the annual cost-of-living index, blocking a rise in payments for only the third time in 40 years. (The Associated Press)

- A new study from Johns Hopkins University suggests that pregnant women living near fracking wells are more likely to give birth prematurely or have high risk pregnancies. An official for a petroleum industry group says the research "relies heavily on assumptions." (McClatchy DC)

Today's Business Brief

- Volkswagen AG will reduce annual investment spending for its main passenger-car brand by $1.1 billion as it tries to recover from a diesel emissions-cheating scandal. The carmaker said it will switch to a different technology for treating diesel emissions "as soon as possible." (Bloomberg News)

- U.S. oil output will drop in 2016 for the first time in eight years as producers slash spending, according to the Organization of the Petroleum Exporting Countries. OPEC slashed its U.S. oil production forecast for next year by 280,000 barrels a day, to 13.538 million barrels, consistent with U.S. Energy Information Administration predictions. (The Wall Street Journal)

- Traditional power companies are increasingly moving into small-scale solar energy. Solar panel installation grew by more than 50 percent in 2014 and is on track for another record-breaking year. (The Associated Press)

Today's Chart Review

Electricity Generation by Fuel Annual Energy Outlook 2014 Reference Case
U.S. Department of Homeland Security

Mark Your Calendars (All Times Eastern)

Tuesday
Association for Demand Response and Smart Grid conference @ 8 a.m.
Wilson Center discussion on climate change opinions in the U.S. and Canada @ 9 a.m.
Environmental and Energy Study Institute briefing on the PREPARE Act @ 10:30 a.m.

Wednesday
Association for Demand Response and Smart Grid conference @ 8 a.m.
Discussion on autonomous transportation at National Press Club @ 10 a.m.
AWEA Wind Energy Finance & Investment Seminar @ 12 p.m.
Environmental Law Institute seminar and webinar on the Clean Power Plan @ 12:30 p.m.
Wilson Center panel on expectations and reality at COP 21 @ 3 p.m.

Thursday
AWEA Wind Energy Finance & Investment Seminar @ 8 a.m.
Federal Energy Regulatory Commission meeting @ 10 a.m.
Environmental Law Institute seminar and webinar on Chevron deference after Perez, Burwell, and Michigan v. EPA @ 2 p.m.

Friday
No events scheduled.

General

Lower gas prices means no Social Security increase next year

Stephen Ohlemacher, The Associated Press

For just the third time in 40 years, millions of Social Security recipients, disabled veterans and federal retirees can expect no increase in benefits next year, unwelcome news for more than one-fifth of the nation's population. They can blame low gas prices.

Volkswagen to Cut Spending by $1.1 Billion Amid Diesel Scandal

Naomi Kresge, Bloomberg News

Volkswagen AG will reduce investment spending at its main passenger-car brand by 1 billion euros ($1.1 billion) a year and speed up other cost cuts in the wake of a diesel emissions-cheating scandal. The German carmaker will switch to a different technology for treating diesel emissions in Europe and North America "as soon as possible," the Wolfsburg, Germany-based carmaker said in a statement Tuesday.

Volkswagen Is Not The Only Manufacturer Failing To Live Up To Regulatory Test Performance

James Ayre, CleanTechnica

While Volkswagen may well be the only auto manufacturer with higher-ups arrogant enough to think that they can commit such blatant fraud forever without experiencing any repercussions, the German company is certainly not the only auto manufacturer that produces vehicles that show a large discrepancy between real-world performance and testing-cycle performance. Amongst the other manufacturers that have been shown by recent research to emit significantly more pollution during real-world operation than during testing-cycle operation are: Mercedes-Benz, Honda, Mitsubishi, and Mazda.

Here's who's been dominating the energy buying space

Cara Smith, Houston Business Journal

Private companies and private equity-backed groups were responsible for 41 percent of the purchases of exploration and production energy companies in 2014, and experts say that private equity groups were likely responsible for the lion's share of those deals. That's according to data from IHS Herold, an independent research firm that specializes in corporate transactions.

S&P 500 Futures Fall on Weak China Imports; Molson Coors Rallies

Roxana Zega, Bloomberg News

Standard & Poor's 500 Index E-mini contractsexpiring in December fell 0.4 percent to 2002.5 at 7:42 a.m in London, inching lower after China's imports extended the longest losing streak in six years. Dow Jones Industrial Average contracts lost 70 points, or 0.4 percent, to 16,971, while those on the Nasdaq 100 Index dropped 24 points, or 0.5 percent.

Oil & Natural Gas

Oil Falls to One-Week Low as IEA Counters OPEC View on Recovery
Grant Smith, Bloomberg News

Oil slid to a one-week low in New York as the IEA's prediction that the global surplus will persist next year countered OPEC's view of a recovering market. West Texas Intermediate futures slipped 0.6 percent after Monday's 5.1 percent drop, the biggest in six weeks.

OPEC Sees U.S. Oil Output Dropping Next Year
Benoit Faucon, The Wall Street Journal

U.S. oil output will decline in 2016 for the first time in eight years as producers slash spending, the Organization of the Petroleum Exporting Countries said Monday, while the producer group continues pumping at high levels. In its closely watched monthly oil market report, OPEC slashed its U.S. oil production forecast by 280,000 barrels a day next year, to 13.538 million barrels a day, a number that includes natural gas liquids.

Johns Hopkins study links fracking and premature births
Sean Cockerham, McClatchy DC

New research from Johns Hopkins University suggests pregnant women living near fracking wells in Pennsylvania are more likely to give birth prematurely or have high risk pregnancies. "Now that we know this is happening we'd like to figure out why," said Brian Schwartz, lead researcher and a professor at the Johns Hopkins Bloomberg School of Public Health.

Cutting Staff Pay to Keep Workers
Chester Dawson And Benoît Faucon, The Wall Street Journal

As layoffs become the energy industry's main response to low oil prices, a handful of producers are aiming to trim personnel costs without pink slips by spreading the pain among their employees. Companies including Occidental Petroleum Corp. and Canadian Natural Resources Ltd. are employing hiring freezes, caps on bonuses, and even across-the-board wage cuts to preserve jobs.

Marathon Oil court victory could deter similar lawsuits, expert says
Suzanne Edwards, Houston Business Journal

A recent court victory for Houston-based Marathon Oil Corp. may curtail a pervasive category of

lawsuits brought by plaintiffs living near drilling activity. On Oct. 7, a San Antonio Court of Appeals affirmed an earlier trial court decision in Marathon's favor, which will put a greater burden of proof on plaintiffs who complain that oilfield operations negatively impact their health and property.

Oil Sands Boom Dries Up in Alberta, Taking Thousands of Jobs With it
Ian Austen, The New York Times

With oil prices falling precipitously, capital-intensive projects rooted in the heavy crude mined from Alberta's oil sands are losing money, contributing to the loss of about 35,000 energy industry jobs across the province.

Phillips 66 Unveils Lower Spending Plan for 2016, Boosts Buybacks
Lisa Beilfuss, The Wall Street Journal

Phillips 66 said Monday that it has set its 2016 capital budget at $3.6 billion, down from $4.6 billion last year, and boosted its stock-buyback plan by $2 billion. The Houston-based company said the budget, excluding Phillips 66 Partners 's capital spending, is focused on its midstream business lines. The company plans to invest $2 billion there, and it said it would spend $1.2 billion on its refining segment.

Gazprom Restarts Gas Deliveries to Ukraine
Laura Mills, The Wall Street Journal

Russian state natural-gas company PAO Gazprom resumed deliveries to Ukraine on Monday, after halting exports in July, reducing the risk of disruption to supplies to the rest of Europe this winter. Deliveries were resumed after Ukraine paid $234 million of a total $500 million prepayment expected for gas in October, Gazprom chief executive Alexei Miller said.

Utilities & Infrastructure

DOE: Climate change poses a threat to grid resiliency
Robert Walton, Utility Dive

The Obama administration has released a report examining the regional impacts of climate change, finding widespread impacts to the utility industry and a potential threat to grid resiliency. DOE found electric grid operations and infrastructure in every region are vulnerable to a variety of impacts, including increasing temperatures, heavy rainfall events, wildfires and hurricanes.

Tests showed rail defect 2 months before W.Va. oil train derailed
Curtis Tate, McClatchy DC

Two separate tests in the two months prior to a fiery oil train derailment in West Virginia earlier this year showed the presence of a rail defect, according to a report on the incident. But neither

the railroad nor the contractor who did the tests followed up on the results in December 2014 and January 2015, and the rail broke under a 107-car CSX train loaded with Bakken crude oil.

Renewables

Big utilities enter market for small rooftop solar
Ray Henry and Susan Montoya Bryan, The Associated Press

Traditional power companies are getting into small-scale solar energy and competing for space on your rooftop. The emerging competition comes as utilities and smaller solar installers fight over the future of the U.S. energy system.

Loss of tax credit puts North Carolina solar industry under a cloud
Steve DeVane, The Fayetteville Observer

State and local officials worry that an end this year to tax credits for solar farms could halt or significantly curtail an industry that has helped build the tax base and generate economic activity in job-hungry rural areas. Any reduction in the industry could hit especially hard in the Cape Fear region, which is home to dozens of solar farms.

Coal

California pension funds to drop coal-mining companies
Chris Megerian, Los Angeles Times

Gov. Jerry Brown on Thursday signed legislation forcing California's pension systems, the two largest public funds in the country, to divest from coal companies. The measure, SB 185 by state Senate leader Kevin de León (D-Los Angeles), requires the funds to sell their holdings in companies that derive at least half of their revenue from mining coal used to generate electricity.

The Fall of King Coal
Tim Murphy, Mother Jones

Don Blankenship earned his way to this summit by reducing many of the nearby mountaintops to heaps of gravel and harvesting the bituminous seams inside them to nearly triple his company's revenue. Heavyset and balding, with a slug of a mustache and anthracite eyes, he was a harsh taskmaster whose cutthroat management style transformed what was once a modest family business into the region's largest coal producer.

Prices mostly unchanged as US OTC thermal coal market shut out again
Jim Levesque, Platts

The US over-the-counter thermal coal market was shut out Friday for the second time this week and the 18th time in 2015 as no physical or financial trades were seen or reported. The inactivity

kept prices mostly unchanged.

Nuclear

America's newest nuke plant shows why nuclear power is dying in the U.S.
Michael Hiltzik, Los Angeles Times

Shortly after New Year's Day, the Tennessee Valley Authority is expected to bring its newest nuclear power plant online. The TVA says Watts Bar Unit 2 in Spring City, Tenn., about 50 miles north of Chattanooga, will be fully modern and superlatively safe — "the nation's first new nuclear generation of the 21st century," the utility says.

Climate

Alaska gov: More drilling needed to fund climate change programs
Devin Henry, The Hill

Alaska Gov. Bill Walker (I) says the state needs to drill more oil to mitigate the impact of climate change. Alaska has no sales or income tax and relies on oil and gas production for much of its operating budget.

UN climate science head calls for carbon pricing
Timothy Cama, The Hill

The new head of the United Nations's climate science agency said countries around the world need to implement systems to put a price on carbon dioxide emissions. Hoesung Lee, chairman of the Intergovernmental Panel on Climate Change (IPCC), said at a news conference in his native South Korea that he wants the agency to put more focus on solving problems around climate change.

A Message from Southern Company:

You may be surprised to learn what a 100-year old utility is doing now. Learn more about innovation at Southern Company.

Opinions, Editorials & Perspectives

VW Scandal Reveals Major Cracks in EPA's Emissions Reduction Strategy
Carol Werner, Morning Consult

Volkswagen's installation of emissions testing "defeat devices" in its diesel cars was decidedly illegal, and the company should be severely punished for flouting our pollution controls in such an egregious manner. But its cheating is merely the proverbial tip of the emissions iceberg.

Rooftop Solar and the Free Market – What the Taxpayers Protection Alliance Gets Wrong

Lyndon Rive, Morning Consult

There are misconceptions about rooftop solar, and then there are intentional obfuscations made by those who are determined to see rooftop solar fail. Whichever best describes the views of Taxpayers Protection Alliance President David Williams, his Sept. 30 opinion piece in Morning Consult demands a response.

How 'grid neutrality' can build the backbone for the modern grid

Herman K. Trabish, Utility Dive

As utilities and customers look to cut carbon emissions and modernize their grids through the use of distributed energy resources (DERs), one of the nagging questions facing sector stakeholders nationwide is how to decide where, when, and how new technologies like rooftop solar or storage will be deployed on the grid. New rules are needed, many stakeholders say, to convert the old grid, based on centralized generation, to one that readily integrates and promotes the proliferation of new grid technologies.

A Message from Southern Company:

Southern Company announces a new facility that will help the company deliver the solutions its customers need for today – and for tomorrow. Learn more about Southern Company's Energy Innovation Center.

Research Reports, Issue Briefs & Case Studies

Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA.

Joan Casey et al., Epidemiology

Unconventional natural gas development has expanded rapidly. In Pennsylvania, the number of producing wells increased from 0 in 2005 to 3,689 in 2013. Prenatal residential exposure to unconventional natural gas development activity was associated with two pregnancy outcomes, adding to evidence that unconventional natural gas development may impact health.

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To: Shinkman, Susan[Shinkman.Susan@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
From: Giles-AA, Cynthia
Sent: Tue 10/13/2015 12:56:07 PM
Subject: Mitigation

This is a pretty interesting clip

http://www.forbes.com/sites/billvisnic/2015/10/10/if-youre-a-volkswagen-dieselgate-victim-will-you-cooperate/

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Tue 10/13/2015 12:59:55 PM
Subject: A.M. NEWSCAST: VW to slash investments, push EVs | New Porsche N.A. chief | Prius mileage up 10% | 2-day FCA vote | AutoNation's CEO on long loans, fall of 'Humpty Dumpty'

October 13, 2015

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To: Snyder, Jim[Snyder.Jim@epa.gov]
Cc: Allen, Gregory (EEO)[Gregory.Allen@vw.com]; Giles, Michael (EEO)[michael.giles@vw.com]
From: Rodgers, William (EEO)
Sent: Tue 10/13/2015 2:30:39 PM
Subject: Audi e-tron

Hi Jim,

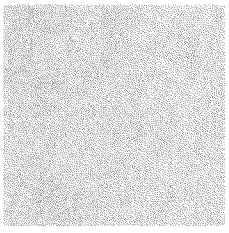
I hate to be a thorn. Have you seen any lab data from the e-tron Charge depleting Highway test? We are also still looking for the newly formatted data for the CD-city test that the lab owed you.

Regards,

Bill Rodgers

EEO

To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Ex. 6
Sent: Tue 10/13/2015 3:01:21 PM
Subject: VW CEO: 'There might be a slight impact on the performance' after recall. Autoweek
vw-ceo-there-might-be-slig.pdf



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Ann Arbor, MI 48105

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http://www.surveymonkey.com/s/epalibsurvey

To: Allnutt, David[Allnutt.David@epa.gov]; Anderson, Lea[anderson.lea@epa.gov]; Anderson, Steve[Anderson.Steve@epa.gov]; Aranda, Amber[aranda.amber@epa.gov]; Averback, Jonathan[Averback.Jonathan@epa.gov]; Belser, Evan[Belser.Evan@epa.gov]; Bianco, Karen[Bianco.Karen@epa.gov]; Bogoshian, Matthew[Bogoshian.Matt@epa.gov]; Branning, Amy[Branning.Amy@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Chapman, Apple[Chapman.Apple@epa.gov]; Choi, Jake[Choi.Jake@epa.gov]; Cozad, David[Cozad.David@epa.gov]; Crum, Lynda[Crum.Lynda@epa.gov]; Crystal, Roy[crystal.roy@epa.gov]; Davis, Julian[davis.julian@epa.gov]; Dickinson, David[Dickinson.David@epa.gov]; Dierker, Carl[Dierker.Carl@epa.gov]; Dolph, Becky[Dolph.Becky@epa.gov]; Doster, Brian[Doster.Brian@epa.gov]; Dubey, Susmita[dubey.susmita@epa.gov]; Dubois, Roland[Dubois.Roland@epa.gov]; Frey, Bert[frey.bertram@epa.gov]; Froikin, Sara[Froikin.Sara@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Graham, Cheryl[Graham.Cheryl@epa.gov]; Harrison, Ben[Harrison.Ben@epa.gov]; Hoffman, Howard[hoffman.howard@epa.gov]; Hogan, Stephanie[Hogan.Stephanie@epa.gov]; Holmes, Carol[Holmes.Carol@epa.gov]; Igoe, Sheila[Igoe.Sheila@epa.gov]; Jordan, Scott[Jordan.Scott@epa.gov]; Kaplan, Robert[kaplan.robert@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]; Klepp, Robert[Klepp.Robert@epa.gov]; Knapp, Kristien[Knapp.Kristien@epa.gov]; Lee, Michael[lee.michaelg@epa.gov]; Lovett, Lauren[Lovett.Lauren@epa.gov]; Mackey, Cyndy[Mackey.Cyndy@epa.gov]; Manners, Mary[manners.mary@epa.gov]; Marks, Matthew[Marks.Matthew@epa.gov]; Matthews, Julie[Matthews.Juliane@epa.gov]; McConkey, Diane[Mcconkey.Diane@epa.gov]; Mclean, Kevin[Mclean.Kevin@epa.gov]; Moore, Bruce[Moore.Bruce@epa.gov]; Morgan, Jeanette[Morgan.Jeanette@epa.gov]; Moyer, Robert[Moyer.Robert@epa.gov]; Muller, Sheldon[Muller.Sheldon@epa.gov]; Niebling, William[Niebling.William@epa.gov]; Nguyen, Quoc[Nguyen.Quoc@epa.gov]; Adair, Jocelyn[Adair.Jocelyn@epa.gov]; Odendahl, Steve[Odendahl.Steve@epa.gov]; Okoye, Winifred[Okoye.Winifred@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Pastorkovich, Anne-Marie[Pastorkovich.Anne-Marie@epa.gov]; Roberts, Martha[Roberts.Martha@epa.gov]; Rodman, Sonja[Rodman.Sonja@epa.gov]; Rowland, John[Rowland.John@epa.gov]; Schaaf, Eric[Schaaf.Eric@epa.gov]; Schmidt, Lorie[Schmidt.Lorie@epa.gov]; Senn, John[Senn.John@epa.gov]; Shenkman, Ethan[Shenkman.Ethan@epa.gov]; Silverman, Steven[silverman.steven@epa.gov]; Smith, Kristi[Smith.Kristi@epa.gov]; Snyder, Doug[Snyder.Doug@epa.gov]; Srinivasan, Gautam[Srinivasan.Gautam@epa.gov]; Stahle, Susan[Stahle.Susan@epa.gov]; Starfield, Lawrence[Starfield.Lawrence@epa.gov]; Stern, Allyn[Stern.Allyn@epa.gov]; Tate, Ragan[Tate.Ragan@epa.gov]; Thrift, Mike[thrift.mike@epa.gov]; Tierney, Jan[tierney.jan@epa.gov]; Ting, Kaytrue[Ting.Kaytrue@epa.gov]; Tsirigotis, Peter[Tsirigotis.Peter@epa.gov]; Versace, Paul[Versace.Paul@epa.gov]; Vetter, Rick[Vetter.Rick@epa.gov]; Walker, Mike[Walker.Mike@epa.gov]; Ward, W. Robert[Ward.Robert@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]; Wilcox, Geoffrey[wilcox.geoffrey@epa.gov]; Williams, Brent[Williams.Brent@epa.gov]; Williams, Melina[Williams.Melina@epa.gov]; Williamson, Timothy[Williamson.Tim@epa.gov]; Zenick, Elliott[Zenick.Elliott@epa.gov]; Wills, Jennifer[Wills.Jennifer@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Blake, Wendy[Blake.Wendy@epa.gov]; Schramm, Daniel[Schramm.Daniel@epa.gov]; Vergeront, Julie[Vergeront.Julie@epa.gov]; Tozzi, Lauren[Tozzi.Lauren@epa.gov]; Coursen, David[Coursen.David@epa.gov]; Pilchen, Zach[Pilchen.Zach@epa.gov]; Skinner-Thompson, Jonathan[Skinner-Thompson.Jonathan@epa.gov]; Vijayan, Abi[Vijayan.Abi@epa.gov]; Roder, Aileen[Roder.Aileen@epa.gov]; Walker, Denise[Walker.Denise@epa.gov]; Caballero, Kathryn[Caballero.Kathryn@epa.gov]; Thompson, Christopher[Thompson.Christopher@epa.gov]; Williams, Christopher[Williams.Christopher@epa.gov]; Matthew, Dayna[Matthew.Dayna@epa.gov]; Reid, Lauren[Reid.Lauren@epa.gov]; Sweet, Andrew[Sweet.Andrew@epa.gov]; Hammons, Jeffrey[Hammons.Jeffrey@epa.gov]; Morris, Rachel[Morris.Rachel@epa.gov]; Nguyen, DucH[Nguyen.DucH@epa.gov]; Jordan, Deborah[Jordan.Deborah@epa.gov]; Charlton, Tom[Charlton.Tom@epa.gov]; Kulschinsky, Edward[Kulschinsky.Edward@epa.gov]; Portmess, Jessica[Portmess.Jessica@epa.gov]; kaminer, joan[Kaminer.Joan@epa.gov]; Kryman, Matthew[Kryman.Matthew@epa.gov]; Greenglass, Nora[Greenglass.Nora@epa.gov]; Spina, Providence[Spina.Providence@epa.gov]
From: Turley, Jennifer

Sent: Tue 10/13/2015 3:12:12 PM
Subject: Air & Radiation Law News for October 13, 2015

Air & Radiation Law News

for October 13, 2015

Bloomberg BNA **Daily Environment Report™**

Air Pollution

EPA's New Volkswagen Probe May Reveal Failure to Disclose

The U.S. Environmental Protection Agency is investigating a second emissions-control software program on Volkswagen AG cars that were rigged to pass pollution tests, one that the automaker may have failed to properly disclose....

Air Pollution

European Commission to Speed Up Vehicle Emissions Rules

In response to criticism from members of the European Parliament in the wake of cheating by Volkswagen, the European Commission will speed up work on new rules establishing testing parameters

for vehicle pollutant emissions, the commission...

Air Pollution

Texas Lawsuits Seek Restitution From Volkswagen

The Texas attorney general filed two lawsuits in state District Court against Volkswagen Group of America Inc. and Audi of America Inc., charging the companies violated Texas clear air standards and state consumer protection laws (Texas...

Air Pollution

White House Reviews EPA Exceptional Events Proposal

The White House is reviewing an Environmental Protection Agency proposal intended to update its policy on air quality data affected by "exceptional events" such as wildfires....

Climate Change

California Requires State Pension Funds to Divest Coal

The nation's two largest public employee pension plans must divest holdings in companies generating 50 percent or more of their revenue from coal mining, under a bill California Gov. Jerry Brown (D) signed into law Oct. 8....

Climate Regulation

EPA Would Push New Rules If Capito Bill Passes: CBO

The Environmental Protection Agency would likely try again to regulate new power plants if Senate legislation killing off existing rules becomes law, the Congressional Budget Office said Oct. 8....

Energy

Climate Change Threatens Energy Sector, DOE Says

Climate change is threatening energy infrastructure throughout the country, a report from the Energy Department found. ...

Energy

DOE Gives $34 Million to Cyber Protection Projects

The Energy Department is providing $34 million in funding to two projects to improve the protection of the electric grid and oil and natural gas infrastructure from cyber attacks, according to an Oct. 9 announcement. The funding goes to the...

Energy

Obama Names Energy Resources Official at State Department

A State Department special envoy has been nominated by the Obama administration to become the assistant secretary for energy resources at the department....

Environmental Reviews

Utah DOT Seeks to Assume NEPA Duties

The Utah Department of Transportation (UDOT) is gathering public comment on an application to assume the Federal Highway Administration's responsibilities under the National Environmental Policy Act (NEPA) for federal aid highway...

International Climate

Alberta Hypes Climate Goal to Offset Oil Sands Rout

Alberta Premier Rachel Notley is pledging to seek a leading role on climate change while promoting investment in the energy industry as the Canadian province grapples with the double-whammy of an oil rout and environmental opposition to its...

International Climate

UN Deal May Cut Outlays in Poor Nations: Lobbyists

The United Nations' draft climate proposal may reduce clean-technology investment to developing countries, because it still limits the role of global carbon markets, according to the International Emissions Trading Association....

International Climate

Vulnerable Nations Call for More Climate Change Funds

Ministers of finance from 20 of the poor and developing nations most at-risk to the impacts of climate change jointly called for a big increase in financing for climate action, calling it a "foremost humanitarian priority."...

Renewable Energy

U.K. Offshore Wind Policy Risking Jobs, Investment, Provider Says

The U.K. government's failure to spell out future policy on offshore wind power is putting the industry's growth at risk, said the country's biggest developer, Dong Energy A/S....

BNA INSIGHTS

An In-Depth Look Into the Role of Environmental Liability Transfers During Bankruptcies

A corporation striving to exit Chapter 11 bankruptcy with an improved balance sheet may be hindered from doing so if, after they emerge, they retain environmental liabilities, which are considered by North American bankruptcy courts as non-dischargeable...

Inside EPA's **Risk Policy Report,** 10/13/2015

http://insideepa.com/newsletters/risk-policy-report

Latest News

EPA Air Toxics Enforcement Focus Spurs Fears Over 'Next Generation' Data

Industry attorneys are warning that EPA's proposal to make community-level air toxics emissions an enforcement focus in the coming years threatens to create new pitfalls for a host of sectors when

combined with the agency's push for wider adoption of novel air monitoring technologies as part of its "next generation" compliance initiative.

U.S. Biofuel Makers Ask D.C. Circuit To Block Imports Of Biodiesel For RFS

U.S. biodiesel producers are asking a federal appeals court to scrap EPA's approval of imports of biodiesel from Argentina used as a qualifying renewable biomass fuel under the agency's renewable fuel standard (RFS), claiming EPA failed to undertake necessary public comment on what they call a flawed tracking system for the biodiesel.

Senate Impasse Over Legislation Renews Doubts About TSCA Reform Vote

Senate disputes over legislation including energy appropriations and a measure to reauthorize the Land and Water Conservation Fund (LWCF) are preventing a vote on a bipartisan Toxic Substances Control Act (TSCA) reform bill, and it is unclear when senators might debate the legislation after the Senate reconvenes on Oct. 19.

EPA Faces Concerns Over Excess Emissions From VW 'Defeat' Devices

EPA is facing growing concerns from state regulators and congressional lawmakers over the excess nitrogen oxide (NOx) emissions that resulted from Volkswagen's unlawful use of NOx control "defeat" devices on its diesel passenger vehicles resulting in increased emissions of the ozone precursor but improving the vehicles' fuel economy and lowering greenhouse gas emissions.

News Briefs

EPA Sends 'Exceptional Events' Air Rule To OMB

EPA has sent for White House Office of Management & Budget (OMB) pre-publication review a proposal to "streamline and clarify" how states can discount high air pollution from "exceptional events" such as dust storms from Clean Air Act compliance, a measure sought by states who want more clarity on the policy.

EPA Moves To Approve Jatropha Oil For RFS

EPA is moving toward approving another low-carbon fuel feedstock under its renewable fuel standard (RFS), offering comment on a preliminary greenhouse gas (GHG) review of jatropha oil for use in producing several biofuels, including biodiesel, renewable diesel, jet fuel, naphtha and liquefied petroleum gas.

Greenwire

LOBBYING:

Mary Landrieu signs FutureGen as 1st client

Kevin Bogardus, E&E reporter

Published: Friday, October 9, 2015

Former Sen. Mary Landrieu (D-La.) has registered her first lobbying client: FutureGen Industrial Alliance Inc., a nonprofit group backing the clean coal project.

Landrieu, now a senior policy adviser at Van Ness Feldman LLP, is one of five lobbyists signed up to lobby on "funding issues regarding the FutureGen 2.0 project," according to lobbying disclosure records released by the Senate this week.

The Van Ness lobbyists have been working for the group since Aug. 25, according to the firm's registration.

The alliance is a nonprofit group set up to support FutureGen 2.0, a near-zero-emissions coal power plant. Its members include industry players such as Alpha Natural Resources Inc. and Peabody Energy Corp., according to its website.

The lobbying push comes after the Department of Energy pulled the plug on its involvement in the project earlier this year, dealing it a fatal blow (*E&E Daily*, Feb. 4).

The firm manages the Coal Utilization Research Council, an industry group that promotes clean coal technology. One of the Van Ness lobbyists registered to lobby for the FutureGen alliance, Shannon Angielski, is CURC's associate director.

Van Ness is registered to lobby for CURC and several other energy clients, such as American Electric Power Co., Shell Oil Co. and Sempra LNG. The firm has earned more than $1.5 million in lobbying fees so far this year, according to the Center for Responsive Politics, a campaign finance watchdog group.

Landrieu, a former chairman of the Senate Energy and Natural Resources Committee, joined Van Ness in May after losing her 2014 re-election bid to Sen. Bill Cassidy (R-La.) (*Greenwire*, May 26).

Under ethics law, the former Louisiana senator can't lobby her colleagues on Capitol Hill for two years after leaving the Senate. Landrieu, however, is allowed to lobby the Obama administration during that period.

Reporter Manuel Quiñones contributed.

CALIFORNIA:

Brown signs coal divestment, other environment bills

Anne C. Mulkern, E&E reporter

Published: Friday, October 9, 2015

California will drop all investments in coal under a bill Gov. Jerry Brown (D) signed yesterday, one of several energy and environment measures he enacted.

S.B. 185 from Senate President Pro Tem Sen. Kevin de León requires California's public pension funds, CalPERS and CalSTRS, to divest from thermal coal holdings. The Golden State will be the first in the United States to do so, a de León statement said.

CalPERS and CalSTRS are the largest public pension funds in the nation, with $293 billion and $184 billion in assets, respectively, de León's statement added.

"Coal is a losing bet for California retirees and it's also incredibly harmful to our health and the health of our environment," de León said. "It has been a pleasure to work with CalPERS and CalSTRS to improve retirement security for our public employees while also aligning our investments with our values as a state."

Bill McKibben, co-founder of 350.org, praised the move.

"California, once again, is helping show the way," McKibben said. "These are two of the 20 largest pension funds on planet Earth, and this first big step will resonate in every financial market around the world. It's a bad day to be a coal baron, and a signal day for the divestment movement and for the Golden State."

But CalPERS and CalSTRS officials know that divestment efforts are futile, said Matt Dempsey, senior director of the global energy and natural resources sector at FTI Consulting Strategic Communications, which sometimes speaks for the fossil fuel industry.

He sent quotes from leaders of the funds, including one attributed to CalSTRS Chief Investment Officer Christopher Ailman and published April 7 on the conservative online Breitbart News Network. It said Ailman told the group's board that "I've been involved in five divestments for our fund. All five of them we've lost money, and all five of them have not brought about social change." The quote could not be immediately independently verified.

"When the chief investment officer of CalSTRS says that every time they've been forced to divest, they've lost money, I think folks need to pay attention to that," Dempsey said. "And that's especially true of the millions of public employees whose retirement security is tied to the performance of these funds."

Brown also approved:

- A.B. 1288 from Assembly Speaker Toni Atkins (D). It adds two appointments to the Air Resources Board, to represent communities that are low-income, ethnic minority, and hard-hit by pollution and the effects of climate change. The measure will "help ensure one of the state's top environmental regulatory bodies -- the California Air Resources Board -- is more representative of the state's diversity and those most impacted by pollution," a statement from Brown's office said.

- S.B. 414 from Sen. Hannah-Beth Jackson (D). It makes some changes to prepare better for oil spills. She represents the Santa Barbara area, where an on-land pipe owned by Plains All American Pipeline ruptured May 19. It sent 105,000 barrels of crude onto the beach, and about 21,000 gallons of that oil flowed into the Pacific Ocean. The measure requires, among other items, that the Office of Spill Prevention and Response (OSPR) administrator arrange drills and exercises with the U.S. Coast Guard, consult peer-reviewed scientific literature on chemical dispersants and ask that the California Dispersant Plan be updated by May 1, 2016. The OSPR administrator also must submit a report to the Legislature by Jan. 1, 2017, "assessing best achievable technology of equipment for oil spill prevention, preparedness and response," according to a Senate bill analysis. "This shall include an assessment of a new method -- estimated recovery system potential -- for evaluating oil skimmers."

- Brown also signed Jackson's S.B. 295. It requires the state fire marshal or someone authorized by the marshal beginning in 2017 to annually inspect all intrastate pipelines and operators of intrastate pipelines. Brown in a signing statement noted that the oil spill earlier this year in Santa Barbara "impacted birds, animals and other marine life and caused the closure of beaches and fishing." He added, "Our coastline and surrounding environments contribute to the great and unique landscape of California. These bills improve planning for and prevention of oil spills and our response when

spills occur."

- A.B. 692 from Assemblyman Bill Quirk (D). It requires every state agency that buys transportation fuels to purchase at least 3 percent "very low carbon transportation fuels," beginning Jan. 1, 2017, with the percentage increasing by 1 point each year until 2024.

- A.B. 682 from Assemblyman Das Williams (D). It lets people who live in mobile home parks make certain energy-related upgrades without filing an application with the Department of Housing and Community Development. They can also fix defects related to the heat-producing or electrical systems without filing an application with HCD.

- A.B. 1236 by Assemblyman David Chiu (D). It mandates that counties and cities create an expedited permitting and inspection process for electric vehicle charging stations.

- A.B. 693 from Assemblywoman Susan Talamantes Eggman (D). It creates the Multifamily Affordable Housing Solar Roofs Program. That will provide financial incentives for solar on multifamily affordable housing properties.

CAMPAIGN 2016:

Trump takes wind farm challenge to U.K.'s highest court

Published: Friday, October 9, 2015

Republican presidential front-runner Donald Trump took his lawsuit against a proposed offshore wind farm to the United Kingdom's highest court yesterday to save the view from a resort he owns on Scotland's North Sea coast.

Trump, whose mother is Scottish, bought the Menie Estate in Aberdeenshire in 2006, transforming protected coastal dunes into a golf course.

"When I saw this piece of land I was overwhelmed by the imposing dunes and rugged Aberdeenshire coastline," Trump said in a personal message on his golf course website. "I knew that this was the perfect site for Trump International, Scotland."

After the Scottish government approved Aberdeen Offshore Wind Farm Ltd.'s proposal to build 11 turbines in 2013, Trump sued to stop what he called a "monstrous" eyesore 2 miles from his resort.

Trump has accused former Scottish First Minister Alex Salmond, who had been a Trump ally, of skewing the approval process in favor of the more than $350 million project.

Trump was not in Westminster yesterday as his attorneys challenged the legality of the wind company's application before the U.K. Supreme Court, but he has threatened to take his lawsuit to European courts if he should lose in the United Kingdom (Owen Bowcott, London *Guardian*, Oct. 8). **-- DTB**

CLIMATE:

Capito bill would clip EPA's wings on Clean Power Plan -- CBO

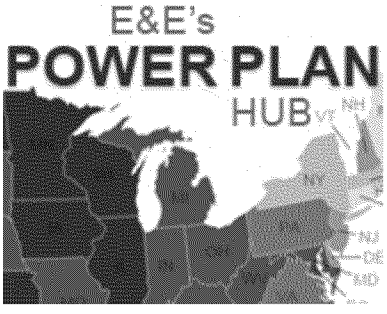
Jean Chemnick, E&E reporter

Published: Friday, October 9, 2015

Sen. Shelley Moore Capito's bill to scuttle U.S. EPA's power plant carbon rules would also severely restrict the scope of any replacement rules, the Congressional Budget Office said yesterday.

The West Virginia Republican's bill, S. 1324, would kill the Clean Power Plan by allowing states to opt out of compliance at will without fear that a federal implementation plan would be constructed to take its place, the CBO report noted. It also would require the agency to set aside rules for new and modified facilities that were final in August and that together make up the core of President Obama's second-term Climate Action Plan.

While the measure would allow the agency to put forward rules to take their place -- and CBO assumes that EPA would do so -- it's not clear that those rules could require technology that differs from a business-as-usual scenario. Rules for existing plants could not be promulgated until EPA makes a report to Congress on their climate and economic effects and issues state-specific plans.



A separate provision of the bill, which CBO does not mention, would bar EPA from regulating under Section 111(d) of the Clean Air Act at all if it has already done so under Section 112, effectively codifying in law a legal objection often raised by opponents of the Clean Air Act that will figure in coming litigation. EPA's 2011 mercury and air toxics rule is written under Section 112.

Rules for new and modified facilities must be based "on actual emissions levels achieved by at least six different electric generating units across the United States when operating for a continuous 12-month period." So, in effect, they couldn't go beyond the current state-of-the-art technology for newly built coal and natural gas generation.

The report acknowledges that the Capito measure "would not prohibit EPA from continuing to work on activities related to power plants, such as developing guidance and providing technical assistance to states." But David Doniger, director of the climate and clean air program at the Natural Resources Defense Council, said it would dramatically change EPA's regulatory authority.

"It's basically saying that instead of being a plumber that comes to your home and fixes your pipes, [EPA is] now allowed to give you advice over the phone," he said.

The Environment and Public Works Committee approved the Capito bill in August, and Senate Majority Leader Mitch McConnell (R-Ky.) has expressed his support. It tracks with his strategy of persuading state governors to "just say no" to implementing EPA's rule.

But while the House has passed roughly similar legislation, it remains unclear whether McConnell will make room for Capito's bill in a busy fall legislative schedule -- especially as it seems unlikely it would garner the 60 votes needed to pass.

Instead, McConnell and Environment and Public Works Chairman James Inhofe (R-Okla.) are readying Congressional Review Act resolutions for after EPA publishes the new and existing power plant rules in the *Federal Register*. They could pass the Senate with a simple majority of the vote, and while they would not be expected to withstand a presidential veto, McConnell hopes they would show the world ahead of this year's climate talks in Paris that Congress is not united behind Obama's climate pledges.

Doniger criticized Republicans for seeking to undermine global confidence in the U.S. pledge.

"The Republicans spent more than a decade arguing that we shouldn't act alone because other countries are unreliable, now they're arguing that they shouldn't act because we're unreliable," he said.

OIL AND GAS:

La. natural gas plant explosion kills 3

Published: Friday, October 9, 2015

An explosion and fire at a Louisiana natural gas plant yesterday killed three workers.

The Gibson, La., plant was not operating before the explosion but had caught fire during maintenance work on a device to filter impurities from natural gas.

Two other contractors were injured in the accident, according to plant owner Williams Partners LP.

"We are deeply saddened by this tragedy. Our thoughts and prayers are with those injured and their families during this very difficult time," said Warren Toups, Williams' operations manager (Alison Sider, *Wall Street Journal*, Oct. 8). **-- BTP**

RENEWABLE ENERGY:

NREL cuts solar energy staff after funding drop

Published: Friday, October 9, 2015

Colorado's National Renewable Energy Laboratory laid off 15 solar energy researchers this week and plans to buy another 50 to 60 people out of their contracts.

The cuts, which would ultimately reduce the NREL's 1,600-person workforce in Colorado by 4 percent, were prompted by the Energy Department reducing and shifting funding for solar research, NREL spokesman George Douglas said.

Federal money for solar energy programs declined from $289.9 million in 2014 to $233 million this year. DOE has also shifted its focus to short-term research, Douglas said.

"Decisions were made to support programs with higher probability for success and more near-term applications," Douglas said (Alicia Wallace, *Denver Post*, Oct. 7). **-- BTP**

TRANSPORTATION:

Secretary rejects NTSB proposal to shift Metro oversight

Published: Friday, October 9, 2015

The U.S. transportation secretary yesterday rejected a proposal to shift federal oversight of the troubled Washington, D.C., Metrorail system.

Last week, National Transportation Safety Board Chairman Christopher Hart said Metro's oversight from the Federal Transit Administration has been inadequate and urged Transportation Secretary Anthony Foxx to put the system under the purview of the more powerful Federal Railroad Administration (*Greenwire*, Oct. 1).

Foxx "does not believe that the NTSB recommendation is either the wisest or fastest way to bring about the necessary safety improvements" at Metro, spokeswoman Suzanne Emmerling said. "While we have made similar findings of oversight and management deficiency in recent inspections and audits, we disagree with their recommendation."

The FRA largely oversees longer-distance freight and commuter trains, as opposed to the FTA's light-rail and subway system portfolio. Experts have said the FRA would have been ill-prepared to handle the Metro system.

"Subways have different operating characteristics than freight and commuter passenger rail," former deputy Transportation Secretary John Porcari said. "There are different train control systems and rolling stock, so there's not as much overlap as you might think" (Aratani/Duggan, *Washington Post*, Oct. 8). -- **BTP**

AIR POLLUTION:

4 automakers added to 'dieselgate' as police raid VW

Published: Friday, October 9, 2015

Four more companies were added to the list of automakers whose diesel vehicles emit significantly less pollution during emissions testing than on the road.

According to data obtained by the London *Guardian*, Mercedes-Benz, Honda Motor Co. Ltd., Mazda Motor Corp. and Mitsubishi Motors Corp. all produced significantly less nitrogen oxide in the laboratory than in more realistic driving conditions.

Last week, the U.K. newspaper said it found vehicles made by Groupe Renault, Nissan Motor Co. Ltd., Hyundai Motor Co., Citroën, Fiat, Volvo Group and Jeep also emitted more NOx while on the road.

Nick Molden, whose company Emissions Analytics tested the cars for the news outlet, said the industry has a "systemic" problem.

Greg Archer, an emissions expert at Transport & Environment, said the new results prove Volkswagen was the "tip of the iceberg."

"What we are seeing here is a dieselgate that covers many brands and many different car models," he said. "The only solution is a strict new test that takes place on the road and verified by an authority not paid by the car industry."

Mercedes-Benz, Honda, Mazda and Mitsubishi all said they test vehicles according to the law, but two --

Mercedes and Honda -- said they support more realistic testing (Damian Carrington, London *Guardian*, Oct. 9).

For the other automakers, no evidence was found of "defeat devices" like those used by Volkswagen AG, which is recalling 11 million vehicles.

German police raided Volkswagen headquarters in Wolfsburg yesterday for information on the employees responsible for cheating pollution tests.

The raid came as Michael Horn, U.S. head of Volkswagen, was pressed by lawmakers during a Capitol Hill hearing (*Greenwire*, Oct. 9).

Volkswagen said a "comprehensive collection of documents" was turned over to police to aid "a swift and complete resolution of the case" (Chapple/Thompson, CNN Money, Oct. 9). **-- DTB**

POLITICS:

E&E Daily's Bush talks impact of leadership uncertainty on energy legislation

Published: Friday, October 9, 2015

How will yesterday's decision by House Majority Leader Kevin McCarthy (R-Calif.) to drop out of the race for speaker affect the future of energy legislation in the House this fall? On today's The Cutting Edge, *E&E Daily* reporter Daniel Bush discusses the latest developments in the speakership race and explains how yesterday's news could affect votes on crude oil exports and other energy issues.

Click here to watch E&ETV's The Cutting Edge.

Monica Trauzzi: Welcome to The Cutting Edge. How will yesterday's House leadership stunner affect the future of key energy legislation? *E&E Daily*'s Dan Bush has been tracking all the latest developments from Capitol Hill. Dan, very surprising day yesterday. How does Kevin McCarthy's decision to not seek the speakership impact the level of order we can expect from the House this fall?

Daniel Bush: Right now it's fair to say the House is in complete disarray. There's a scramble on to find somebody who can step up and run for speaker successfully, but right now it's unclear that any member of the GOP caucus has the 218 votes that they would need to win a floor vote, and at the same time, Congress is facing several huge fiscal issues, from raising the debt limit on November 5th to avoiding another government shutdown on December 11th. So the prospects for this stuff is tricky.

Monica Trauzzi: So obviously the crude oil export bill has received a lot of attention and been a big focus throughout the fall, including from the White House, where we've heard indications from the president that he would veto any such bill. Despite leadership uncertainty, the House has moved forward on the crude oil export bill, but there was some controversy. What were the most controversial amendments there?

Daniel Bush: Sure, so there's an amendment fight between Democrats and Republicans over key provisions of the bill. Democrats have been asking for stipulations, restrictions on the crude oil export bill in order to get their support. Some have called for a year delay in implementing it. Frank Pallone, the -- sorry, the ranking member of the Energy and Commerce Committee, has put forward language that would require the president to sign off only if he determined that it didn't increase carbon emissions. So that's been the main fight, and Republicans have, so far, blocked Democratic amendments to the bill and appear, you know, eager to move forward with their version of the legislation.

Monica Trauzzi: So if this leadership uncertainty stretches beyond the end of October, what will the broader impacts be, then, on energy and the legislation that's trying to move through the House?

Daniel Bush: Sure. So the crude oil export ban bill is sort of one part of it, but there's been a broader debate over energy reform in general. There's a big package moving through the House right now. Fred Upton, the chairman of the Energy and Commerce Committee, had hoped to put that bill on the floor sometime this fall, but obviously the speaker's race has thrown a wrench into that, and it's unclear at this point when there's time in the calendar for them to get to that legislation. So clearly there's going to be delay. We don't know yet how long.

Monica Trauzzi: So there are a lot of names going in the ring right now for who the next speaker could be. How could that person, that one person really shape the future and the agenda that we see coming out of the House?

Daniel Bush: It's going to be very difficult. You mentioned that there are several people sort of in the mix. Paul Ryan, the chairman of the Ways and Means Committee, is being petitioned hard to get in. Somebody like him would have to unite the more moderate wing of the caucus with the Freedom Caucus in the Republican Party, the more conservative element. That's going to be very difficult to do, and it's going to affect, as you said, all sorts of legislation moving forward, and it's difficult at this point to see how the Republican Party in the near term can come together on these big energy and fiscal issues.

Monica Trauzzi: All right. Fascinating to watch. Thank you for coming on the show.

Daniel Bush: Thanks for having me.

Monica Trauzzi: More Cutting Edge coming next Friday. We'll see you then.

[End of Audio]

Click here to watch E&ETV's The Cutting Edge.

GRID:

Supreme Court to host high-stakes duel over energy rule

Robin Bravender, E&E reporter

Published: Monday, October 12, 2015

The Supreme Court will hear oral arguments Wednesday over a federal rule requiring that electricity providers give financial incentives to customers who slash power use in times of high energy demand.

The fight over the Federal Energy Regulatory Commission's demand-response rule will likely be the year's most important energy case.

"The stakes are really, really high," said David Goldberg, an attorney representing environmental groups that back the rule. "It's part and parcel to very important changes that have happened in energy regulation and energy provision, and is very, very important to the future of our nation's energy supply because this is a dynamic, flexible method."

At issue is a 2011 FERC regulation, Order No. 745, which requires grid operators to compensate electricity users for conserving power at peak times. Demand-response customers get paid the same rate for conservation as utilities get for selling electricity.

Grid operators and power providers -- represented by the Electric Power Supply Association (EPSA), American Public Power Association and others -- have told the courts that the rule sets an unfair compensation scheme and is illegal because it's beyond FERC's jurisdiction.

They contend that FERC's order effectively regulates retail electricity sales to businesses and residential customers that legally fall under states' jurisdiction. FERC, meanwhile, has authority over wholesale electricity sales -- when operators purchase electricity from power providers for resale to consumers.

"FERC's claim that it has authority to regulate reduced retail demand because it has invited 'demand response providers' into the wholesale markets merely describes FERC's power grab without justifying it," attorneys representing EPSA told the Supreme Court.

The U.S. Court of Appeals for the District of Columbia Circuit agreed with those challenging the rule, and tossed it out in a split decision last year (*Greenwire*, May 23, 2014).

Judge Janice Rogers Brown, writing for the majority, disputed FERC's contention that retail markets affect wholesale rates and that, therefore, the commission has jurisdiction.

Under that premise, she wrote, FERC's authority would be "almost limitless."

"Without boundaries, [FERC's interpretation] could ostensibly authorize FERC to regulate any number of areas, including the steel, fuel, and labor markets," she wrote.

FERC, meanwhile, argues the rule is legal. "Demand-response payments by wholesale-market operators expressly fall within FERC's" authority affecting wholesale rates, Solicitor General Donald Verrilli said in a brief to the Supreme Court.

"Those payments are made by wholesale-market operators in wholesale markets for the purpose of balancing wholesale supply and demand, setting wholesale prices at optimal levels, and enhancing the reliability of the interstate grid," he added.

Reporter Jeremy Jacobs contributed.

FEDERAL AGENCIES:

Report on 'invincible' boss didn't out whistleblowers -- DOE

Kevin Bogardus, E&E reporter

Published: Monday, October 12, 2015

The Department of Energy says its release of an investigative report on a DOE site office manager known for terrorizing subordinates didn't out individuals complaining about their boss.

In management comments obtained by *Greenwire* under the Freedom of Information Act, the Office of Science said great care was taken when processing a report that looked into the unnamed manager's conduct.

The document -- signed by Joseph McBrearty, deputy director of field operations for the DOE office -- says department lawyers worked diligently to redact the report, making it tough to know who said what about the manager in question.

"The Counsel's Office reported that the investigative report document had been thoroughly reviewed and that the subsequent redaction was approached in a very conservative manner, taking great care to ensure that it would be difficult to identify individuals," the response says.

The document also adds that "it was the professional opinion of the attorney who conducted the redaction that the redaction process was properly executed and that the redacted Investigative report did not include any inappropriate personnel information."

The management comments came in response to a once-hidden DOE inspector general report -- also uncovered by *Greenwire* via FOIA -- that detailed the misbehavior of the site office manager, whose name was redacted in the report. Thought "invincible" by underlings, the manager cursed at employees and opened their private email, among other transgressions (*Greenwire*, Sept. 4).

The Office of Science "generally" agreed with the IG's findings but took exception to its characterization of the investigative report's handling, saying it "incorrectly infers" DOE procedure wasn't properly followed.

The department watchdog considered those thoughts and made changes to its final report. The IG, however, emphasized that the investigative report's release to the manager helped create a hostile work environment at the site office.

"Our point all along has been that, despite Science's efforts to redact the investigative report, and as evidenced by the Manager's own statement, the release of this sensitive information to the Site Office Manager negatively impacted the work environment at the Site Office," said the IG, according to its own report.

DOE leaders releasing such information to the manager "may have compromised the integrity of the complaint process, placing these witnesses at risk for reprisal and retaliation," concluded the watchdog.

The manager believed the investigative report helped he or she to determine who was complaining at the site office. Despite the redactions, the manager's copy of the report still had the employees' names that were interviewed during the investigation.

"I have received the redacted version of the Report and although the areas of [sic] blacked out, I know who the negative comments came from because the style of communicating is something that I am quite familiar with since the same style has been used to communicate directly with me," the manager said in an email.

The manager's misconduct didn't result in any punishment from DOE. He or she has since retired, which means management couldn't take further action.

A DOE spokesman declined to comment for this story, saying the department doesn't comment on "personnel matters."

The management comments listing their objections to the IG report were not included in DOE's original response to *Greenwire*'s FOIA request. The Office of Science was responsible for the document and determined later to release it under the request.

Nevertheless, the management comments still have not been posted online yet along with its corresponding IG report. An IG spokeswoman said the document will be released soon on the web.

"We are coordinating with the Department regarding the management response. Based on the outcome of our coordination, our plan is to post the management response to our website," spokeswoman Felicia Jones said.

Reporter Hannah Northey contributed.

CLIMATE:

Bill would require CBO to report carbon impacts of legislation

Amanda Reilly, E&E reporter

Published: Monday, October 12, 2015

Rep. Jared Huffman (D-Calif.) on Friday reintroduced legislation that he said would provide transparency about the climate change impacts of bills and resolutions introduced in Congress.

Under the Huffman bill, the Congressional Budget Office would be required to calculate a carbon score for legislation and resolutions for which it also calculates financial impacts.

Huffman introduced the legislation Friday as the House passed legislation to overturn the 40-year-old ban on crude oil exports.

"Members of Congress already rely on fiscal impact estimates produced by the Congressional Budget Office to help make up their minds," Huffman said, "but we must also take into account the environmental consequences of our votes."

Huffman introduced the legislation last November, but the bill did not receive any votes. Sen. Bernie Sanders (I-Vt.) also last Congress unsuccessfully introduced the legislation in the upper chamber.

Democratic Reps. Mark Pocan of Wisconsin and Doris Matsui and Alan Lowenthal of California are original co-sponsors of the new bill in the House.

Called the "Carbon Pollution Transparency Act," the legislation would require that CBO undertake a carbon analysis of bills and resolutions in the same time frame that it releases financial analyses.

The carbon score would be based on the incremental change in carbon dioxide emissions brought on by introduced legislation. The director of CBO would be required to use "established best practices" to come up with the carbon impact.

"The American public has the right to know whether their representatives in Washington are voting to help or harm the environment," Huffman said, "and my bill would ensure we have a fair judge of each bill's environmental impact."

Huffman voted against the crude exports bill Friday, but he was successful in attaching an amendment to require the Department of Energy to report on the greenhouse gas impacts of listing the export ban (*Greenwire*, Oct. 9).

CAMPAIGN 2016:

Greens hope climate is part of the conversation in Dem debate

Jennifer Yachnin, E&E reporter

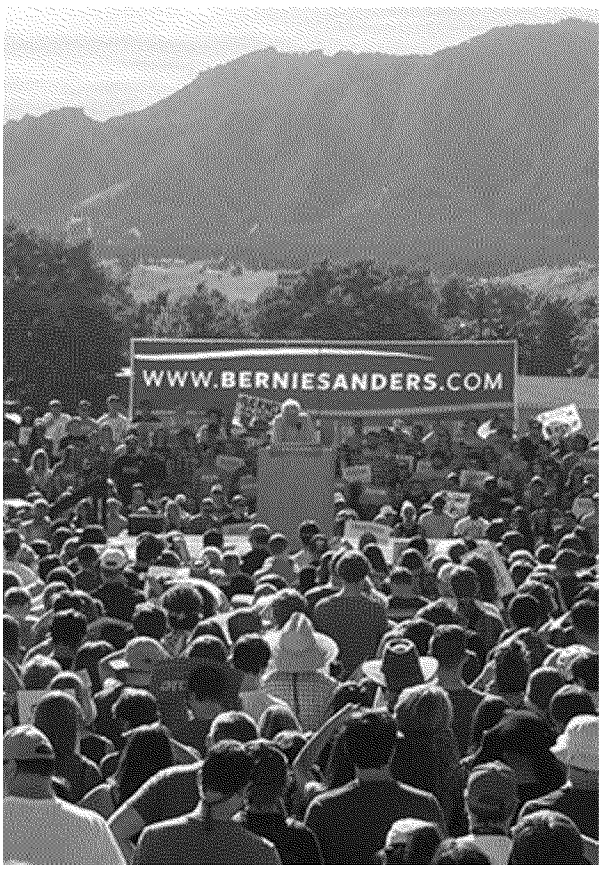
Published: Monday, October 12, 2015

BOULDER, Colo. -- During a nearly hourlong effort to rally Democratic primary voters here Saturday, Vermont Sen. Bernie Sanders (I) pitched his views on income inequality, immigration reform, rising college tuition and gun control.

"This is a people's campaign, and you brothers and sisters are part of a political revolution," Sanders said. "This is a campaign that is taking on the establishment at every level of society."

While the message hit home for many in the crowd -- college-age supporters made up a large portion of the several hundred people gathered on a grassy field underneath a blazing late autumn sun -- Sanders spent notably less time on another area: energy policy.

"There is nothing more important than leaving our planet healthy and habitable for our kids and our grandchildren," Sanders said nearly 45 minutes into his speech, sparking applause from the crowd. "The debate is over. The scientific community has spoken in a virtually unanimous voice: Climate change is real, it is caused by human activities, and it is already causing devastating problems on this planet."



Sen. Bernie Sanders at a rally Saturday in Boulder, Colo. Photo by Jennifer Yachnin.

Sanders, who has argued that U.S. EPA's Clean Power Plan could be more aggressive in its effort to

reduce carbon emissions, added that the nation has a "moral responsibility" to shift its energy system away from fossil fuels.

While the Vermont senator's remarks on energy policy Saturday -- which took less than minute -- hit on a number of priorities pushed by environmental activists, it also highlights an ongoing challenge for these groups in the Democratic and Republican presidential primary season: the often short shrift given to climate change policy in both the Republican and Democratic primaries to date.

While a handful of candidates have put a brief spotlight on energy and environmental policies -- former Florida Gov. Jeb Bush (R) vowed to roll back a series of EPA rules as part of a broader regulatory reform effort; former Maryland Gov. Martin O'Malley (D) has pledged a full shift to renewable energy as a key part of his platform; and former Secretary of State Hillary Clinton (D) made headlines for her opposition to the Keystone XL pipeline -- the subject has largely been skirted in a series of Republican forums and a pair of debates to date.

As Democratic presidential contenders prepare for their first debate this week, environmentalists including California billionaire Tom Steyer and the League of Conservation Voters have urged CNN to include the issue in its queries to candidates.

"Whoever ends up winning the nomination is going to have to continue President Obama's climate legacy -- the fate of our planet depends on it. So it's critical that we hear from the candidates just how they plan to combat the climate crisis and continue making the United States a global environmental leader," LCV wrote in an email to its members.

Much as it did with the CNN-sponsored Republican debate last month, the LCV will poll its members and then promote a single question to moderators related to climate change.

The Sierra Club said it will monitor whether Democratic contenders -- Sanders, O'Malley and Clinton, as well as former Rhode Island Gov. Lincoln Chafee and former Virginia Sen. Jim Webb -- address topics such as how each candidate would improve on the Clean Power Plan and how the United States should lead global efforts to address climate change.

"Look, action on the climate crisis and clean energy should be an issue the candidates and debate moderators discuss during every debate. There's very few things more important than the future of the planet," said Sierra Club Political Director Khalid Pitts.

But if the Democratic debate held in Nevada tomorrow does not address those issues, Steyer has called for another session that would solely address climate change and renewable energy ahead of the Iowa caucuses next year.

In a Sept. 25 memorandum, Steyer praised the Democratic field for addressing climate change but urged the candidates to offer greater detail about their plans.

"A crisis of this magnitude, with dire consequences for our economic and national security, requires a robust discussion from our leaders," Steyer said.

The National Wildlife Federation had planned to host a similarly themed event for Republican primary contenders last week but cancelled the Fitzwater Presidential Forum on Energy and the Environment after only three of the 14 candidates agreed to attend (*E&ENews PM*, Oct. 7).

The NWF will hold a similar event for Democratic primary contestants, but a date has yet to be finalized.

'He's our best choice'

As Sanders' campaign supporters awaited the senator's arrival here Saturday, many shielded themselves from the sun with campaign posters, and others passed the time playing numerous games of Frisbee.

Many of those in attendance at the rally cited the senator's proposal to make tuition free at state colleges and universities among their top reasons for backing the would-be Democratic presidential nominee. "I'm really excited to have a candidate that represents normal working people," said Denver resident Rachel Knapik, 37, who was dressed in a "Bernie for President" T-shirt and holding a matching campaign sign.

No one among two-dozen individuals polled by *Greenwire* -- including one man in a green-and-white T-shirt featuring the image of a wind turbine and the word "renewable energy" -- raised Sanders' statements on climate change or energy policy.

While dozens of attendees said they planned to support Sanders' bid, Louisville, Colo., resident Janelle Carlisle said she was at the event to help move her decisionmaking process along.

"I'm making up my mind, but I'm leaning in his direction," said Carlisle, who added that it's important for any would-be presidential nominee to be able to work with Congress and lamented poor relationship between Republican congressional leadership and Obama.

"Maybe with Bernie Sanders, who's been in the Senate a long time, he could use his connections to get things done," she said.

But Carlisle said she's open to switching allegiances should Vice President Joe Biden opt into the Democratic contest in the coming weeks.

"I would go with him 100 percent," she said.

Loveland, Colo., residents Sharon and John Steinman, however, said their support for Sanders is certain -- even if he loses the Democratic nomination.

"I'm looking for a candidate, and he's our best choice. He's got a good view for the future," said John Steinman, who vowed to "write in" Sanders' name on the general election ballot if necessary.

Sharon Steinman added: "We'll vote for him if he goes independent again."

RAIL:

Vermonter line resumes normal operation after rock slide

Sean Reilly, E&E reporter

Published: Monday, October 12, 2015

Amtrak begins the workweek with service on its Vermonter route back to normal operations, one week after a derailment blamed on a rock slide.

Trains on the line, which connect St. Albans in northern Vermont and Washington, D.C., began running their full routes on Friday and continued "very smoothly" throughout the weekend, Amtrak spokeswoman Chelsea Kopta confirmed this morning.

After the Oct. 5 mishap knocked a southbound train off the tracks, Amtrak substituted buses for stops north of Springfield, Mass. The derailment sent seven passengers and crew members to the hospital, although all were released the same day (*Greenwire*, Oct. 6).

While the cause is still under investigation by the National Transportation Safety Board, Vermont Gov. Peter Shumlin (D) said at a news conference last week that a rock ledge fell on the tracks.

"This was a freak of nature," Shumlin said.

ELECTRIC VEHICLES:

Competition for charging spots accompanies EV surge

Published: Monday, October 12, 2015

California is on the leading edge of cutting carbon emissions in the United States, but the surge in electric vehicles in the state has pushed people into conflict over a limited number of charging stations.

Electric vehicle drivers are now routinely seen unplugging one another's cars at public charging stations, and a quasi-black market for trading reserved spots has arisen in some places.

"It's high time for somebody to tackle the electric vehicle etiquette problem," said Maureen Blanc, director of Charge Across Town, a San Francisco-based nonprofit that is trying to help spread the adoption of electric vehicles.

California has about 15,000 official charging stations for its roughly 150,000 electric vehicles. Gov. Jerry Brown (D) has announced that he intends for the state to have 1.5 million electric cars on the road by 2025, with plans to sharply increase the number of charging stations (Matt Richtel, *New York Times*, Oct. 10). **-- BTP**

RAIL:

W.Va. oil train derailment preventable -- feds

Published: Monday, October 12, 2015

Federal investigators said Friday an oil train derailment that set a home and nearby area ablaze in southern West Virginia in February was preventable.

The Federal Railroad Administration fined CSX Corp. and its inspection contractor $25,000 each for failing to catch a rail defect before 27 of 109 cars in a CSX train went off the rails in Mount Carbon. The explosion and subsequent fire destroyed a home, injuring the owner, while 3 million gallons of North Dakota's oil field crude spilled, polluting the Kanawha River and a nearby creek.

During two inspections in the preceding months, a CSX contractor driving the rails in an truck outfitted with rail-reading technology found a potential problem but did not inspect more closely, incorrectly deeming the crack a surface flaw.

FRA chief safety officer Bob Lauby said speed and the Feb. 16 snowstorm were not factors, but the weight of previous trains likely expanded the crack. The agency is advising more detailed inspections and advanced training for inspectors as oil trains have derailed in flames in six states in recent years.

"Where we see a need for action in order to increase safety, we will not hesitate to take it," acting FRA Administrator Sarah Feinberg said. "It is increasingly clear that as limits are pushed on rail wear, there is cause for concern and need for action."

CSX has recovered more than 181,000 gallons of crude oil and agreed to a deal with U.S. EPA to clean up the area. More than 200 Fayette County residents sued CSX in September.

"Our country relies on the safe transportation of large quantities of energy products across the nation, and it is our responsibility to require operators to implement strict safety standards," Transportation Secretary Anthony Foxx said in a statement (AP/*Fuel Fix*, Oct. 9). **-- DTB**

AIR POLLUTION:

EPA to update 'exceptional events' rule soon

Amanda Reilly, E&E reporter

Published: Monday, October 12, 2015

U.S. EPA is poised to soon release a rule to update its "exceptional events" regulation that addresses air violations caused by events out of state control.

The agency sent a proposed rule to the White House for review Thursday, according to the Office of Management and Budget. EPA is aiming to release the proposal in the fall and take final action next year.

Under the exceptional events program, states can submit data to prove that high pollution readings are the result of wildfires, overseas emissions, ozone falling from the upper atmosphere and other events out of their control.

EPA has rarely used the program to excuse high readings of ground-level ozone, a key component of smog. The rule update comes after several states expressed concern that EPA's current program was not up to the task of dealing with a more stringent ozone standard.

Earlier this month, the agency tightened the national ambient air quality standard for ozone from 75 parts per billion, which was set in 2008 during the George W. Bush administration, to 70 ppb.

High-elevation sites in Western states at times approach that level due to background amounts of ozone in the air (*Greenwire*, Nov. 17, 2014). More than half of the states expressed concerns to EPA about background ozone as the agency considered a more stringent standard, according to a survey by the Association of Air Pollution Control Agencies (*Greenwire*, June 11).

Business and industry groups opposed to a tighter ozone standard also raised background ozone as a reason for EPA to retain the 75 ppb limit.

EPA acknowledged the concerns about background ozone in its final rule setting the new ozone standard and said that the exceptional events rule was a tool that states could use to address high background levels.

"EPA is in the process of updating that rule to simplify and expedite the process for air agency development and EPA review of these demonstrations," EPA said in a fact sheet released with the final ozone standard.

The agency said that changes to the rule would be finalized "well in advance" of any actions that states have to take to comply with the new ozone standard.

Along with making changes to the rules, EPA says that it will release guidance in the same time frame for how states should address wildfires that affect the amount of ozone in the air.

"The agency anticipates an increase in the number of fire-related exceptional events for a number of reasons," EPA said, "including an anticipated increased incidence of wildfires as a result of climate change."

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CLIMATEWIRE — Tue., October 13, 2015

READ FULL EDITION

1.NATIONS:

30 years after famine and strife, Ethiopia sees a future that is bright green

ADDIS ABABA, Ethiopia -- From atop Mount Entoto, which rises 10,500 feet above sea level and draws thousands of pilgrims annually as one of this country's most revered spiritual sites, it is impossible to look upon the sprawling capital below without sensing both the burden of Ethiopia's history and the promise of its future.

2.REGULATION:

Behind the scenes, most states are exploring the benefits of carbon trading

Swaths of states are engaged in early regional talks about how to comply with U.S. EPA's Clean Power Plan and whether to embrace carbon trading to keep costs down. These "no regrets" discussions -- mostly coordinated by nongovernmental organizations -- offer a safe space for state air and electric regulators to share ideas and analyze how various paths forward might affect their power systems and economies.

TODAY'S STORIES

3.NEGOTIATIONS:
Major world utilities seek a voice in the outcome of Paris climate change talks

4.FINANCE:
Coal chief wants emission-cutting coal technologies to compete for Green Fund aid

5.POLITICS:
N.J.'s Gov. Christie is 'not a total zero' on clean energy

6.RESEARCH:
Horn of Africa gets hotter and drier, defying climate models

7.POLICY:
In Minn., a state yearns for power plants that are 'above average'

8.EMISSIONS:
Forests advocates see a gap in draft text for Paris talks

9.EMISSIONS:
Carbon intensity fell sharply last year, but world still behind 2 C target -- report

10.NEGOTIATIONS:
Rich countries on track to meet $100B climate change pledge, ministers say

11.OIL AND GAS:
Alaskan governor says drilling needed to pay for climate change impacts

12.RESEARCH:
Nev. lakes experience temperatures not seen in thousands of years

E&E INTERACTIVE

13.POWER PLAN HUB:

Regional groups look to carbon trading for Clean Power Plan

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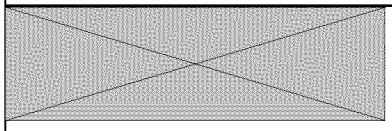
GREATER EXPECTATIONS SPECIAL REPORT



Continuing this week, **Greater Expectations: The New Geopolitics of Climate Change** exposes the on-the-ground reality of developing countries challenged by a world that will require every nation to cut carbon emissions. **Go to** the special report.

ENERGYWIRE — Tue., October 13, 2015

READ FULL EDITION

1.CLEAN POWER PLAN:

PJM state officials discuss possible carbon rule coordination

Following the lead of states throughout the Midwest and other regions, counterparts in the Mid-Atlantic have been talking in recent months about ways they could work together to facilitate compliance with U.S. EPA's Clean Power Plan.

2.REGULATION:

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Swaths of states are engaged in early regional talks about how to comply with U.S. EPA's Clean Power Plan and whether to embrace carbon trading to keep costs down. These "no regrets" discussions -- mostly coordinated by nongovernmental organizations -- offer a safe space for state air and electric regulators to share ideas and analyze how various paths forward might affect their power systems and economies.

TOP STORIES

3.SECURITY:

Federal threat-sharing program is slow to grow in energy sector

4.CLEAN POWER PLAN:

Ark. kicks off state planning process that may serve as model

5.MARCELLUS SHALE:

Surface activity bigger threat to water than injection -- study

ELECTRICITY

6.CLEAN POWER PLAN:

EDF says Texas compliance with carbon rule within reach

7.CLEAN POWER PLAN:

Mo. AG Koster joins states' lawsuit

8.CALIFORNIA:

High temperatures knock out power in parts of Los Angeles

OIL AND GAS

9.EARTHQUAKES:
Okla. company challenges disposal restrictions
10.LAW:
Court rejects timeline for drilling permit near Glacier NP
11.PEOPLE:
Chesapeake ushers in new chairman
12.NATURAL GAS:
Cluster of pipelines awaiting federal approval face many concerns
13.EAGLE FORD SHALE:
One Texas county sees a concentration of wells amid decline
14.POLAND:
Shale gas industry facing collapse

E&E INTERACTIVE

15.POWER PLAN HUB:
Regional groups look to carbon trading for Clean Power Plan

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From: E&E Publishing
Sent: Tue 10/13/2015 5:35:30 PM
Subject: October 13 -- Greenwire is ready

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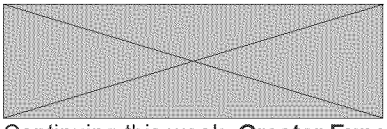

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D.C. judge a formidable foe for Obama's environmental agenda

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TOP STORIES

2.WATER POLICY:
Panel rules against consolidating challenges to WOTUS
3.NUCLEAR:
Mass. reactor to close, complicating state climate plans
4.REGULATIONS:
Pollution violations more likely at public facilities -- study

CONGRESS

5.FEDERAL AGENCIES:
Congressman offers bill to ban private email server use
6.NATIONAL MONUMENTS:
Grijalva bill would protect 1.7M acres around Grand Canyon
7.MINING:
House bill would boost college engineering programs

NATURAL RESOURCES

8.FOREST SERVICE:
Agency to withdraw Tongass timber sale
9.WILDLIFE:
Funding woes stall fight against trafficking from Latin America
10.NATIONAL FORESTS:
Malheur ranger districts rack up OSHA violations
11.FISHERIES:
São Tomé convicts notorious poaching crew

LAW

12.PROPERTY RIGHTS:
Supreme Court won't hear Utah public lands access case

DROUGHT

13.CALIFORNIA:

Nagging helps curb wasted water

14.CALIFORNIA:

11.8M-gallon guzzler remains incognito

15.COLOMBIA:

Indigenous group struggles with drought, indifference

CLIMATE CHANGE

16.ARCTIC:

Colder war looms as climate change opens access

17.NEGOTIATIONS:

NATO calls for 'ambitious, legally-binding' climate agreement

18.PUBLIC OPINION:

70% of Americans now believe in climate change -- poll

ENERGY

19.OIL SANDS:

Companies struggle as Alberta boom wanes

20.WIND:

Gusts damage turbine -- but not much else -- in Mont.

AIR AND WATER

21.WATER POLLUTION:

Pa. takes steps to using mine wastewater for fracking

22.AIR POLLUTION:

Leonardo DiCaprio to produce movie about Volkswagen scandal

TRANSPORTATION

23.ELECTRIC VEHICLES:

New Tesla could qualify for $35,000 in tax breaks

STATES

24.CALIFORNIA:

New regs could lift mining ban, infuriate industry

25.WASHINGTON:

Man who rerouted river owes lifetime of $50 payments

26.OHIO:

State wildlife chief leaves for private sector

27.OREGON:

Ballot initiative push targets ivory, wildlife products

E&E INTERACTIVE

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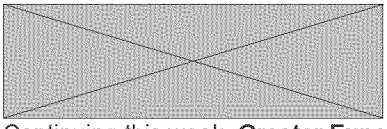

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: tim slonaker
Sent: Tue 10/13/2015 6:48:14 PM
Subject: VW Fraud

Greetings Mr. Grundler
I am contacting you to express my discontent with the VW emissions fraud.
While the agency has the ability to fine VW and mandate that they fix the cars in violation, this will do nothing to repair the harmful emissions that these vehicles have already produced. Therefore, I am asking for the EPA to require VW to not only fix the vehicles but to mandate that all future VW vehicles sold be required to exceed the mandated emissions (by the same amount
and same time) in which these vehicles installed with the defeat device were on the road and the amount
in % in which these vehicles did not comply with the law. This will be one of the few remedies in which VW
can make the community at large whole.

Thank you,
Tim Slonaker

To: Bunker, Byron[bunker.byron@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Millett, John[Millett.John@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
Cc: Valentine, Julia[Valentine.Julia@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Senn, John[Senn.John@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]
From: Belser, Evan
Sent: Tue 10/13/2015 7:02:51 PM
Subject: RE: WSJ questions on VW--NEED RESPONSES

Ex. 5

Evan

Evan Belser

Chief, Mobile Source Enforcement Branch, Air Enforcement Division

National Coordinator for Administrative Litigation, Office of Civil Enforcement

Office of Enforcement and Compliance Assurance

United States Environmental Protection Agency

202-564-6850

From: Bunker, Byron
Sent: Tuesday, October 13, 2015 2:48 PM
To: Conger, Nick; Hengst, Benjamin; Birgfeld, Erin; Grundler, Christopher; Millett, John; Sutton, Tia
Cc: Valentine, Julia; Allen, Laura; Senn, John; Belser, Evan
Subject: RE: WSJ questions on VW--NEED RESPONSES

Hi Nick,

Ex. 5

Ex. 5

Ex. 5

****

From: Conger, Nick
Sent: Tuesday, October 13, 2015 2:24 PM
To: Hengst, Benjamin; Birgfeld, Erin; Bunker, Byron; Grundler, Christopher; Millett, John; Sutton, Tia
Cc: Valentine, Julia; Allen, Laura; Senn, John; Belser, Evan
Subject: WSJ questions on VW--NEED RESPONSES

Ex. 5

Nick

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

Liz/Nick:

Amy and I wanted to follow up on some questions we're hoping you can help with as we do

reporting on VW.

1) Can you break down for us which of the VW diesel models are Generation 1, Generation 2 and Generation 3? Some detail beyond model years would be helpful, as I understand, for instance, that certain model-year Passats are Generation 2 but not Jettas. If you can tell us make, model and year for each generation, and tell us what differentiates each generation, that would be very helpful.

2) Could you walk us through or point us to the specific rules that require Volkswagen to explain the capabilities of auxiliary emissions control devices on the 2016 diesel models as part of the certification process? I understand they are obligated under EPA regulations to lay that all our for the agency. Perhaps you can point us to the specific rules or put us on the phone with someone who can help?

3) Has VW yet fulfilled its obligation to explain all the capabilities of the AECD on the 2016 diesel models? If not, has VW indicated when you can expect the full explanation?

Best,

Mike

To: Rodgers, William (EEO)[William.Rodgers@vw.com]
Cc: Allen, Gregory (EEO)[Gregory.Allen@vw.com]; Giles, Michael (EEO)[michael.giles@vw.com]
From: Snyder, Jim
Sent: Tue 10/13/2015 7:18:41 PM
Subject: RE: Audi e-tron

I think its still in quality check but should be today or tomorrow. The holiday and today's open house have disrupted things.

JIm

From: Rodgers, William (EEO) [mailto:William.Rodgers@vw.com]
Sent: Tuesday, October 13, 2015 10:31 AM
To: Snyder, Jim
Cc: Allen, Gregory (EEO); Giles, Michael (EEO)
Subject: Audi e-tron

Hi Jim,

I hate to be a thorn. Have you seen any lab data from the e-tron Charge depleting Highway test? We are also still looking for the newly formatted data for the CD-city test that the lab owed you.

Regards,

Bill Rodgers

EEO

To: Snyder, Jim[Snyder.Jim@epa.gov]
From: Rodgers, William (EEO)
Sent: Tue 10/13/2015 7:20:29 PM
Subject: RE: Audi e-tron

Ok thanks.

From: Snyder, Jim [mailto:Snyder.Jim@epa.gov]
Sent: Tuesday, October 13, 2015 3:19 PM
To: Rodgers, William (EEO)
Cc: Allen, Gregory (EEO); Giles, Michael (EEO)
Subject: RE: Audi e-tron

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JIm

From: Rodgers, William (EEO) [mailto:William.Rodgers@vw.com]
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To: Snyder, Jim
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Bill Rodgers

EEO

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Tue 10/13/2015 7:26:57 PM
Subject: P.M. NEWSCAST: UAW deal would allow more FCA temp workers: report | XC40 in Volvo pipeline | Eyeing EVs at Aston | VW 'cheat' put to test | Musk: 'I don't hate Apple'

October 13, 2015

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Ex. 6
Sent: Tue 10/13/2015 8:09:20 PM
Subject: VW hearing held before Congress

Hello Mr. Grundler. As a 2012 VW Jetta diesel owner, I read the transcripts from the hearing and was unimpressed by VW CEO Mr. Horn. If he truly desires to "make things right", then VW should buy the vehicles back from affected consumers. Period. As the EPA failed to catch even 1 vehicle out of 482,000 in seven years, I am asking the agency to protect the consumers now. The fixes proposed have the potential to damage fuel economy and/or performance. Further, it can take another year to "fix" them. Why should VW be allowed to pollute the air for another year with no repercussions all the while profiting from their lies in the form of monthly car payments? I am respectfully requesting the EPA mandate that VW buy the affected vehicles back immediately. Anything less is inherently unfair to the innocent people who simply bought a car under false pretenses. As the company has already demonstrated they will not do the right thing voluntarily, they should be pushed in that direction. Any help you can provide with this would be greatly appreciated.

Sincerely,

Ex. 6

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To: Conger, Nick[Conger.Nick@epa.gov]
Cc: Belser, Evan[Belser.Evan@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Millett, John[Millett.John@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Senn, John[Senn.John@epa.gov]; Werner, Jacqueline[Werner.Jacqueline@epa.gov]
From: Allen, Laura
Sent: Tue 10/13/2015 8:12:49 PM
Subject: Re: WSJ questions on VW--NEED RESPONSES

Julia and I are good with this.

On Oct 13, 2015, at 3:50 PM, Birgfeld, Erin <Birgfeld.Erin@epa.gov> wrote:

> Hi All,
>
> This looks good. I made one edit question 2 to use our more plain language AECD definition.
>
> -Erin
>
> **From:** Belser, Evan
> **Sent:** Tuesday, October 13, 2015 3:03 PM
> **To:** Bunker, Byron; Conger, Nick; Hengst, Benjamin; Birgfeld, Erin; Grundler, Christopher; Millett, John; Sutton, Tia
> **Cc:** Valentine, Julia; Allen, Laura; Senn, John; Werner, Jacqueline
> **Subject:** RE: WSJ questions on VW--NEED RESPONSES
>
> These responses look good to me.
>
> Evan
>
> Evan Belser

Chief, Mobile Source Enforcement Branch, Air Enforcement Division

National Coordinator for Administrative Litigation, Office of Civil Enforcement

Office of Enforcement and Compliance Assurance

United States Environmental Protection Agency

202-564-6850

From: Bunker, Byron
Sent: Tuesday, October 13, 2015 2:48 PM
To: Conger, Nick; Hengst, Benjamin; Birgfeld, Erin; Grundler, Christopher; Millett, John; Sutton, Tia
Cc: Valentine, Julia; Allen, Laura; Senn, John; Belser, Evan
Subject: RE: WSJ questions on VW--NEED RESPONSES

Hi Nick,

Here are draft responses pending review by Erin, Julia, and Laura.

1) Can you break down for us which of the VW diesel models are Generation 1, Generation 2 and Generation 3? Some detail beyond model years would be helpful, as I understand, for instance, that certain model-year Passats are Generation 2 but not Jettas. If you can tell us make, model and year for each generation, and tell us what differentiates each generation, that would be very helpful.

Generation 3: all model year 2015 vehicles

Generation 2: 2012-2014 model year Passat

Generation 1: all 2009-2014 models (except Passat)

It would be better to contact Volkswagen for a detailed explanation of the technology differences between these vehicles.

2) Could you walk us through or point us to the specific rules that require Volkswagen to explain the capabilities of auxiliary emissions control devices on the 2016 diesel models as part of the certification process? I understand they are obligated under EPA regulations to lay that all our for the agency. Perhaps you can point us to the specific rules or put us on the phone with someone who can help?

Ex. 5

The regulations related to disclosing AECDs are listed in the Notice of Violation. Here is the appropriate excerpt.

To obtain a COC, a light-duty vehicle manufacturer must submit a COC application to the EPA for each test group of vehicles that it intends to enter into United States commerce. 40 C.F.R. § 86.1843-01. The COC application must include, among other things, a list of all auxiliary emission control devices (AECDs) installed on any applicable vehicles. 40 C.F.R. § 86.1844-01(d)(11). An AECD is "any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system." 40 C.F.R. § 86.1803-01. The COC application must also include "a justification for each AECD, the parameters they sense and control, a detailed justification of each AECD that results in a reduction in effectiveness of the emission control system, and [a] rationale for why it is not a defeat device." 40 C.F.R. § 86.1844-01(d)(11).

Note: The NOV provided more detail about when AECD's are considered defeat devices under the Clean Air Act (see excerpts copied below from pages 2-3 of the September 18

NOV).

3) Has VW yet fulfilled its obligation to explain all the capabilities of the AECD on the 2016 diesel models? If not, has VW indicated when you can expect the full explanation?

Volkswagen has withdrawn their 2016 application for certification. Questions regarding when Volkswagen will have an updated application should be directed to Volkswagen.

****

Byron Bunker

Director Compliance Division

Office of Transportation and Air Quality

Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

Bunker.Byron@epa.gov

Phone: (734) 214-4155

Mobile: (734) 353-9623

****

From: Conger, Nick
Sent: Tuesday, October 13, 2015 2:24 PM
To: Hengst, Benjamin; Birgfeld, Erin; Bunker, Byron; Grundler, Christopher; Millett, John; Sutton, Tia
Cc: Valentine, Julia; Allen, Laura; Senn, John; Belser, Evan
Subject: WSJ questions on VW--NEED RESPONSES

Hi OTAQ. I think Erin is in Michigan, as are many others, but here are some questions from the Wall Street Journal that we need to turn around by 6pm today. #3 should be easy. Can you guys help with responses?

Including Evan for awareness and in case he has any thoughts.

Nick

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

Liz/Nick:

Amy and I wanted to follow up on some questions we're hoping you can help with as we do reporting on VW.

1) Can you break down for us which of the VW diesel models are Generation 1, Generation 2 and Generation 3? Some detail beyond model years would be helpful, as I understand, for instance, that certain model-year Passats are Generation 2 but not Jettas. If you can tell us make, model and year for each generation, and tell us what differentiates each generation, that would be very helpful.

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3) Has VW yet fulfilled its obligation to explain all the capabilities of the AECD on the 2016 diesel models? If not, has VW indicated when you can expect the full explanation?

Best,

Mike

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Tue 10/13/2015 8:37:55 PM
Subject: DAILY: FCA could double use of temp workers under new UAW agreement | VW will cut spending by $1 billion | Toyota packs new Prius with tech | Porsche N.A. names new CEO | Cleaning up diesel engines

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Toyota, aiming for new showcase, packs Prius with tech

October 13, 2015

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Fiat Chrysler could double use of temp workers under new UAW contract, report says

Fiat Chrysler Automobiles can double its use of lower-paid temporary staffers under a new labor agreement being voted on by the UAW, two people familiar with the matter told Bloomberg.

VW will cut spending by $1 billion, launch all-electric Phaeton in EV push

VW Group said it will reduce investment spending at the VW brand by $1.1 billion a year, switch to a different diesel emissions treatment technology and launch an all-electric Phaeton sedan as the flagship for a new focus on electrification.

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New FCA-UAW contract deal would raise Tier 2 pay to $29 an hour, report says
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Toyota, aiming for new showcase, packs Prius with tech

Toyota is packing the next-generation Prius with such a profusion of new technologies that it makes the best-selling hybrid truly worthy of its name, which means "to go before." The fourth-generation Prius aims to be a showcase for the brand's latest powertrain, chassis and safety technologies.

deadline
with older VW diesels will need software and hardware fixes, Horn tells lawmakers
As crisis grows, Volkswagen dealers fear cash won't be enough
VW diesels, with operative emissions gear, are slower and thirstier, Consumer Reports finds

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Porsche North America names Klaus Zellmer CEO

RICHARD TRUETT

Volkswagen's sports car unit Porsche today named Klaus Zellmer president and CEO of Porsche Cars North America, effective Nov. 1.

Cleaning up the diesel engine, upstream

Oak Ridge National Laboratory has promising projects that reduce diesel emissions in the cylinder.

UAW shrinks voting on Fiat Chrysler pact to 2 days

Story of VW emissions scandal coming to big screen

Shortfall rises by $16 billion at UAW retiree health care fund

Volvo readies compact crossover for 2018, sources say

Aston Martin seeks 'beauty and soul' in all-electric sports cars

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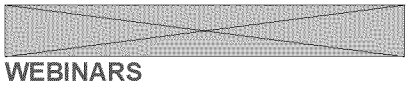

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by DMEautomotive

» Nov. 4 at 11am ET - Digital Disruption

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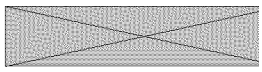

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To: Charmley, William[charmley.william@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Haley, Mike[Haley.Mike@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Haugen, David[haugen.david@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Cook, Leila[cook.leila@epa.gov]
Cc: Sargeant, Kathryn[sargeant.kathryn@epa.gov]; Storhok, Ines[storhok.ines@epa.gov]
From: Bradish, Tracey
Sent: Tue 10/13/2015 9:13:38 PM
Subject: SLT Agenda Items

SLT Agenda, October 14

- Non-Responsive
- Non-Responsive
- Non-Responsive
- Ethics and VW
- Non-Responsive

Other Items?

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: EnergyGuardian
Sent: Tue 10/13/2015 9:22:05 PM
Subject: Go bold on climate, governors and greens ask Dem candidates

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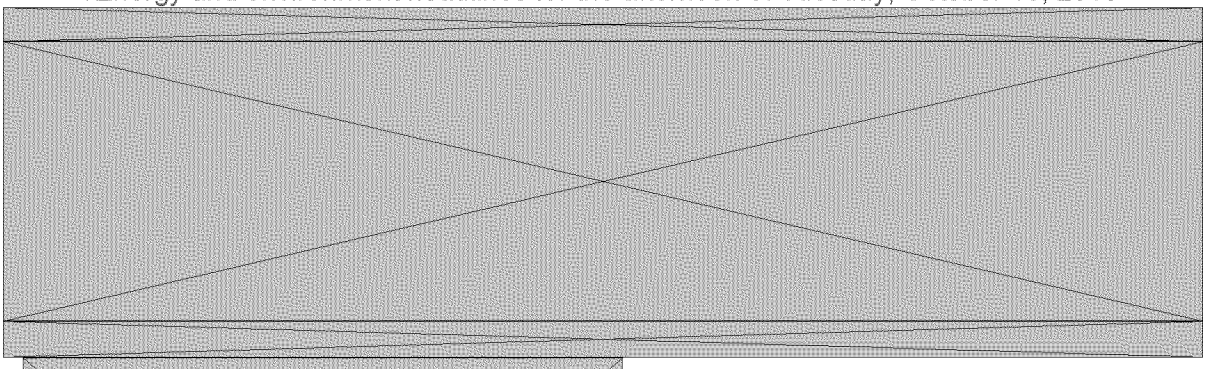
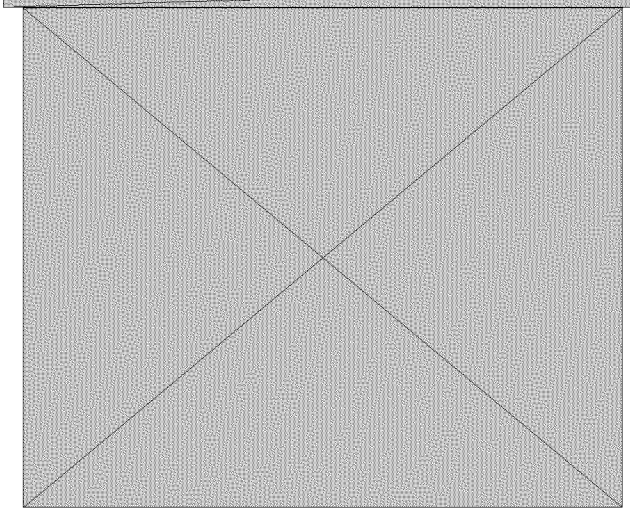
Energy and environment headlines for the afternoon of Tuesday, October 13, 2015





Go bold on climate, governors and greens ask Dem candidates

By Kevin Rogers

Environmentalists and a group of Democratic governors are calling on the five Democratic presidential contenders to use tonight's debate to lay out specific plans to combat climate change and promote the expansion of clean energy.

As former Secretary of State Hillary Clinton, Vermont Sen. Bernie Sanders, former Maryland Gov. Martin O'Malley, former Virginia Sen. Jim Webb and former Rhode Island

Gov. Lincoln Chafee gathered in Las Vegas for the first debate of the 2016 cycle, several environmental groups were lobbying them — and the debate's moderators — to give climate change top billing.

In a joint statement released by the climate action advocacy group NextGen Climate, Washington Gov. Jay Inslee, Pennsylvania Gov. Tom Wolf, Delaware Gov. Jack Markell and Vermont Gov. Peter Shumlin said they were "on the frontlines in the fight against the impacts of climate change" and needed a candidate who would drive strong federal climate action. They argued that climate policy couldn't be a "footnote" in the party's 2016 platform.

"Climate change is an urgent threat to our country's economy, health, and communities — and as governors we don't have the luxury of ignoring this crisis," they said. "Individual states can't solve this issue alone — the magnitude of the climate crisis requires leadership at every level of government. Our next president must stand with governors across this country and take decisive action to cut carbon pollution and build America's clean energy future."

Tom Steyer, president of NextGen, told reporters on a call that Democrats would have a unique opportunity to make an economic case for clean energy development and climate action — something that Republican contenders haven't made. But he warned that Democrats would have to get specific.

"Seizing on this growth strategy is the ultimate opportunity for the Democratic party, especially this year," he said. "We're not looking for well-meaning intentions and concern at this point. We're actually looking for specific plans that explain how we're going to get there and how it's integrated into an entire program."

Advocates for the coal industry called on the candidates to lay out the economic impact of emissions-fighting regulations and compare the costs with the benefits.

NextGen has called on Democratic candidates to lay out a plan to remake the country's power portfolio so that half of U.S. energy consumption is from renewable power by 2030, and the country is powered entirely by renewables by 2050. The group has launched a print and video campaign to lobby the Democratic National Committee to schedule a separate debate focused on climate and energy issues.

The Sierra Club also laid out its wish list ahead of the debate, calling on candidates to vow to defend and strengthen the Obama administration's Clean Power Plan, uphold any agreement coming from December's United Nations climate negotiations, and to lay out a game plan for getting the U.S. on track toward 100-percent renewable energy.

"As the Democratic party chooses its next nominee for President, action on climate and climate-smart policies, advocacy for the booming clean energy economy, and ensuring we all have clean air to breathe and clean water to drink will be top priorities — and must be top topics of discussion," Political Director Khalid Pitts wrote in a blog post.

The group also urged Democrats to come out forcefully against the Keystone XL pipeline.

and Arctic drilling and to support public land conservation efforts.

The National Resources Defense Council Action Fund and the League of Conservation Voters have also launched online campaigns pressing Tuesday's moderators to make climate change a central part of the debate.

The candidates were being lobbied by the opposite side of the climate equation, too, with the American Coalition for Clean Coal Electricity, a coal industry group, calling on the Democrats to detail the potential economic impacts of the Clean Power Plan and justify their support for the Environmental Protection Agency regulations.

EPA's carbon rule sets a 2030 deadline for cutting power plant carbon emissions 32 percent below 2005 levels. All of the Democrats, with the exception of Webb, have gone on the record in support of the regulations. Webb's campaign did not return a request for comment.

"The debate presents an excellent opportunity for the candidates to explain why they are putting the President's political priorities ahead of everyday Americans' pocketbook priorities in this critical election," ACCCE spokeswoman Laura Sheehan said in a statement. "If they fly true to form, the Democratic candidates will be all but tripping over themselves to show their support for the President's costly climate agenda."

Quick Links

Massachusetts nuclear power plant to close by 2019

Ohio, West Virginia, Pennsylvania combine on gas drilling

Shell drill vessels leave Arctic after oil exploration ends

Scandal-hit VW to change diesel emissions technology

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High court won't hear Utah appeal over road access

Ex-coal CEO on trial talks safety in secretly recorded calls

Grijalva pushes creation of monument in far northern Arizona

China jails former oil executive for 20 years for corruption

$34 million in DOE grants to improve energy sector cybersecurity

Interstate carbon trading may come from Clean Power Plan

Spend big on innovation to fight climate change, says Gates

Oil down as IEA stokes oversupply fears

Denver-based driller overdrawn after credit review

Chevron tows Big Foot to shore for servicing

Mexican wind farm challenged by San Diego residents on environmental grounds

Global warming 'direct threat' to American prosperity: Rice

4 decades on, Wats Bar 2 nuke plant nearing completion

Upcoming Events

Massachusetts nuclear power plant to close by 2019

By Mark Pratt

BOSTON (AP) — The beleaguered Pilgrim Nuclear Power Station, the only nuclear power plant in Massachusetts, will close by June 2019 because it's becoming too expensive to run, its owner announced Tuesday.

The decision by New Orleans-based Entergy Corp. comes about a month after federal inspectors downgraded the plant's safety rating to the lowest level and said they would increase oversight in the wake of a shutdown during a winter storm. The owner maintained that the plant in Plymouth remained safe, although it needed millions of dollars in upgrades.

Entergy cited "poor market conditions, reduced revenues and increased operational costs." Bill Mohl, president of Entergy Wholesale Commodities, said the decision to close was a "decision of last resort" and "agonizing."

The plant, which went online in 1972, produces 680 megawatts of electricity, enough to power more than 600,000 homes. It was relicensed in 2012 for an additional 20 years and employs more than 600 people.

More

Ohio, West Virginia, Pennsylvania combine on gas drilling

By Julie Carr Smyth

COLUMBUS, Ohio (AP) — Ohio, West Virginia and Pennsylvania have agreed to cooperate in attracting shale gas development and jobs to their region over the next three years rather than compete with each other.

The states signed an agreement Tuesday during the Tri-State Shale Summit in Morgantown, West Virginia. They say they've agreed to coordinate marketing efforts, workforce development, investment strategies and academic research as they capitalize on Utica and Marcellus shale development "in an environmentally sound manner."

Shale gas has become available through the horizontal drilling practice commonly known as fracking.

Ohio Lt. Gov. Mary Taylor says challenges and opportunities surrounding the industry don't recognize state lines so collaboration is essential.

More

Shell drill vessels leave Arctic after oil exploration ends

By Dan Joling

ANCHORAGE, Alaska (AP) — Vessels used by Royal Dutch Shell PLC to drill for oil off Alaska have safely departed Arctic waters.

Shell announced Sept. 28 it would cease further exploration in the Chukchi and Beaufort seas after spending upward of $7 billion on Arctic offshore exploration.

The company cited disappointing results from an exploratory well drilled in the Chukchi and the unpredictable federal regulatory environment.

Shell experienced transit problems with vessels the last time it drilled off Alaska in 2012.

More

Scandal-hit VW to change diesel emissions technology

By David McHugh

FRANKFURT, Germany (AP) — Volkswagen's flagship brand plans to change its diesel technology in Europe and North America as well as develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

More

White House: Iran missile test a likely UN violation

By The Associated Press

WASHINGTON (AP) — The White House says there are "strong indications" that Iran violated U.N. Security Council resolutions when it test fired a new ballistic missile.

White House press secretary Josh Earnest said Tuesday that such violations are nothing new.

Earnest says the Iranians have "almost serially" violated international concerns about the country's ballistic missile program.

But the White House spokesman added that those violations are "entirely separate" from the historic nuclear deal reached between Iran and world powers.

More

A message from America's Natural Gas Alliance

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Learn more at www.thinkaboutit.org.

High court won't hear Utah appeal over road access

WASHINGTON (AP) — The Supreme Court won't hear an appeal from Utah officials

seeking rights of way over several roads that run through federal lands.

The justices on Tuesday let stand a lower court ruling that said Utah and Kane County could only claim rights to six of 12 routes over which they sought control.

The dispute is one of dozens of lawsuits the state and its counties have filed claiming title to more than 12,000 separate rights of way through federal lands. The contested routes range from graded dirt roads to dry stream beds.

State officials assert their rights under a Civil War-era law that allowed settlers to develop trails over public lands. Environmental groups say increased vehicle access would jeopardize animal habitats and degrade other environmentally sensitive areas.

Ex-coal CEO on trial talks safety in secretly recorded calls

By The Associated Press

CHARLESTON, W.Va. (AP) — Prosecutors are continuing to replay phone calls ex-Massey Energy CEO Don Blankenship secretly recorded in his office.

In recordings played in federal court Tuesday, Blankenship said he sometimes thought without federal mine regulators, "we'd blow ourselves up."

Blankenship is charged with conspiring to break mine safety laws and lying to financial regulators about safety practices at Upper Big Branch Mine in West Virginia, which exploded in 2010, killing 29 miners.

In the recordings, he also said he wanted to mention safety efforts in a news release after the explosion because it was "a chance to do some propaganda there."

And he said he wanted to keep an ex-Massey official's safety memo confidential because it would be a terrible document to resurface in a legal case if a fatal accident occurred.

Grijalva pushes creation of monument in far northern Arizona

By Felicia Fonseca

FLAGSTAFF, Ariz. (AP) — U.S. Rep. Raul Grijalva is reviving a push to designate a large swath of northern Arizona as a national monument.

Grijalva, a Democrat, said he would introduce legislation next week to create Greater Grand Canyon Heritage National Monument while acknowledging it likely won't get even a hearing

in Congress. The goal is to have a template ready that President Barack Obama could consider signing as a proclamation for a new monument, he said.

The proposed 1.7 million-acre monument is a mix of towering cliffs and canyons, grasslands, forest and desert that is popular with hunters, hikers, ranchers and other recreationists. It also includes 1 million acres rich in uranium ore that is temporarily banned from the filing of new mining claims. Grijalva, environmentalists and tribes want to make that ban permanent but have faced stiff opposition from Republicans and the mining industry.

Tribal leaders who joined Grijalva on Monday in a news conference said the creation of a monument would protect the area's water, sacred sites and other cultural resources.

More

China jails former oil executive for 20 years for corruption

By The Associated Press

BEIJING (AP) — A Chinese court sentenced a former senior executive of a state oil company on Tuesday to 20 years in prison after finding him guilty of corruption.

The sentencing of Wang Yongchun, former deputy general manager of China National Petroleum Corp., came a day after the company's former chairman, Jiang Jiemin, was given 16 years' imprisonment for corruption.

The Xiangyang Intermediate People's Court in central China said Wang received 49 million yuan ($7.9 million) in bribes between 2000 and 2013 and failed to explain the source of another 42 million yuan.

It said Wang — at Jiang's direction — provided assistance to others, causing huge losses to the state.

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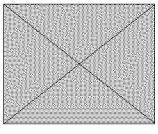

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

$34 million in DOE grants to improve energy sector cybersecurity

The Department of Energy has awarded $12.2 million to the University of Arkansas and $22.5 million to the University of Illinois Cyber Resilient Energy Delivery Consortium for projects to improve cyber defense technology on the grid and on oil and natural gas infrastructure, the Los Alamos Daily Post reports.

More

Interstate carbon trading may come from Clean Power Plan

Many states—even a number of those traditionally opposed to cap-and-trade—are in preliminary discussions exploring whether carbon trading should be part of their plans to comply with the Environmental Protection Agency's Clean Power Plan, E&E reports.

More

Spend big on innovation to fight climate change, says Gates

Bill Gates is working to fight climate change by trying to accelerate the process for inventing new technology in the energy sector, The Atlantic reports.

More

Oil down as IEA stokes oversupply fears

A projection from the International Energy Agency saying that the oil glut will persist well into next year dragged prices down Tuesday. U.S. benchmark crude lost 44 cents, settling at $46.66 a barrel on the Nymex, while in London, Brent fell 62 cents, or 1.2 percent, to $49.24, Reuters reports.

More

Denver-based driller overdrawn after credit review

Emerald Oil Inc. says it is $20 million overdrawn after lenders reduced the company's credit line by 40 percent, so it has entered negotiations with the banks on how to pay back what's owed, The Wall Street Journal reports.

More

Chevron tows Big Foot to shore for servicing

After problems with platform anchors delayed Chevron's multibillion dollar Big Foot drilling project in the Gulf of Mexico, the company has towed the platform back to South Texas for servicing and is investigating what went wrong, FuelFix reports.

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Mexican wind farm challenged by San Diego residents on environmental grounds

A lawsuit against Energia Sierra Juarez—a joint U.S.-Mexican wind project that sells all of its output to San Diego Gas & Electric—also names the Department of Energy and the U.S. Fish and Wildlife Service, and claims DOE didn't consider environmental impacts in Mexico before signing off on the deal, KPBS reports.

More

Global warming 'direct threat' to American prosperity: Rice

Joining the Obama administration push to promote the fight against climate change ahead of the U.N. talks in Paris, National Security Adviser Susan Rice told an audience at Stanford University that the "advancing menace" of climate change is the biggest long-term challenge on the planet, Politico reports.

More

4 decades on, Wats Bar 2 nuke plant nearing completion

With the Tennessee Valley Authority's Wats Bar Unit 2 nuclear plant due to come online early next year—construction on it having started in 1972—the Los Angeles Times argues that the facility's history is symbolic of problems in the industry.

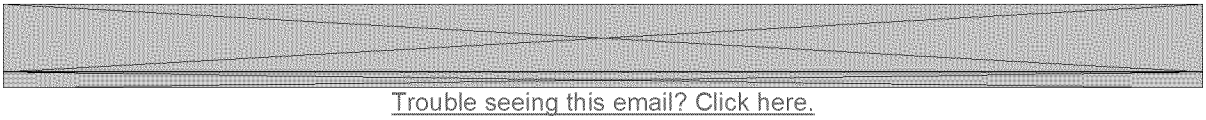
More

Upcoming Events

- Oct. 13, Las Vegas: CNN to host the first Democratic 2016 presidential debate. Former Secretary of State Hillary Clinton, Vermont Sen. Bernie Sanders, former Maryland Gov. Martin O'Malley, former Virginia Sen. Jim Webb and former Rhode Island Gov. Lincoln Chafee to debate. 9:30 pm
- Oct. 13, Washington: The Environmental and Energy Study Institute to hold a briefing on the bipartisan PREPARE Act, which would reform extreme weather response and recovery efforts to save taxpayer money. Government Accountability Office Assistant Director for Natural Resources and Environment Joe Thompson to speak. 10:30 am
- Oct. 13, Washington: The Wilson Center and the Canada Institute to host a discussion on climate policy views in the U.S. and Canada. 9:00 am , Ronald Reagan Building and International Trade Center.
- Oct. 14, Washington: The District of Columbia Bar to hold a discussion on the legality of the Environmental Protection Agency's Clean Power Plan to reduce greenhouse gas emissions from the power sector. Natural Resources Defense Council Climate and Clean Air Director David Doniger, Georgetown Professor Lisa Heizerling and

Bracewell & Giuliani partner Jeff Holmstead to speak. 12:30 pm , 1101 K Street, NW.

- Oct. 14, Washington: International Energy Agency Energy Efficiency and Environment Division chief Phillipe Benoit to discuss the agency's 2015 Energy Efficiency Market Report. 12:30 pm , 1616 Rhode Island Avenue, NW.
- Oct. 14, Washington: Former General Motors Chief Technology Officer Larry Burns, Domino's Pizza Executive Vice President Lynn Liddle and Securing America's Future Energy CEO Robby Diamond to participate in a discussion on the future for autonomous vehicles. 10:00 am , National Press Club
- Oct. 14, Washington: Energy Secretary Ernest Moniz to give keynote address at the final day of the National Summit on Smart Grid and Climate Change. 9:00 am , Hyatt Regency Capitol Hill.



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To: Wehrly, Linc[wehrly.linc@epa.gov]
From: EnergyGuardian
Sent: Tue 10/13/2015 9:22:34 PM
Subject: Go bold on climate, governors and greens ask Dem candidates

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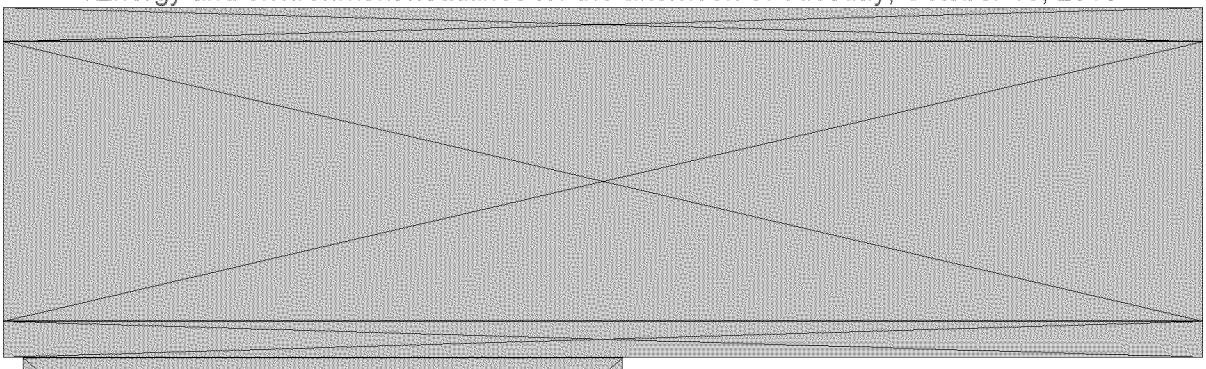
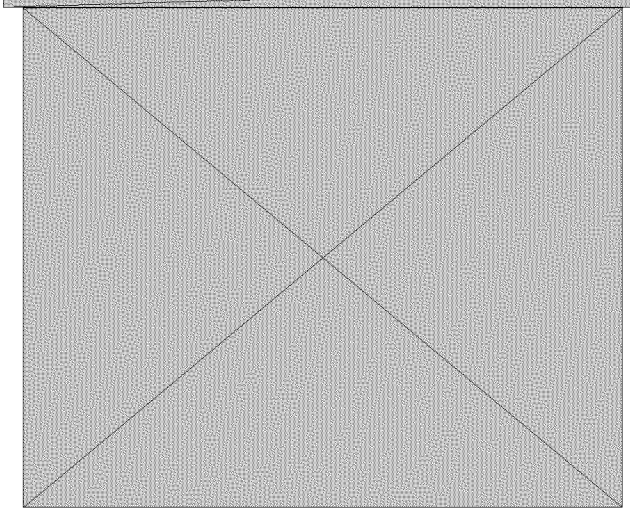
Energy and environment headlines for the afternoon of Tuesday, October 13, 2015





Go bold on climate, governors and greens ask Dem candidates

By Kevin Rogers

Environmentalists and a group of Democratic governors are calling on the five Democratic presidential contenders to use tonight's debate to lay out specific plans to combat climate change and promote the expansion of clean energy.

As former Secretary of State Hillary Clinton, Vermont Sen. Bernie Sanders, former Maryland Gov. Martin O'Malley, former Virginia Sen. Jim Webb and former Rhode Island

Gov. Lincoln Chafee gathered in Las Vegas for the first debate of the 2016 cycle, several environmental groups were lobbying them — and the debate's moderators — to give climate change top billing.

In a joint statement released by the climate action advocacy group NextGen Climate, Washington Gov. Jay Inslee, Pennsylvania Gov. Tom Wolf, Delaware Gov. Jack Markell and Vermont Gov. Peter Shumlin said they were "on the frontlines in the fight against the impacts of climate change" and needed a candidate who would drive strong federal climate action. They argued that climate policy couldn't be a "footnote" in the party's 2016 platform.

"Climate change is an urgent threat to our country's economy, health, and communities — and as governors we don't have the luxury of ignoring this crisis," they said. "Individual states can't solve this issue alone — the magnitude of the climate crisis requires leadership at every level of government. Our next president must stand with governors across this country and take decisive action to cut carbon pollution and build America's clean energy future."

Tom Steyer, president of NextGen, told reporters on a call that Democrats would have a unique opportunity to make an economic case for clean energy development and climate action — something that Republican contenders haven't made. But he warned that Democrats would have to get specific.

"Seizing on this growth strategy is the ultimate opportunity for the Democratic party, especially this year," he said. "We're not looking for well-meaning intentions and concern at this point. We're actually looking for specific plans that explain how we're going to get there and how it's integrated into an entire program."

Advocates for the coal industry called on the candidates to lay out the economic impact of emissions-fighting regulations and compare the costs with the benefits.

NextGen has called on Democratic candidates to lay out a plan to remake the country's power portfolio so that half of U.S. energy consumption is from renewable power by 2030, and the country is powered entirely by renewables by 2050. The group has launched a print and video campaign to lobby the Democratic National Committee to schedule a separate debate focused on climate and energy issues.

The Sierra Club also laid out its wish list ahead of the debate, calling on candidates to vow to defend and strengthen the Obama administration's Clean Power Plan, uphold any agreement coming from December's United Nations climate negotiations, and to lay out a game plan for getting the U.S. on track toward 100-percent renewable energy.

"As the Democratic party chooses its next nominee for President, action on climate and climate-smart policies, advocacy for the booming clean energy economy, and ensuring we all have clean air to breathe and clean water to drink will be top priorities — and must be top topics of discussion," Political Director Khalid Pitts wrote in a blog post.

The group also urged Democrats to come out forcefully against the Keystone XL pipeline.

and Arctic drilling and to support public land conservation efforts.

The National Resources Defense Council Action Fund and the League of Conservation Voters have also launched online campaigns pressing Tuesday's moderators to make climate change a central part of the debate.

The candidates were being lobbied by the opposite side of the climate equation, too, with the American Coalition for Clean Coal Electricity, a coal industry group, calling on the Democrats to detail the potential economic impacts of the Clean Power Plan and justify their support for the Environmental Protection Agency regulations.

EPA's carbon rule sets a 2030 deadline for cutting power plant carbon emissions 32 percent below 2005 levels. All of the Democrats, with the exception of Webb, have gone on the record in support of the regulations. Webb's campaign did not return a request for comment.

"The debate presents an excellent opportunity for the candidates to explain why they are putting the President's political priorities ahead of everyday Americans' pocketbook priorities in this critical election," ACCCE spokeswoman Laura Sheehan said in a statement. "If they fly true to form, the Democratic candidates will be all but tripping over themselves to show their support for the President's costly climate agenda."

Quick Links

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Shell drill vessels leave Arctic after oil exploration ends

Scandal-hit VW to change diesel emissions technology

White House: Iran missile test a likely UN violation

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Chevron tows Big Foot to shore for servicing

Mexican wind farm challenged by San Diego residents on environmental grounds

Global warming 'direct threat' to American prosperity: Rice

4 decades on, Wats Bar 2 nuke plant nearing completion

Upcoming Events

Massachusetts nuclear power plant to close by 2019

By Mark Pratt

BOSTON (AP) — The beleaguered Pilgrim Nuclear Power Station, the only nuclear power plant in Massachusetts, will close by June 2019 because it's becoming too expensive to run, its owner announced Tuesday.

The decision by New Orleans-based Entergy Corp. comes about a month after federal inspectors downgraded the plant's safety rating to the lowest level and said they would increase oversight in the wake of a shutdown during a winter storm. The owner maintained that the plant in Plymouth remained safe, although it needed millions of dollars in upgrades.

Entergy cited "poor market conditions, reduced revenues and increased operational costs." Bill Mohl, president of Entergy Wholesale Commodities, said the decision to close was a "decision of last resort" and "agonizing."

The plant, which went online in 1972, produces 680 megawatts of electricity, enough to power more than 600,000 homes. It was relicensed in 2012 for an additional 20 years and employs more than 600 people.

More

Ohio, West Virginia, Pennsylvania combine on gas drilling

By Julie Carr Smyth

COLUMBUS, Ohio (AP) — Ohio, West Virginia and Pennsylvania have agreed to cooperate in attracting shale gas development and jobs to their region over the next three years rather than compete with each other.

The states signed an agreement Tuesday during the Tri-State Shale Summit in Morgantown, West Virginia. They say they've agreed to coordinate marketing efforts, workforce development, investment strategies and academic research as they capitalize on Utica and Marcellus shale development "in an environmentally sound manner."

Shale gas has become available through the horizontal drilling practice commonly known as fracking.

Ohio Lt. Gov. Mary Taylor says challenges and opportunities surrounding the industry don't recognize state lines so collaboration is essential.

More

Shell drill vessels leave Arctic after oil exploration ends

By Dan Joling

ANCHORAGE, Alaska (AP) — Vessels used by Royal Dutch Shell PLC to drill for oil off Alaska have safely departed Arctic waters.

Shell announced Sept. 28 it would cease further exploration in the Chukchi and Beaufort seas after spending upward of $7 billion on Arctic offshore exploration.

The company cited disappointing results from an exploratory well drilled in the Chukchi and the unpredictable federal regulatory environment.

Shell experienced transit problems with vessels the last time it drilled off Alaska in 2012.

More

Scandal-hit VW to change diesel emissions technology

By David McHugh

FRANKFURT, Germany (AP) — Volkswagen's flagship brand plans to change its diesel technology in Europe and North America as well as develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

More

White House: Iran missile test a likely UN violation

By The Associated Press

WASHINGTON (AP) — The White House says there are "strong indications" that Iran violated U.N. Security Council resolutions when it test fired a new ballistic missile.

White House press secretary Josh Earnest said Tuesday that such violations are nothing new.

Earnest says the Iranians have "almost serially" violated international concerns about the country's ballistic missile program.

But the White House spokesman added that those violations are "entirely separate" from the historic nuclear deal reached between Iran and world powers.

More

A message from America's Natural Gas Alliance

Clean is Powerful. Natural gas helps Georgia Power's plant generate electricity with 50% fewer emissions. Think about it.

Learn more at www.thinkaboutit.org.

High court won't hear Utah appeal over road access

WASHINGTON (AP) — The Supreme Court won't hear an appeal from Utah officials

seeking rights of way over several roads that run through federal lands.

The justices on Tuesday let stand a lower court ruling that said Utah and Kane County could only claim rights to six of 12 routes over which they sought control.

The dispute is one of dozens of lawsuits the state and its counties have filed claiming title to more than 12,000 separate rights of way through federal lands. The contested routes range from graded dirt roads to dry stream beds.

State officials assert their rights under a Civil War-era law that allowed settlers to develop trails over public lands. Environmental groups say increased vehicle access would jeopardize animal habitats and degrade other environmentally sensitive areas.

Ex-coal CEO on trial talks safety in secretly recorded calls

By The Associated Press

CHARLESTON, W.Va. (AP) — Prosecutors are continuing to replay phone calls ex-Massey Energy CEO Don Blankenship secretly recorded in his office.

In recordings played in federal court Tuesday, Blankenship said he sometimes thought without federal mine regulators, "we'd blow ourselves up."

Blankenship is charged with conspiring to break mine safety laws and lying to financial regulators about safety practices at Upper Big Branch Mine in West Virginia, which exploded in 2010, killing 29 miners.

In the recordings, he also said he wanted to mention safety efforts in a news release after the explosion because it was "a chance to do some propaganda there."

And he said he wanted to keep an ex-Massey official's safety memo confidential because it would be a terrible document to resurface in a legal case if a fatal accident occurred.

Grijalva pushes creation of monument in far northern Arizona

By Felicia Fonseca

FLAGSTAFF, Ariz. (AP) — U.S. Rep. Raul Grijalva is reviving a push to designate a large swath of northern Arizona as a national monument.

Grijalva, a Democrat, said he would introduce legislation next week to create Greater Grand Canyon Heritage National Monument while acknowledging it likely won't get even a hearing

in Congress. The goal is to have a template ready that President Barack Obama could consider signing as a proclamation for a new monument, he said.

The proposed 1.7 million-acre monument is a mix of towering cliffs and canyons, grasslands, forest and desert that is popular with hunters, hikers, ranchers and other recreationists. It also includes 1 million acres rich in uranium ore that is temporarily banned from the filing of new mining claims. Grijalva, environmentalists and tribes want to make that ban permanent but have faced stiff opposition from Republicans and the mining industry.

Tribal leaders who joined Grijalva on Monday in a news conference said the creation of a monument would protect the area's water, sacred sites and other cultural resources.

More

China jails former oil executive for 20 years for corruption

By The Associated Press

BEIJING (AP) — A Chinese court sentenced a former senior executive of a state oil company on Tuesday to 20 years in prison after finding him guilty of corruption.

The sentencing of Wang Yongchun, former deputy general manager of China National Petroleum Corp., came a day after the company's former chairman, Jiang Jiemin, was given 16 years' imprisonment for corruption.

The Xiangyang Intermediate People's Court in central China said Wang received 49 million yuan ($7.9 million) in bribes between 2000 and 2013 and failed to explain the source of another 42 million yuan.

It said Wang — at Jiang's direction — provided assistance to others, causing huge losses to the state.

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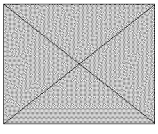

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

$34 million in DOE grants to improve energy sector cybersecurity

The Department of Energy has awarded $12.2 million to the University of Arkansas and $22.5 million to the University of Illinois Cyber Resilient Energy Delivery Consortium for projects to improve cyber defense technology on the grid and on oil and natural gas infrastructure, the Los Alamos Daily Post reports.

More

Interstate carbon trading may come from Clean Power Plan

Many states—even a number of those traditionally opposed to cap-and-trade—are in preliminary discussions exploring whether carbon trading should be part of their plans to comply with the Environmental Protection Agency's Clean Power Plan, E&E reports.

More

Spend big on innovation to fight climate change, says Gates

Bill Gates is working to fight climate change by trying to accelerate the process for inventing new technology in the energy sector, The Atlantic reports.

More

Oil down as IEA stokes oversupply fears

A projection from the International Energy Agency saying that the oil glut will persist well into next year dragged prices down Tuesday. U.S. benchmark crude lost 44 cents, settling at $46.66 a barrel on the Nymex, while in London, Brent fell 62 cents, or 1.2 percent, to $49.24, Reuters reports.

More

Denver-based driller overdrawn after credit review

Emerald Oil Inc. says it is $20 million overdrawn after lenders reduced the company's credit line by 40 percent, so it has entered negotiations with the banks on how to pay back what's owed, The Wall Street Journal reports.

More

Chevron tows Big Foot to shore for servicing

After problems with platform anchors delayed Chevron's multibillion dollar Big Foot drilling project in the Gulf of Mexico, the company has towed the platform back to South Texas for servicing and is investigating what went wrong, FuelFix reports.

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Mexican wind farm challenged by San Diego residents on environmental grounds

A lawsuit against Energia Sierra Juarez—a joint U.S.-Mexican wind project that sells all of its output to San Diego Gas & Electric—also names the Department of Energy and the U.S. Fish and Wildlife Service, and claims DOE didn't consider environmental impacts in Mexico before signing off on the deal, KPBS reports.

More

Global warming 'direct threat' to American prosperity: Rice

Joining the Obama administration push to promote the fight against climate change ahead of the U.N. talks in Paris, National Security Adviser Susan Rice told an audience at Stanford University that the "advancing menace" of climate change is the biggest long-term challenge on the planet, Politico reports.

More

4 decades on, Wats Bar 2 nuke plant nearing completion

With the Tennessee Valley Authority's Wats Bar Unit 2 nuclear plant due to come online early next year—construction on it having started in 1972—the Los Angeles Times argues that the facility's history is symbolic of problems in the industry.

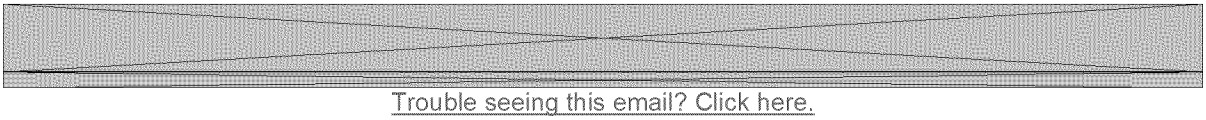
More

Upcoming Events

- Oct. 13, Las Vegas: CNN to host the first Democratic 2016 presidential debate. Former Secretary of State Hillary Clinton, Vermont Sen. Bernie Sanders, former Maryland Gov. Martin O'Malley, former Virginia Sen. Jim Webb and former Rhode Island Gov. Lincoln Chafee to debate. 9:30 pm
- Oct. 13, Washington: The Environmental and Energy Study Institute to hold a briefing on the bipartisan PREPARE Act, which would reform extreme weather response and recovery efforts to save taxpayer money. Government Accountability Office Assistant Director for Natural Resources and Environment Joe Thompson to speak. 10:30 am
- Oct. 13, Washington: The Wilson Center and the Canada Institute to host a discussion on climate policy views in the U.S. and Canada. 9:00 am , Ronald Reagan Building and International Trade Center.
- Oct. 14, Washington: The District of Columbia Bar to hold a discussion on the legality of the Environmental Protection Agency's Clean Power Plan to reduce greenhouse gas emissions from the power sector. Natural Resources Defense Council Climate and Clean Air Director David Doniger, Georgetown Professor Lisa Heizerling and

Bracewell & Giuliani partner Jeff Holmstead to speak. 12:30 pm , 1101 K Street, NW.

- Oct. 14, Washington: International Energy Agency Energy Efficiency and Environment Division chief Phillipe Benoit to discuss the agency's 2015 Energy Efficiency Market Report. 12:30 pm , 1616 Rhode Island Avenue, NW.
- Oct. 14, Washington: Former General Motors Chief Technology Officer Larry Burns, Domino's Pizza Executive Vice President Lynn Liddle and Securing America's Future Energy CEO Robby Diamond to participate in a discussion on the future for autonomous vehicles. 10:00 am , National Press Club
- Oct. 14, Washington: Energy Secretary Ernest Moniz to give keynote address at the final day of the National Summit on Smart Grid and Climate Change. 9:00 am , Hyatt Regency Capitol Hill.



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To: Soth, Judith[Soth.Judith@epa.gov]
From: Grundler, Christopher
Sent: Tue 10/13/2015 10:01:25 PM
Subject: Fwd: TATD's Special All Hands meeting w/ Chris Grundler (Weds. 10/14 @ 11am)

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Sent from my iPhone

Begin forwarded message:

From: "Haugen, David" <haugen.david@epa.gov>
Date: October 13, 2015 at 9:43:29 AM EDT
To: "Grundler, Christopher" <grundler.christopher@epa.gov>
Cc: "Brusstar, Matt" <brusstar.matt@epa.gov>, "Hengst, Benjamin" <Hengst.Benjamin@epa.gov>, "Cook, Leila" <cook.leila@epa.gov>
Subject: TATD's Special All Hands meeting w/ Chris Grundler (Weds. 10/14 @ 11am)

Chris,

I think your calendar for tomorrow/Wednesday has you talking with the TATD Division at 11:00 for 30-45 minutes.

The Division meeting is in the Lab Conference Rooms A-B-C-D.

We discussed at the Fall SLT Retreat that the overarching objective was for you to meet with every OTAQ Division and provide a sort of "State-of-Office" OTAQ update.

If you would also highlight a couple of TATD specific items, I suggest …

•□□□□□□□ The HD Vehicle Technology Showcase will have just wrapped up. Please thank the TATD staff for its success

•□□□□□□□ The 4DX (4 Disciplines of Execution) Wildly Important Goals accomplished:

- Vehicle Testing operations, led by John and Maria, came through with huge increases in

vehicle test volumes by focusing on this metric

- Sterling's team in the Engine Testing Center more than doubled the number of cert engines tested in HD05 this past year

- Dan Barba's NCAT team, working with the ASD team, published seven peer-reviewed technical papers in 2015. I can't emphasize enough the importance of the testing and modeling work that's being done in NCAT to support the Light-Duty Midterm Evaluation and the HD GHG Phase 2 rulemaking. Their publications and presentations are helping to demonstrate OTAQ's technical leadership to industry and the American public.

- Erica's Immediate Office obligated $6M of FY14 funds by the second quarter, and over 50% of FY15 funds by the end of September

Last year, I told you in all sincerity that I was "blown away" by your progress with 4DX, and the enthusiasm you showed me.

- I look forward to your continued commitment to 4DX this year, and I've come to expect that I will be "blown away" once again.

Ex. 7

•□□□□□□□ I always mention to David my expectations that first and foremost is the importance of **Safety** in your performing work, and our reliance on the highest **Quality** in the tests you perform. We should always be vigilant in protecting our most important assets:

- you, the people here performing the work;

- the facility we need to conduct these important tests; and

- our reputation for fair, honest, and sound science & test data.

Thanks, David

To: Grundler, Christopher[grundler.christopher@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cook, Leila[cook.leila@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bradish, Tracey[bradish.tracey@epa.gov]; Spieth, John[Spieth.John@epa.gov]; Haugen, David[haugen.david@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]
Cc: Allen, Laura[Allen.Laura@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Valentine, Julia
Sent: Tue 10/13/2015 10:19:18 PM
Subject: Top story on Detroit News home page: GREAT photo of the huge truck

Click on the link for the awesome photo!

http://www.detroitnews.com/search/epa/

Ann Arbor EPA lab tests other cars after VW scandal

Ann Arbor — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.

Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and rental companies in real-world driving conditions. The EPA also could take cars from manufacturers' assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be testing a range of vehicles with a range of configurations and situations," McCabe told reporters at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars

need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle & Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions.

mmartinez@detroitnews.com

(313) 222-2401

Twitter.com/MikeMartinez_DN

Julia P. Valentine

Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

To: Grundler, Christopher[grundler.christopher@epa.gov]; McCabe, Janet[McCabe.Janet@epa.gov]
From: Allen, Laura
Sent: Tue 10/13/2015 10:20:23 PM
Subject: Fwd: Top story on Detroit News home page: GREAT photo of the huge truck

Nice story here.

Begin forwarded message:

From: "Valentine, Julia" <Valentine.Julia@epa.gov>
Date: October 13, 2015 at 6:14:15 PM EDT
To: "Allen, Laura" <Allen.Laura@epa.gov>, "Conger, Nick" <Conger.Nick@epa.gov>, "Purchia, Liz" <Purchia.Liz@epa.gov>, "Harrison, Melissa" <Harrison.Melissa@epa.gov>, "Hull, George" <Hull.George@epa.gov>
Cc: AO OPA Media Relations <AO_OPA_Media_Relations@epa.gov>
Subject: Top story on Detroit News home page: GREAT photo of the huge truck

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mmartinez@detroitnews.com

(313) 222-2401

Twitter.com/MikeMartinez_DN

Julia P. Valentine

Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

To: Cook, Leila[cook.leila@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Tue 10/13/2015 10:39:36 PM
Subject: Fwd: VW hearing held before Congress

Ex. 5

Sent from my iPhone

Begin forwarded message:

From: "Black, Sarah B." <sblack@chesco.org>
Date: October 13, 2015 at 4:09:20 PM EDT
To: "'Grundler.christopher@Epa.gov'" <Grundler.christopher@Epa.gov>
Subject: VW hearing held before Congress

Hello Mr. Grundler. As a 2012 VW Jetta diesel owner, I read the transcripts from the hearing and was unimpressed by VW CEO Mr. Horn. If he truly desires to "make things right", then VW should buy the vehicles back from affected consumers. Period. As the EPA failed to catch even 1 vehicle out of 482,000 in seven years, I am asking the agency to protect the consumers now. The fixes proposed have the potential to damage fuel economy and/or performance. Further, it can take another year to "fix" them. Why should VW be allowed to pollute the air for another year with no repercussions all the while profiting from their lies in the form of monthly car payments? I am respectfully requesting the EPA mandate that VW buy the affected vehicles back immediately. Anything less is inherently unfair to the innocent people who simply bought a car under false pretenses. As the company has already demonstrated they will not do the right thing voluntarily, they should be pushed in that direction. Any help you can provide with this would be greatly appreciated.

Sincerely,

Sarah B. Black, Esq.

Assistant Public Defender

Chester County Public Defender's Office

P: (610) 344-6940, x 5415

F: (610) 344-6120

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To: Allen, Laura[Allen.Laura@epa.gov]
Cc: Grundler, Christopher[grundler.christopher@epa.gov]
From: McCabe, Janet
Sent: Tue 10/13/2015 10:40:36 PM
Subject: Re: Top story on Detroit News home page: GREAT photo of the huge truck

Nice

Sent from my iPhone

On Oct 13, 2015, at 6:20 PM, Allen, Laura <Allen.Laura@epa.gov> wrote:

> Nice story here.
>
> Begin forwarded message:
>
> **From:** "Valentine, Julia" <Valentine.Julia@epa.gov>
> **Date:** October 13, 2015 at 6:14:15 PM EDT
> **To:** "Allen, Laura" <Allen.Laura@epa.gov>, "Conger, Nick" <Conger.Nick@epa.gov>, "Purchia, Liz" <Purchia.Liz@epa.gov>, "Harrison, Melissa" <Harrison.Melissa@epa.gov>, "Hull, George" <Hull.George@epa.gov>
> **Cc:** AO OPA Media Relations <AO_OPA_Media_Relations@epa.gov>
> **Subject: Top story on Detroit News home page: GREAT photo of the huge truck**
>
> Click on the link for the awesome photo!
>
> http://www.detroitnews.com/search/epa/
>
> ## Ann Arbor EPA lab tests other cars after VW scandal
>
> *Ann Arbor* — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.
>
> Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and

rental companies in real-world driving conditions. The EPA also could take cars from manufacturers' assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be testing a range of vehicles with a range of configurations and situations," McCabe told reporters at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle & Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions.

mmartinez@detroitnews.com

(313) 222-2401

Twitter.com/MikeMartinez_DN

Julia P. Valentine

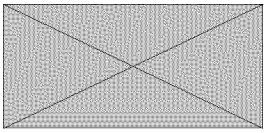
Office of Public Affairs

U.S. EPA

202.564.2663 direct

202.740.1336 m/txt

To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Environmental Law360
Sent: Wed 10/14/2015 7:31:33 AM
Subject: Carbon Plan Will Force New Collaboration, State Leader Says



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CSX Corpora

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Center for Biologic Diversity Inc.

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Duke

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COMPANIES
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Arch Coal Inc.

Aruba Networks, Inc.

BNSF Railway

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EQT Corporation

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U.S. Department of Justice

U.S. Supreme Court

Army Corps of Engineers

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Agua Caliente Band of Cahuilla Indians

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National Marine Fisheries Service

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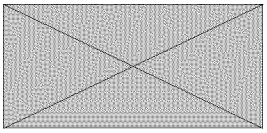
To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Environmental Law360
Sent: Wed 10/14/2015 7:33:47 AM
Subject: Carbon Plan Will Force New Collaboration, State Leader Says



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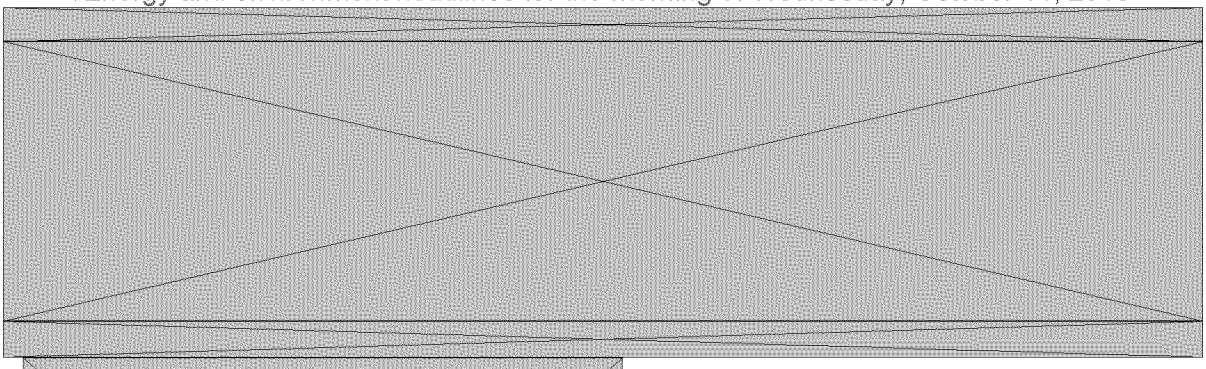
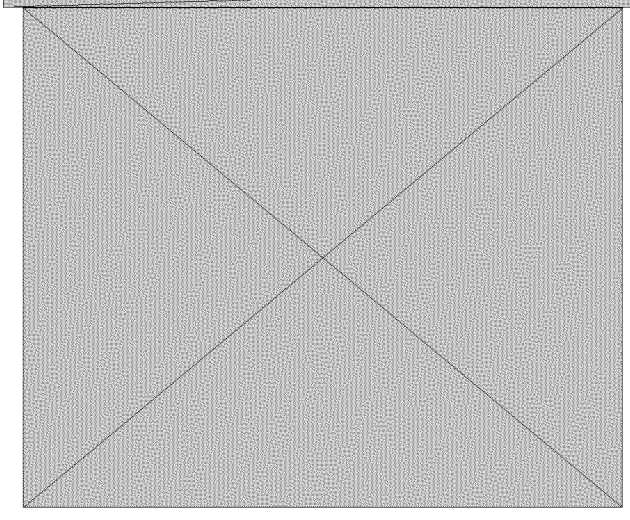
Energy and environment headlines for the morning of Wednesday, October 14, 2015





Germany's DEA buying E.ON Norway oil, gas business for $1.6B

By The Associated Press

BERLIN (AP) — German-based oil and gas firm DEA Deutsche Erdoel AG says it plans to buy utility E.ON's Norwegian oil and gas business in a deal worth $1.6 billion.

DEA, a former unit of energy company RWE that now belongs to an international investment arm of Russian billionaire Mikhail Fridman's Alfa Group, said Wednesday that the deal will more than double its current production in Norway. It is subject to approval by Norwegian

authorities and the European Commission.

DEA supervisory board chairman Lord Browne said the planned acquisition is the first step in the company's new growth strategy. He said that it "has access to substantial financial resources" and he expects it to make more investments in the Norwegian continental shelf and other core areas.

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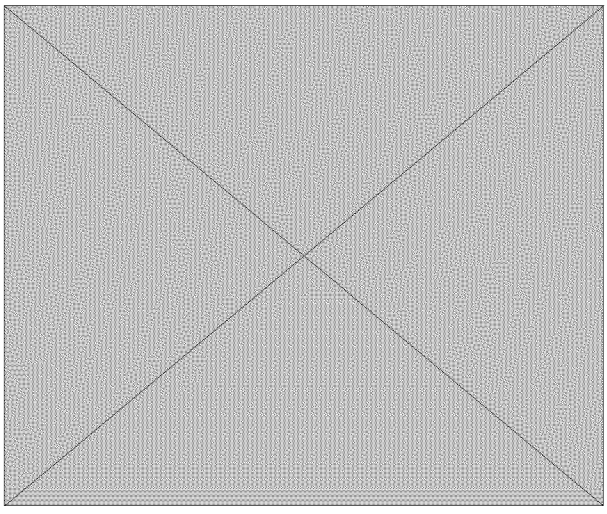

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Badger and her husband are part of a complicated process that starts with constructing new reefs out of clamshells and other material from a seafood processing plant in Rhode Island. Microscopic oyster larvae are purchased from Maine and placed in special tanks at UNH's Jackson Estuarine Lab, where the spat — young oysters — attach themselves to shells discarded from area restaurants.

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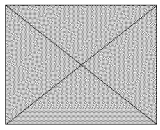

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

Refinery outage prompts more California gasoline imports

Data from the Energy Information Administration shows California is importing ten times more gasoline than usual since February's explosion at Exxon Mobil's Torrance refinery, FuelFix reports.

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Russia blames U.S., OPEC, for oil glut

Russian oil output has remained unchanged, Energy Minister Alexander Novak told CNBC in an interview, noting that U.S. shale producers have added five million barrels of crude a day to the global supply, "a huge quantity" which the market "hasn't been able to process."

More

D.C. Appeals Judge Kavanaugh playing key role in legal fights over EPA

Judge Brett Kavanaugh, a Bush administration appointee to the U.S. Court of Appeals for the District of Columbia Circuit, has delivered opinions challenging some Environmental Protection Agency air pollution rules and will likely play a key role in lawsuits going forward, E&E reports.

More

Pipeline, transmission line projects in focus with Pilgrim shutdown

The natural gas pipelines and electricity transmission lines being planned for New England take on a new importance in the wake of the announcement that the Pilgrim Nuclear Generating Station will be closing, The Boston Globe reports.

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Oklahoma debating regulators' quake authority

The move by Tulsa-based Marjo Operating Co. Inc. challenging the authority of the Oklahoma Corporation Commission to curtail its disposal wells as a result of earthquake risk

has started a debate in the state over the issue, KFOR reports.

More

Oil sluggish on continuing glut worries

Oil prices showed little signs of revival for a third consecutive day as concerns over global oversupply persist. U.S. benchmark crude gained 1 cent to $46.67 a barrel in electronic trading on the Nymex early Wednesday, while Brent lost 5 cents to $49.19, Reuters reports.

More

General Mills gets DOE recognition for energy savings

A heat recovery project at a plant in Cedar Rapids, Iowa is one of the steps taken by General Mills to save energy, which has been recognized by the Department of Energy as showing leadership in the efficiency field, The Gazette reports.

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Tesla finds big tax deduction for Model X owners

Owners of Tesla Motors' new Model X SUV should be eligible for a $25,000 tax deduction, the Los Angeles Times reports.

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GOP climate position evolved over the last decade

Money from fossil fuel interests and the rise of the Tea Party were factors contributing to the shift in the Republican Party position on climate change since candidate Sen. John McCain spoke out against its dangers during the 2008 campaign, The New York Times reports.

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Forest Service sued over pipeline feeding California bottled water operation

Environmental groups have sued the U.S. Forest Service to shut down a pipeline that brings water out of the San Bernadino National Forest that they say is being bottled by Nestle, alleging that it's operating under an expired permit, The Hill reports.

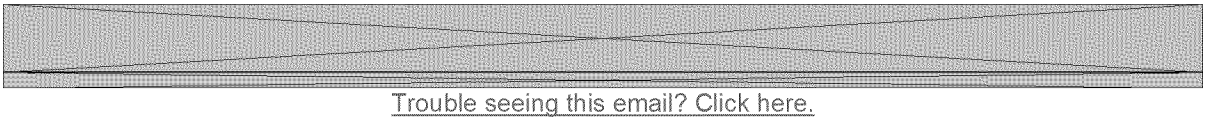
More

Upcoming Events

- Oct. 14, Washington: The District of Columbia Bar to hold a discussion on the legality of the Environmental Protection Agency's Clean Power Plan to reduce greenhouse gas

emissions from the power sector. Natural Resources Defense Council Climate and Clean Air Director David Doniger, Georgetown Professor Lisa Heizerling and Bracewell & Giuliani partner Jeff Holmstead to speak. 12:30 pm , 1101 K Street, NW.

- Oct. 14, Washington: International Energy Agency Energy Efficiency and Environment Division chief Phillipe Benoit to discuss the agency's 2015 Energy Efficiency Market Report. 12:30 pm , 1616 Rhode Island Avenue, NW.
- Oct. 14, Washington: Former General Motors Chief Technology Officer Larry Burns, Domino's Pizza Executive Vice President Lynn Liddle and Securing America's Future Energy CEO Robby Diamond to participate in a discussion on the future for autonomous vehicles. 10:00 am , National Press Club
- Oct. 14, Washington: Energy Secretary Ernest Moniz to give keynote address at the final day of the National Summit on Smart Grid and Climate Change. 9:00 am , Hyatt Regency Capitol Hill.



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Sent: Wed 10/14/2015 11:26:48 AM
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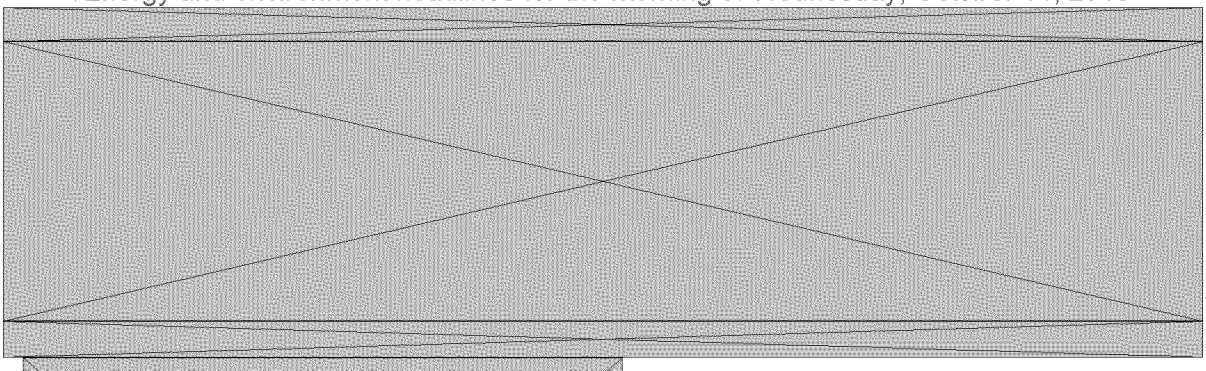

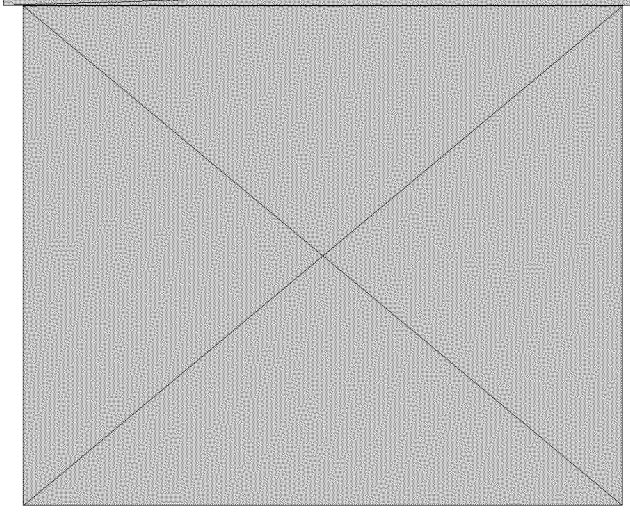

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ST. LOUIS (AP) — A report card is out on the Mississippi River basin, and the grade is not good: a D+, with the river's aging transportation infrastructure topping the list of concerns.

The report by America's Watershed Initiative assesses categories such as the abundance of clean water, flood control and risk, ecosystem health, the economy and recreation on the river and its watershed, which touches parts of 31 states and covers two-fifths of the continental U.S.

The category of biggest concern is the condition of infrastructure such as locks and dams, creating what initiative members call a threat to the nation's economy.

"Our aging water infrastructure desperately weakens America's capability to reliably and efficiently move and export food and goods," said Stephen Gambrell, director of the Mississippi River Commission and a member of the initiative's steering committee.

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A major effort is underway here and elsewhere along the East Coast to restore the natural oyster population, which has plummeted in recent decades due to disease, over-harvesting and other problems. Led by the University of New Hampshire, the project brings together numerous partners ranging from restaurants that recycle discarded oyster shells to volunteer "foster parents" who raise baby oysters until they're big enough to survive on their own.

"We had this one shell that had four nice oysters on it. Each time we'd pull them up, we'd go, 'Oh, there he is! There's our star!'" said Lynn Badger of Newmarket, who like any good grandma keeps pictures of her baby oysters on her phone. "So it's kind of fun to see them, even though it's really hard to discern one from another."

Badger and her husband are part of a complicated process that starts with constructing new reefs out of clamshells and other material from a seafood processing plant in Rhode Island. Microscopic oyster larvae are purchased from Maine and placed in special tanks at UNH's Jackson Estuarine Lab, where the spat — young oysters — attach themselves to shells discarded from area restaurants.

More

Germany's DEA buying E.ON Norway oil, gas business for $1.6B

By The Associated Press

BERLIN (AP) — German-based oil and gas firm DEA Deutsche Erdoel AG says it plans to buy utility E.ON's Norwegian oil and gas business in a deal worth $1.6 billion.

DEA, a former unit of energy company RWE that now belongs to an international investment arm of Russian billionaire Mikhail Fridman's Alfa Group, said Wednesday that the deal will more than double its current production in Norway. It is subject to approval by Norwegian authorities and the European Commission.

DEA supervisory board chairman Lord Browne said the planned acquisition is the first step in the company's new growth strategy. He said that it "has access to substantial financial resources" and he expects it to make more investments in the Norwegian continental shelf and other core areas.

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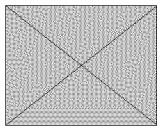

Week in Review – House Defies White House on Oil Export Ban

New Climate Change Laws in California.

Click here to read the brief

Refinery outage prompts more California gasoline imports

Data from the Energy Information Administration shows California is importing ten times more gasoline than usual since February's explosion at Exxon Mobil's Torrance refinery, FuelFix reports.

More

Russia blames U.S., OPEC, for oil glut

Russian oil output has remained unchanged, Energy Minister Alexander Novak told CNBC in an interview, noting that U.S. shale producers have added five million barrels of crude a day to the global supply, "a huge quantity" which the market "hasn't been able to process."

More

D.C. Appeals Judge Kavanaugh playing key role in legal fights over EPA

Judge Brett Kavanaugh, a Bush administration appointee to the U.S. Court of Appeals for the District of Columbia Circuit, has delivered opinions challenging some Environmental Protection Agency air pollution rules and will likely play a key role in lawsuits going forward, E&E reports.

More

Pipeline, transmission line projects in focus with Pilgrim shutdown

The natural gas pipelines and electricity transmission lines being planned for New England take on a new importance in the wake of the announcement that the Pilgrim Nuclear Generating Station will be closing, The Boston Globe reports.

More

Oklahoma debating regulators' quake authority

The move by Tulsa-based Marjo Operating Co. Inc. challenging the authority of the Oklahoma Corporation Commission to curtail its disposal wells as a result of earthquake risk has started a debate in the state over the issue, KFOR reports.

More

Oil sluggish on continuing glut worries

Oil prices showed little signs of revival for a third consecutive day as concerns over global oversupply persist. U.S. benchmark crude gained 1 cent to $46.67 a barrel in electronic trading on the Nymex early Wednesday, while Brent lost 5 cents to $49.19, Reuters reports.

More

General Mills gets DOE recognition for energy savings

A heat recovery project at a plant in Cedar Rapids, Iowa is one of the steps taken by General Mills to save energy, which has been recognized by the Department of Energy as showing leadership in the efficiency field, The Gazette reports.

More

Tesla finds big tax deduction for Model X owners

Owners of Tesla Motors' new Model X SUV should be eligible for a $25,000 tax deduction, the Los Angeles Times reports.

More

GOP climate position evolved over the last decade

Money from fossil fuel interests and the rise of the Tea Party were factors contributing to the shift in the Republican Party position on climate change since candidate Sen. John McCain spoke out against its dangers during the 2008 campaign, The New York Times reports.

More

Forest Service sued over pipeline feeding California bottled water operation

Environmental groups have sued the U.S. Forest Service to shut down a pipeline that brings water out of the San Bernadino National Forest that they say is being bottled by Nestle, alleging that it's operating under an expired permit, The Hill reports.

Upcoming Events

- Oct. 14, Washington: The District of Columbia Bar to hold a discussion on the legality of the Environmental Protection Agency's Clean Power Plan to reduce greenhouse gas emissions from the power sector. Natural Resources Defense Council Climate and Clean Air Director David Doniger, Georgetown Professor Lisa Heizerling and Bracewell & Giuliani partner Jeff Holmstead to speak. 12:30 pm , 1101 K Street, NW.
- Oct. 14, Washington: International Energy Agency Energy Efficiency and Environment Division chief Phillipe Benoit to discuss the agency's 2015 Energy Efficiency Market Report. 12:30 pm , 1616 Rhode Island Avenue, NW.
- Oct. 14, Washington: Former General Motors Chief Technology Officer Larry Burns, Domino's Pizza Executive Vice President Lynn Liddle and Securing America's Future Energy CEO Robby Diamond to participate in a discussion on the future for autonomous vehicles. 10:00 am , National Press Club
- Oct. 14, Washington: Energy Secretary Ernest Moniz to give keynote address at the final day of the National Summit on Smart Grid and Climate Change. 9:00 am , Hyatt Regency Capitol Hill.

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To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Governors' Biofuels Coalition
Sent: Wed 10/14/2015 11:59:57 AM
Subject: Today's Biofuels News

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NEWS UPDATE October 14, 2015

Oil Sands Boom Dries Up in Alberta, Taking Thousands of Jobs With it

By IAN AUSTEN, New York Times • • Posted October 14, 2015

At a camp for oil workers here, a collection of 16 three-story buildings that once housed 2,000 workers sits empty. A parking lot at a neighboring camp is now dotted with abandoned cars. With oil prices falling precipitously, capital-intensive projects rooted in the heavy crude mined from Alberta's oil sands are losing money, contributing to the loss of about 35,000 energy industry jobs across the province.
[read more …]

Op-Ed: VW Scandal Reveals Major Cracks in EPA's Emissions Reduction Strategy

By Carol Werner, Morning Consult • • Posted October 14, 2015

Volkswagen's installation of emissions testing "defeat devices" in its diesel cars was decidedly illegal, and the company should be severely punished for flouting our pollution controls in such an egregious manner. But its cheating is merely the proverbial tip of the emissions iceberg. While the largest and most deceptive greenwashing scam in recent memory, it's just one more example of EPA's failed regulatory oversight approach over car emissions. EPA's emissions testing is like Swiss cheese, with holes big enough to drive a car through. [read more …]

California governor signs bill correcting tax problem for biodiesel

By Biofuels Digest • • Posted October 14, 2015

California Gov. Jerry Brown signed AB 1032 into law, correcting a tax problem and clearing the way for a significant increase in the volumes of biodiesel blended in the state. The bill, introduced by Assembly Member Rudy Salas and sponsored by the California Biodiesel Alliance, amended Section 60501 of the Revenue and Taxation Code by adding biodiesel to the law allowing for refunds on nontaxable fuel. [read more …]

Gov. Cuomo aims to link U.S. Northeast's carbon market with Calif.'s

Elizabeth Harball, E&E reporter • • Posted October 14, 2015

In a release made public after the remarks, the governor's office added that the administration will pursue a linkage between the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade system that involves eight other Northeastern states, and California's carbon market, which is also linked to the Canadian provinces of Quebec and Ontario. "Connecting these markets would be more cost-effective and stable, thereby supporting clean energy and driving international carbon emission reductions," the release stated. "New York State will also engage other states and provinces to build a broader carbon market and further drive an international discussion that encourages government action on carbon emissions." [read more …]

Ex-Sen. Talent revs up fight over whether ethanol must be added to fuel

By Deirdre Shesgreen, Springfield News-Leader • • Posted October 14, 2015

Former Missouri Sen. Jim Talent has joined a pitched battle to protect the ethanol industry from a two-pronged political attack in Washington, a showdown that pits Show-Me State farmers against an array of powerful interest groups. At issue are federal rules requiring ethanol and other alternative fuels to be added to America's gasoline supply, which has been a boon to corn farmers in Missouri and other Midwestern states. But the ethanol mandates, which are supposed to increase every year under a 2005 law that Talent helped craft, are a bane to the oil industry, which is committed to killing the requirements. [read more …]

Note: News clips provided do not necessarily reflect the views of coalition or its member governors.

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Cc: Gonzalez, Gail[Gonzalez.Gail@epa.gov]; White, SharonB[White.SharonB@epa.gov]
From: Stewart, Gwen
Sent: Wed 10/14/2015 12:12:51 PM
Subject: Grundler, Christopher Calendar
Grundler Christopher Calendar.ics

CHRISTOPHER GRUNDLER

WEDNESDAY, OCTOBER 14, 2015

CALENDAR

AA OFFICE

9:00 AM – 10:00 AM VW Update

Location: RM. 5400 DC/RM. C-174 DOD AA

Gwen Stewart

Office of Transportation and Air Quality

202 564-1682 – Telephone

202 564-1686 – Fax Number

Stewart.gwen@epa.gov

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

From: Stewart, Lori
Required Attendees: Grundler, Christopher; Hengst, Benjamin; Bunker, Byron; Giles-AA, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan; Werner, Jacqueline; Niebling, William
Optional Attendees: Huffman, Linda; Cook, Leila
Location: Conference Call 1-866-299-3188; Participant Code: **Non-Responsive**
Importance: Normal
Subject: VW Update
Categories: Green Category
Start Date/Time: Wed 10/14/2015 1:00:00 PM
End Date/Time: Wed 10/14/2015 2:00:00 PM
Today's Meeting Participants

To: McCabe, Janet; Giles, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan; Werner, Jacqueline; Niebling, William

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
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Linda Huffman

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Washington, D.C. 20460

202-564-3139

To: Bunker, Byron[bunker.byron@epa.gov]
Cc: Kaul, Meetu[Kaul.Meetu@epa.gov]
From: Wehrly, Linc
Sent: Wed 10/14/2015 12:43:31 PM
Subject: Re: Did OTAQ meet with WVU researchers this week?

We have not met with WVU. I agree they may have been here for the Technology Showcase. May have also met with our modeling people (Ed Nam or Angela Cullen).

Sent from my iPhone

On Oct 14, 2015, at 7:41 AM, Bunker, Byron <bunker.byron@epa.gov> wrote:

> Not that I am aware of. They might have been here for the technology showcase at the lab, but I am not aware of any meetings with our VW team.
>
> Linc – do you know differently?
>
> **********
>
> Byron Bunker
>
> Director Compliance Division
>
> Office of Transportation and Air Quality
>
> Environmental Protection Agency
>
> 2000 Traverwood Drive
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> Ann Arbor, MI 48105
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> Phone: (734) 214-4155
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> Mobile: (734) 353-9623
>
> **********

From: Kaul, Meetu
Sent: Wednesday, October 14, 2015 7:38 AM
To: Bunker, Byron; Wehrly, Linc
Subject: Did OTAQ meet with WVU researchers this week?

I understand they are in Ann Arbor and heard they were meeting with EPA. Any info you could shed on that would be helpful. Thanks

---

Ms.Meetu Kaul, Attorney-Advisor

Air Enforcement Division
United States Environmental Protection Agency
Direct: 202-564-5472
Email: kaul.meetu@epa.gov

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Automotive News
Sent: Wed 10/14/2015 1:12:54 PM
Subject: A.M. NEWSCAST: Strategy 'differences' prompt departure of VW's designated N.A. chief | Toyota's plan to slash CO2 | FCA reassigns designer | Rewarding dealers for 'doing the right thing'

October 14, 2015

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From: Turley, Jennifer

Sent: Wed 10/14/2015 2:54:58 PM
Subject: Air & Radiation Law News for October 14, 2015

Air & Radiation Law News for October 14, 2015

Bloomberg BNA **Daily Environment Report™**

Air Pollution

China's Emissions Probe Exposes Broad Issues

While Chinese environmental authorities have announced their own probes into Volkswagen AG's compliance with emissions standards, recent reports spotlight a broader problem with vehicle emissions tests in many parts of the country...

Air Pollution

European Commission to Publish Auto Emissions Rule

The European Commission said Oct. 13 that it will publish ahead of an Oct. 28 regulatory committee vote a proposal on "conformity factors" to be used in a new generation of vehicle pollutant emissions tests that

are being introduced...

Air Pollution

VW Will Cut Spending by $1.1 Billion Amid Diesel Scandal

Volkswagen AG will reduce investment at its main passenger-car brand by about 1 billion euros ($1.1 billion) a year and speed up an existing cost-cutting push as the impact of the diesel-emissions scandal ripples through the automaker....

Climate Change

NOAA Chief Urges Planning for Ongoing Climate Impacts

Today's warmer weather, rising sea levels and more frequent extreme weather events are not passing changes, Kathryn Sullivan, administrator of the National Ocean and Atmospheric Administration said Oct. 9....

Climate Change

The Activist and the CEO: Renewable Energy's Odd Couple

One sports a giraffe-print dashiki. The other wears an impeccably tailored navy lue suit. Meet the renewable energy odd couple: the environmental activist and his onetime target, the chief of Italy's largest utility....

Corporate Responsibility

Blackrock Taps Into Do-Good Investing, Gains Millennials

It began as idle chatter between two employees in their 20s exploring the intersection of lucre and idealism. Both had read about the practice of investing in companies that seek to do good and still make a profit....

Elections

Variety of Republican Climate Views Arises in Campaign

Sen. Lindsey Graham (R-S.C.), who trails far behind the leading Republican contenders in presidential polling, broke with his party and challenged rivals to tell him why they doubt that human activity predominantly contributes to climate...

Emissions Trading

Cap-and-Trade Programs Gain Traction With Businesses

The world is coming to terms with the idea that putting a price on carbon emissions is necessary to fight global warming. Now there is a growing consensus on how to make it happen: Cap and trade....

Energy

FERC Questions FirstEnergy's Contract in D.C. Circuit Case

FirstEnergy Corp. and supporting companies' claims that they have rights of first refusal to build new transmission facilities under a previous Supreme Court ruling are "jurisdictionally barred," the Federal Energy Regulatory...

Energy

Massachusetts Pilgrim Nuclear Plant to Close in 2019

The Pilgrim nuclear power plant in Plymouth, Mass., will be shuttered by June 1, 2019, Entergy Corp. announced Oct. 13....

International Climate

IMF, World Bank Pledge More Funding for 2020 Climate Goal

The goal of providing $100 billion a year to help poor countries adapt to the impacts of climate change is a step closer to fruition after the heads of the International Monetary Fund, the World Bank, and finance officials from 188 countries wrapped...

International Climate

Record Carbon Cut Bolsters U.K. Lead Among G-20

The U.K. led the G-20 last year in reducing the carbon intensity of its economy, a key measure of success in the battle against climate change....

International Climate

Republicans Gearing Up to Undercut Obama on Climate Accord

Senate Republicans are about to open attacks on multiple fronts to undercut President Barack Obama's efforts to essentially bypass the Senate in negotiating the first truly global agreement to address climate change....

International Climate

Rice Calls Climate Change 'Direct Threat' to U.S. Security

Climate change is "an advancing menace" that poses an immediate and "direct threat" to U.S. prosperity, safety, defense, national security and public health, Susan Rice, President Barack Obama's national security...

Renewable Energy

Deep Data Analysis From Wind Signals Next Investments

Enel SpA is investing small sums of money on the order of 40 million euros ($45 million) to tap savings in the "millions" by examining the data that comes from hundreds of power plants it's operating worldwide, its chief executive...

Trade

Trade Deal Expected to Expedite Natural Gas Exports

The federal approval process for liquefied natural gas exports would be streamlined for the Pacific nations included in a historic trade deal signed earlier in October, but most analysts said the real-world impact would be muted. ...

Vehicle Fuels

Quebec Action Plan Promotes Electric Vehicle Use

The Quebec government faces an uphill battle to convince the Canadian auto industry that a new C$421 million ($324 million) provincial action plan to significantly boost the use of electric vehicles will focus on consumer incentives rather...

INTERVIEW

See Current Bloomberg BNA Interview: EPA Seeks Wide Range of Views on National Enforcement Initiatives, EPA Deputy Assistant Administrator Says

Inside EPA's **Environmental Policy Alert,** 10/14/2015

http://insideepa.com/newsletters/environmental-policy-report

Latest News

Industry Says Agencies Lack Power To Regulate Trailers In Truck GHG Rule

The Truck Trailer Manufacturers Association (TTMA) says EPA and the National Highway Traffic Safety Administration (NHTSA) lack statutory authority to regulate trailers in their proposed phase 2 greenhouse gas and fuel economy rules for medium- and heavy-duty trucks, as the agencies proposed to do for the first time, suggesting the agencies will almost certainly face litigation over the issue once the rules are finalized.

Environmentalists Cite CSAPR Ruling In Push For Retroactive PM2.5 Limits

Environmentalists are seeking to bolster their suit trying to force retroactive application of stricter fine particulate matter (PM2.5) control requirements by citing an appellate court's ruling that backed EPA's ability to retroactively invalidate previously approved state air quality plans under its Cross-State Air Pollution Rule (CSAPR).

News Briefs

Environmentalists Sue EPA Over Missing PM2.5 SIPs

Environmentalists are suing EPA over its alleged failure to ensure submission of adequate state implementation plans (SIPs) for meeting the agency's 2006 fine particulate matter (PM2.5) national ambient air quality standard (NAAQS), aiming to force issuance of the emission reduction plans for five Western states.

Greenwire

LAW:

D.C. judge a formidable foe for Obama's environmental agenda

Robin Bravender, E&E reporter

Published: Tuesday, October 13, 2015

A Republican operative-turned federal judge has emerged as one of the most powerful critics of President Obama's environmental rules.

Judge Brett Kavanaugh -- a 50-year-old George W. Bush administration appointee to the U.S. Court of Appeals for the District of Columbia Circuit -- has pounded the administration in a series of legal opinions rebuffing some of its most high-profile air pollution rules. And because he's widely seen as an influential voice with Supreme Court justices and a leading contender for a GOP nomination to the high court, Kavanaugh's legal moves are being closely watched by those on both sides of the environmental debate.

Given Kavanaugh's "track record in these important cases over the last few years, I would think him a judge that is more open to second-guessing the EPA than nearly anyone," said Tom Donnelly, counsel at the left-leaning Constitutional Accountability Center.

Kavanaugh "happened to be on a bunch of big environmental cases, and he's written separately in several of them and the Supreme Court paid attention," said Jonathan Adler, a law professor at Case Western Reserve University who previously clerked on the D.C. Circuit.

With the fate of nearly every major environmental rule hinging on the outcome of lawsuits that could drag out for years, Kavanaugh could play a major role in determining which policies survive. And his take on environmental law will become even more relevant should he ultimately secure a seat on the high court.

Most recently, Kavanaugh has been central to a high-stakes battle surrounding which judges will hear challenges to U.S. EPA's landmark greenhouse gas standards for power plants.

In a lucky draw for those looking to pre-emptively challenge the draft rule, three GOP-appointed judges (including Kavanaugh) were selected for the panel picked to hear their arguments. Those judges said the challenge was premature, but that didn't stop EPA's opponents from making some interesting procedural maneuvers in an attempt to secure Kavanaugh and the other two judges on the panel that will ultimately hear challenges to the final rule.

So far, the judges have denied the attempts by states and industry to maintain that panel, but the unusual legal maneuvering is a clear indication that EPA's challengers see those judges as a favorable audience in what promises to be a broad legal assault against the administration's signature climate change rule.

It's unclear what role, if any, Kavanaugh will ultimately play in refereeing the legal disputes over that climate rule. But with a lifetime appointment to the court where many of the administration's most controversial environmental rules are challenged, his environmental opinions are certain to have lasting impacts.

'Auxiliary solicitor general'

Kavanaugh's track record on big clean air cases has given the left reason to fret.

In late 2012, after the D.C. Circuit upheld a suite of EPA's early greenhouse gas regulations, Kavanaugh

penned his own lengthy opinion dissenting from his colleagues. He argued that EPA "exceeded its statutory authority" and said the whole court should have reheard the case.

The Supreme Court later agreed to hear the case and struck down portions of EPA's permitting regime that Kavanaugh, too, had found objectionable.

In a 5-4 vote, the court's conservative wing ruled in 2014 that EPA couldn't force stationary facilities to obtain air pollution permits and install pollution controls based solely on their emissions of greenhouse gases. The court also ruled that EPA unlawfully interpreted the Clean Air Act when it revised the greenhouse gas emission thresholds that trigger permitting rules for factories, for power plants and on industrial facilities.

Kavanaugh had laid out similar reasoning in his at-times sharply worded dissent. "In my view, EPA's reading of the statute was impermissible," he wrote in 2012. "An agency cannot adopt an admittedly absurd interpretation and discard an eminently reasonable one."

While he strongly repudiated the agency's legal rationale, he noted that the climate regulations in question "may well be a good idea as a matter of policy. The task of dealing with global warming is urgent and important."

The Supreme Court ruled that EPA could require greenhouse gas reductions for stationary sources that are required to obtain the permits for emissions of other pollutants. That decision was seen largely as a win for EPA, although it did limit the agency's ability to crack down on industrial facilities' emissions (*Greenwire*, June 23, 2014).

"They didn't adopt all of his reasoning but reached sort of a similar result to what Kavanaugh had suggested in his dissent from rehearing below," said Donnelly of the Constitutional Accountability Center.

"At the time, I thought there's this weird way in these environmental cases where Kavanaugh serves as almost an auxiliary solicitor general, where he can -- for the conservative justices on the court -- signal these cases might be of interest to them," he said.

'He doesn't always win'

In another high-profile clean air case surrounding hazardous air pollution from power plants, Kavanaugh appeared again to have some sway with the Supreme Court.

The D.C. Circuit last year upheld EPA standards to curb mercury and other hazardous pollution from power plants. But in the 2-1 opinion, Kavanaugh dissented from his two Democrat-appointed colleagues when it came to EPA's cost considerations.

"[W]hen considering just as a general matter whether it is 'appropriate' to regulate, it is well-accepted that consideration of costs is a central and well-established part of the regulatory decisionmaking process," he wrote. "But EPA did not consider costs here. And EPA's failure to do so is no trivial matter."

In a 5-4 opinion issued in June, the Supreme Court agreed. In the ruling backed by the court's conservative majority, Justice Antonin Scalia wrote that the Obama administration unlawfully failed to consider compliance costs before issuing the landmark rule.

"It is unreasonable," he added, "to read an instruction to an administrative agency to determine whether 'regulation is appropriate and necessary' as an invitation to ignore cost" (*Greenwire*, June 29).

In another case, Kavanaugh wrote for the majority in a 2012 ruling that tossed out EPA's Cross-State Air

Pollution Rule that aimed to rein in harmful emissions that cross state lines. "In this case," he wrote, "we conclude that EPA has transgressed statutory boundaries."

The Supreme Court agreed to hear that case, too, and in 2014 dealt a blow to Kavanaugh and the D.C. Circuit when it upheld the EPA rule (*Greenwire*, April 29, 2014).

"He doesn't always win; that's one point that's important," said Simon Lazarus, senior counsel at the Constitutional Accountability Center.

Not all of Kavanaugh's opinions have angered environmentalists.

In a 2014 ruling, Kavanaugh wrote a majority opinion that vacated part of an EPA rule for cement kilns that shielded polluters from lawsuits if they exceeded emission limits during malfunctions, a move that greens welcomed. Industry groups, too, applauded that ruling (*Greenwire*, April 18, 2014).

And he signed on to a 2013 opinion finding that EPA's 2011 retroactive veto of a major West Virginia mountaintop-removal mining project was legal (*Greenwire*, April 23, 2013).

"He's been assigned to some high-profile cases in which the EPA was acting particularly aggressively and which presented particularly difficult legal issues," Adler said.

Ultimately, Kavanaugh is someone who "really wants to get the legal questions right and doesn't worry too much about where that leads him," Adler said. "I don't think he's a consistent vote against EPA; I don't think he's a consistent vote against regulation."

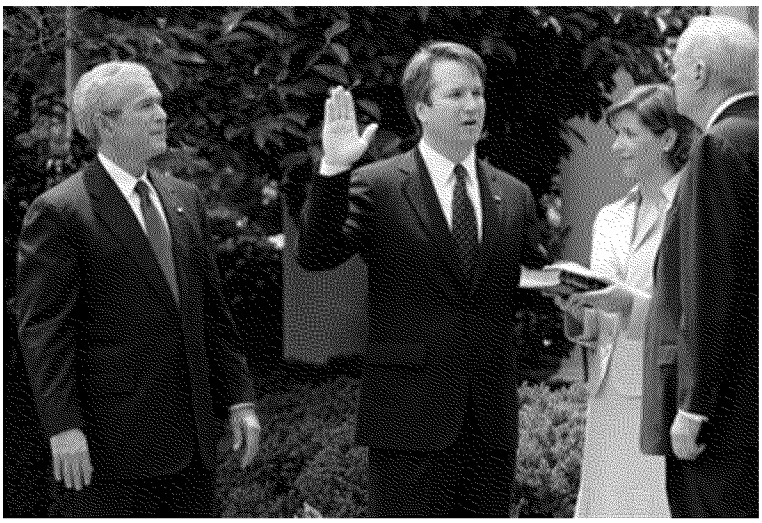
'Political animal'?

Kavanaugh's judicial tenure began with a political splash.

He was assistant to President George W. Bush and the White House staff secretary in 2003 when the president nominated him to the appeals court. The pick infuriated congressional Democrats, who painted him as a right-wing ideologue.

Sen. Charles Schumer (D-N.Y.) in 2006 called Kavanaugh the "go-to guy among young Republican lawyers appearing at the epicenter" of many controversial issues.

Kavanaugh, who was 41 at the time, had helped the Bush White House fill judicial posts with conservatives and was one of the authors of the "Starr report" issued in 1998 that argued for President Clinton's impeachment.



Kavanaugh was sworn in by Supreme Court Justice Anthony Kennedy in the White House Rose Garden in 2006. Photo by Eric Draper, courtesy of the White House.

"[I]f there has been a partisan political fight that needed a very bright legal foot soldier in the last decade, Brett Kavanaugh was probably there," Schumer said during Kavanaugh's 2006 confirmation hearing. At a previous hearing about Kavanaugh in 2004, Schumer had called the nomination "not just a drop of salt in the partisan wounds, it is the whole shaker."

At a speech earlier this year, Kavanaugh recalled those salt comments. "It's good to have your mom at these hearings," he said, according to the *Milwaukee Journal Sentinel*. "She said, 'I think he really respects you.' Gotta love your mom."

Despite Democrats' long-running complaints, Kavanaugh was ultimately confirmed in 2006.

And in his first decade on the bench, lawyers on the left and the right credit him with being smart, savvy and tough to pigeonhole.

"A lot of people -- like me, for example -- thought he was really a political person who wasn't going to be a formidable jurist as a judge, but I think we were wrong. He's very conservative, but he's clearly a thoughtful judge. ... That's why he's formidable," Lazarus said.

Said Adler, "It's hard to look at [Kavanaugh's] record on the D.C. Circuit and say he's just a political animal. He's written very thoughtful, very detailed, very impressive opinions."

And he's widely seen as a possible GOP Supreme Court nominee.

"He would, I think, be on a short list," Adler said. "He has the characteristics that presidents or those who pick judges tend to look for. Would he be a controversial nominee? I don't know."

Kavanaugh spent a stint at the high court himself; he was a clerk for Justice Anthony Kennedy from 1993 until 1994. He now manages an annual basketball game at the Supreme Court that pits its clerks against D.C. Circuit clerks. Kavanaugh and Sri Srinivasan -- an Obama appointee to the D.C. Circuit -- are the only judges who play.

And Kavanaugh is known as a "feeder judge," whose clerks often score clerkships with Supreme Court justices.

Kavanaugh hails from Bethesda, Md.; he's the only child of Martha and Ed Kavanaugh. He credits his mother, who was a state prosecutor and judge, with influencing his career path. His father was the longtime head of the trade association representing the cosmetic, toiletries and fragrance industries.

In 2004, Kavanaugh married Ashley Estes, who also worked in the Bush White House as the president's personal secretary. President Bush and first lady Laura Bush (along with their weapon-wielding Secret Service detail) attended their wedding ceremony at Christ Church in Georgetown, *The Washingtonian* reported. The Kavanaughs have two daughters.

People who know Kavanaugh describe him as a friendly, personable guy.

"Judge Kavanaugh is a real pleasure to appear before -- he's very well prepared and poses thoughtful, incisive questions in a courteous and engaging way," said Sean Donahue, an attorney who frequently represents environmental groups before the D.C. Circuit and who clerked for former Justice John Paul Stevens when Kavanaugh was also a Supreme Court clerk.

When Adler was a summer associate at Kirkland & Ellis, Kavanaugh -- then a partner at the firm -- would see Adler working late into the night and urge him to go out and have fun.

"He's always struck me as a fairly easygoing guy," Adler said. "He's not a firebrand."

NUCLEAR:

Mass. reactor to close, complicating state climate plans

Hannah Northey, E&E reporter

Published: Tuesday, October 13, 2015

Entergy Corp. announced plans today to shutter Massachusetts' only nuclear power plant in 2019, appeasing green groups and safety advocates while raising questions about whether the state can meet its goals for slashing emissions of heat-trapping greenhouse gases.

The Pilgrim Nuclear Generating Station in Plymouth will close no later than June 1, 2019, the company said, citing poor market conditions, reduced revenue and increased operating costs. The exact timing of the shutdown will be decided in the first half of 2016, Entergy said.

While the plant's license doesn't expire until 2032, the beleaguered 43-year-old facility's safety record and financial outlook took a pounding last month, with federal regulators finding "continuing weaknesses in the implementation of Entergy's program for identifying, evaluating and resolving problems at Pilgrim" (*Greenwire*, Sept. 2).

Entergy warned then it could close the plant if upgrade costs exceeded the value of operating the boiling water reactor.

Bill Mohl, the president of Entergy Wholesale Commodities, said Entergy was required to inform the region's grid operator yesterday if it wanted to participate in a capacity auction that starts tomorrow, and an "overly negative economic picture" -- as well as the Nuclear Regulatory Commission's safety finding -- prompted the decision to close the plant. Entergy, he said, has made a commitment to generate capacity from the plant through 2019, and that could be done through securing capacity from other generators if Entergy decides to shut the plant before 2019.

In a call with reporters, Mohl also said cash flows for Pilgrim, which employs about 630 people, is negative looking forward. Entergy has also warned that economics are tough for its James A. FitzPatrick nuclear power plant in New York, but Mohl said it's "premature" to discuss what will happen with that facility.

Although Massachusetts Gov. Charlie Baker (R) in the past has said the plant is part of his state's balanced energy portfolio, Entergy has been pressured by Sen. Ed Markey (D-Mass.), Attorney General Maura Healey (D) and former Gov. Michael Dukakis (D) to close the facility over safety concerns.

Some have also questioned whether Entergy can afford to continue safely operating the plant and storing nuclear waste. The company won't reveal its costs or revenues from the Pilgrim plant, but it said it's spent about $70 million upgrading it since Japan's 2011 Fukushima Daiichi disaster (*Greenwire*, Sept. 18).

Markey is a member of the Senate Environment and Public Works Committee, which has jurisdiction over NRC, and a longtime foe of nuclear power. He applauded Entergy's announcement, saying it could cost $100 million to bring the plant into compliance with NRC safety standards. The senator also doubled down on his criticism of nuclear power and called for Massachusetts to invest in wind, solar, geothermal power, efficiency and fuel-efficient vehicles.

"Pilgrim Nuclear Power Station is just the latest example of how nuclear power simply cannot compete in the current energy market," Markey said in a statement. "And alongside the economic conditions that Entergy blames this closure on, there also have been decades-long and repetitive operational safety and security concerns with the facility that have contributed to this announcement."

How the plant's closure will affect Massachusetts' ability to meet its climate goals is unclear.

Mark Kresowik, a regional director for the Sierra Club's Beyond Coal campaign, said the plant's closure would not affect the state's capacity of meeting its targets under U.S. EPA's Clean Power Plan.

The nine Northeastern states in the Regional Greenhouse Gas Initiative have signaled that they will submit a regional plan that uses RGGI as a compliance mechanism for the federal rule, meaning Massachusetts would not need to meet its targets alone. And RGGI's reduction target for 2020 is likely to be lower than the Clean Power Plan's targets for those states by 2030. So the Northeast can easily absorb the loss of Pilgrim's zero-carbon power.

EPA's rule requires states to submit preliminary plans starting next year, but they need not include detailed information about how states will meet their emissions-reduction obligations under the rule. Final plans are not due until 2018, a year before Pilgrim is slated to close.

But Emily Norton, chapter director of the Massachusetts Sierra Club, said the state's own more-stringent climate goals could be thrown into question by Pilgrim's closure. The Massachusetts Global Warming Solutions Act sets a state target of 25 percent reductions compared with 1990 levels by 2020. That compares with the Clean Power Plan's mandated 17.8 percent cut compared with 2005 levels by 2030.

"In general we're very pleased and have been advocating for the closure out of safety concerns, but this will in the short term bring some challenges to meeting our greenhouse gas reduction goals, no question about it," she said.

Massachusetts state lawmakers are considering a host of legislative solutions for raising energy production -- solar, hydropower, offshore wind and natural gas -- to offset high electricity costs in the Old Colony State.

Although the Pilgrim plant was providing a small amount of capacity in the state, Norton said the facility's output will need to be replaced and that highlights ongoing debates over the state's reliance on natural gas, controversial pipeline construction and just how much renewable investment should take place.

"We think the whole concept of having the electric customers pay for increased natural gas pipelines that will supposedly save us energy costs, we just think there needs to be a lot more analysis," Norton said.

'Deck is stacked'

Pilgrim joins a line of merchant nuclear power generators that have closed in recent months, blaming "flawed" market structures and warning that climate ramifications will follow.

Marvin Fertel, the Nuclear Energy Institute's president and CEO, said the Pilgrim closure -- despite the construction of five new reactors in the Southeast -- shows the "deck is stacked" against Pilgrim financially, even though it has generated carbon-free power and reliability in New England during extreme weather.

The closure, he said, shows that electricity markets in the Northeast are not working and do little to support aging reactors.

"Beyond literally being an electricity powerhouse for four decades, it has significantly helped improve the region's air quality and, to this day, has an important role to play in regional and national efforts to reduce greenhouse gas emissions in the electric sector," Fertel said. "There will be impacts to offset the loss of this around-the-clock source of carbon-free electricity."

Fertel noted that Dominion Resources Inc. closed the Kewaunee nuclear plant in northeast Wisconsin in 2013 and Entergy Nuclear shuttered the Vermont Yankee plant late last year because of economic pressures, closures that he said also call for market reforms. Exelon Corp., the country's largest nuclear operator, is now calling for legislation in Illinois to save its struggling plants there.

Entergy's Mohl today said the markets in the region are not "free and open" when others are subsidizing renewables and bolstering other energy sources. He also said it's "inappropriate" for Massachusetts' clean energy standard to exclude nuclear power and that the Clean Power Plant cannot work if existing reactors are removed from the market.

"You're basically picking winners and losers, and we don't think that's what a competitive market is intended to do," he said. "The consequences are the shutdown of viable facilities."

"It's another one bites the dust," Glenrock Associates analyst Paul Patterson said. "If you're a regulated nuclear plant or have a long-term [purchase power agreement], that's a different story. But if you're basically living by the revenues determined by the market, you face considerable risk due to competition."

Patterson said it's no surprise Pilgrim is closing and that merchant nuclear plants are facing cheap gas that's lowering power prices, pressure from subsidized renewables, weak demand for power, an influx of new competitive generation that's not subsidized, and regulated power competing with non-regulated generation.

Patterson said it would also appear to pose a question about the state's climate goals.

"It's carbon-free generation that will no longer be operational," he said, but he quickly added the state is taking steps to ramp up renewables and hydropower from Canada.

The region's grid operator could provide more clarity as early as next month. The New England ISO is

poised to issue a final plan in the coming weeks for meeting the region's electricity needs over the next 10 years (*EnergyWire*, Sept. 15).

Reporter Jean Chemnick contributed.

REGULATIONS:

Pollution violations more likely at public facilities -- study

Amanda Reilly, E&E reporter

Published: Tuesday, October 13, 2015

Government-owned entities are more likely to violate certain air and water regulations and less likely to receive sanctions than their private counterparts, according to a new study.

The study by researchers from Indiana University and Texas A&M University found that public power plants and hospitals were 9 percent more likely to violate Clean Air Act regulations than private-sector facilities.

And public water utilities had 14 percent more Safe Drinking Water Act health violations than private firms.

"We find consistent evidence that publicly owned facilities are more likely than similar privately owned facilities to violate regulatory requirements under the CAA and SDWA," the authors wrote. "We also revealed a tendency for enforcement officials to impose less severe punishment on public agencies violating the CAA and SDWA, when compared to similarly noncompliant private firms."

The study by Indiana University associate professor David Konisky and Texas A&M associate professor Manuel Teodoro was first published online last month in the *American Journal of Political Science*.

The researchers examined power plant and hospital records from 2000 to 2011 and water utility records from 2010 to 2013. They looked at more than 3,000 power plants, 1,000 hospitals and 4,200 water utilities -- both public and private.

According to the results, public facilities were both more likely to have committed violations of the air and water laws and less likely to have received sanctions than private facilities.

The study found that public power plants and hospitals were 20 percent less likely to be fined for violations of the Clean Air Act and 1 percent less likely to receive a punitive sanction.

Public water utilities were 3 percent less likely to be the subject of enforcement actions for violations of the Safe Drinking Water Act, compared to investor-owned utilities.

The authors theorized that was because public and private firms operate in different political environments.

"We argue that government agencies and private firms often face different compliance costs, and that agencies have greater incentives than firms to appeal regulations through political channels," the authors said. "Simultaneously, the typical enforcement instruments that regulators use to influence firm behavior may be less effective against governments."

The authors cautioned against assuming that privatization of public facilities in these sectors was the only solution.

Along with privatization, potential reforms could include subsidies and more aggressive enforcement mechanisms, they wrote.

In a statement, Konisky called for more research to see whether the trend extends to other environmental regulations.

"We also hope the idea of government regulating government will spark interest for research in other domains," he said. "We're investigating the environmental dimensions of the issue, but if other scholars want to pick up these ideas and investigate them in other spaces, that would be great."

FEDERAL AGENCIES:

Congressman offers bill to ban private email server use

Kevin Bogardus, E&E reporter

Published: Tuesday, October 13, 2015

Rep. Kevin Cramer (R-N.D.) has introduced legislation that would ban Cabinet secretaries from using private email servers for government business.

H.R. 3743, the "Securing Every Relevant and Vital Electronic Record Act of 2015," or SERVER Act, would prohibit the heads of executive departments from maintaining a private email server for conducting official business.

The bill comes after Hillary Clinton, considered the front-runner for the 2016 Democratic presidential nomination, used a private server for email while she served as secretary of State. Clinton's use of private email has become a headache for her campaign as questions have been raised over whether she complied with federal record-keeping and transparency laws.

In a statement, Cramer said his bill was in the interest of national security because government records are under attack from terrorist groups and foreign governments.

"Our nation's electronic communications and records are under constant cyber-attack by terrorist organizations and more frequently by foreign governments," Cramer said. "This legislation ensures no Department Secretary may use a private server for emails and storage of electronic data. It is in the interest of national security to ensure our nation's secrets and communications between our top leaders receive the highest level of protection."

Penalties would be stiff for those found violating the SERVER Act. A Cabinet secretary could face up to three years in prison, forfeit his or her office and be disqualified from serving again in government.

"The use of private email servers may inhibit the preservation of all records and electronic communications which may be needed for Congressional, civil or criminal investigations," Cramer said. "The SERVER Act will help ensure all records and communications are maintained and stored in compliance with federal law."

Clinton is not the only senior official who has had email troubles during the Obama administration. Former U.S. EPA Administrator Lisa Jackson also came under congressional scrutiny for her email practices

along with others at the Chemical Safety Board and IRS in recent years (*Greenwire*, March 3).

NEGOTIATIONS:

NATO calls for 'ambitious, legally-binding' climate agreement

Jean Chemnick, E&E reporter

Published: Tuesday, October 13, 2015

The North Atlantic Treaty Organization is the latest organization to weigh in on the need for the world to reach an ambitious agreement in Paris at the end of this year.

The intergovernmental military alliance of 28 nations is poised to adopt a resolution today during its annual Parliamentary Assembly meeting in Stavanger, Norway, that would urge members to pursue "an ambitious, legally-binding, rules-based, universal, flexible, balanced, sustainable and dynamic agreement" during this year's U.N. climate talks.

"In Paris, our governments must take actions that they will not regret in a few years' time," said Baroness Meta Ramsay, chairwoman of the Science and Technology Committee and member of the U.K. House of Lords, in a statement. She added that the Paris conference must not be a repeat of the Copenhagen, Denmark, talks five years ago that failed to produce a deal on emissions to follow the expiring Kyoto Protocol.

The resolution asks nations to make good on their national pledges to the U.N. Framework Convention on Climate Change, endorses proposals to periodically review those contributions after an agreement has been reached and calls for an overall goal of keeping warming to 1.5 or 2 degrees Celsius above preindustrial levels. Scientists say that threshold would allow the world to avoid the worst effects of climate change, but those who track the negotiations say current pledges fall far short of meeting the goal.

The NATO resolution also states that its nations are "fully convinced that climate change-related risks will affect international security through increased natural disasters; stress on economic, food and water security; risks to public health; internal and external migration; and resource competition."

It calls for greater engagement within NATO to respond to these security threats, including a heightened focus on warming during the alliance's summits going forward.

The resolution is one of eight the alliance will vote on today. Other topics include Ukraine and international terrorism -- more traditional areas of concern for the military alliance. But NATO's resolution is consistent with the U.S. military's heightened focus on climate change, which it has called a "threat multiplier."

PUBLIC OPINION:

70% of Americans now believe in climate change -- poll

Published: Tuesday, October 13, 2015

About 70 percent of Americans now believe in climate change science, according to a new survey -- the highest acceptance level since 2008.

The belief level rose 7 percentage points in the last half a year, according to polling by Muhlenberg College and the University of Michigan. The increase in acceptance was particularly notable among evangelical Christians and Republicans, the researchers said.

People appear to recognize the role that climate change is having on weather patterns, said co-author Barry Rabe, a professor from the University of Michigan. Many of the survey respondents noted weather events like droughts or floods close to home that influenced their opinion.

Support was also strong for renewable energy, energy efficiency measures and natural gas. Solar power had a 90 percent approval rating among respondents.

The survey was conducted shortly before Pope Francis' visit to the United States, which the authors noted appeared to have an effect on the results. About 15 percent of respondents said the pope's visit had made them more convinced regarding climate change (Emma Howard, London *Guardian*, Oct. 13). **-- BTP**

WIND:

Gusts damage turbine -- but not much else -- in Mont.

Published: Tuesday, October 13, 2015

Wind gusts Sunday in two Montana cities reached as high as 72 miles per hour, but except for a damaged wind turbine at Billings' City College campus, damage was moderate.

"We didn't really get a lot of damage reports, which is kind of odd," said Marc Singer, science and operations officer for the National Weather Service. "It was obviously a really windy day."

"Broken roofs, gutters, decks," Tom Yelvington, an arborist with Yellowstone Valley Tree Surgeons, said of the damage he'd seen. "Other storms we've looked at, there's been car damage and other things. But this one wasn't that bad really."

Taisei Tech, the maker of the turbine near the Montana State University campus, did not respond for comment (Mike Kordenbrock, *Billings Gazette*, Oct. 13). **-- BTP**

AIR POLLUTION:

Leonardo DiCaprio to produce movie about Volkswagen scandal

Published: Tuesday, October 13, 2015

Actor Leonardo DiCaprio and producer Jennifer Davisson have agreed to produce a Paramount movie about the Volkswagen diesel scandal.

Paramount had bought movie rights to a coming book by *New York Times* reporter Jack Ewing on the scandal, in which Volkswagen used illegal technology to selectively turn on emissions controls and cheat on U.S. EPA standards. While the vehicles were driving normally, the emissions controls would turn off, releasing up to 40 times more pollution than permitted (*Greenwire*, Sept. 18).

Volkswagen is potentially facing tens of billions of dollars in fines from EPA (*E&ENews PM*, Sept. 25).

No other details about the movie have been announced (Dave McNary, *Variety*, Oct. 12). **-- BTP**

ELECTRIC VEHICLES:

New Tesla could qualify for $35,000 in tax breaks

Published: Tuesday, October 13, 2015

Some buyers of Tesla Motors' new Model X could qualify for up to $35,000 in tax and rebate benefits, but a growing resentment toward tax benefits for upper-class Americans could cause a backlash.

"This is a high-priced vehicle that only wealthy people can buy," said Karl Brauer of Kelley Blue Book. "There are a lot of people who believe we have already done enough to help Tesla."

Section 179 of the Internal Revenue Service code allows small-business owners to receive a tax credit for purchasing heavy equipment. The "Hummer tax loophole" is limited to vehicles over 6,000 pounds, a limit the Model X will slightly surpass. This $25,000 tax credit comes on top of a $7,500 federal tax credit and a $2,500 California rebate for electric vehicle buyers.

Tesla founder Elon Musk has yet to announce a base price for the Model X, but the fully loaded "Signature Series" released last month cost $132,000.

"If a Realtor is buying a station wagon to drive clients around and show houses, that might be considered appropriate, but with a Tesla you are leaving that realm," said Steve Ellis, vice president of Taxpayers for Common Sense. "It's more of a toy, and they are abusing the system" (Fleming/Hirsch, *Los Angeles Times*, Oct. 13). **– BTP**

Power Plan Hub:

Regional groups look to carbon trading for Clean Power Plan

Emily Holden and Rod Kuckro, E&E reporters

Published: October 13, 2015

Regional coalitions of states that are exploring Clean Power Plan options are focusing heavily on whether carbon trading might help them meet their goals.

In the West, the Colorado-based Center for the New Energy Economy has organized states in the Western Electricity Coordinating Council, which spans from the coast to the eastern edge of Colorado. In the Midwest, the Bipartisan Policy Center is joining forces in coordinating sessions among states within the Midcontinent Independent System Operator. In the Southeast, Duke University's Nicholas Institute for Environmental Policy Solutions is holding similar state dialogues. And in the Mid-Atlantic, states in the PJM Interconnection have formed a new coalition to focus on the Clean Power Plan.

POWER PLAYS

Each Monday, **Power Plays** previews upcoming moves on the way to Clean Power Plan compliance and recaps the week's developments.

To read more about their discussions, check out this morning's *ClimateWire* and *EnergyWire* for dispatches from E&E's regional reporters.

With Congress in recess, the Clean Power Plan agenda of events is light this week.

Starting today, the National Summit on Smart Grid & Climate Change will explore the smart grid's role in plans developed for the Clean Power Plan. Speakers include Energy Secretary Ernest Moniz and top officials from the Office of Management and Budget and National Security Council, as well as representatives from state air and energy offices and a number of electric utilities.

In case you missed it:

- New York Gov. Andrew Cuomo (D) announced his state will "explore the possibility" of linking the Northeast's carbon cap-and-trade system with California's (*ClimateWire*, Oct. 9).

- The director of Georgia's Environmental Protection Division told a packed room of electric utility officials, policymakers, clean energy advocates and others to set aside their personal views of U.S. EPA's Clean Power Plan and help the Peach State draft a plan that would meet its carbon-reduction goals (*EnergyWire*, Oct. 9).

- Kentucky Attorney General Jack Conway, the Democratic nominee for governor in next month's election, promised not to implement the Clean Power Plan pending litigation against the rule (*Greenwire*, Oct. 8).

- North Carolina may limit Clean Power Plan implementation to actions "inside the fence line" of coal-fired power plants, meaning the state would likely fall short of its obligations (*EnergyWire*, Oct. 8).

- Fourteen attorneys general submitted a Freedom of Information Act request seeking evidence that EPA intentionally delayed the rule's publication (*ClimateWire*, Oct. 8).

For questions or comments about E&E's Power Plan Hub or related stories, please email staff reporters Emily Holden and Rod Kuckro at PowerPlanHub@eenews.net.

AN E&E PUBLISHING SERVICE

CLIMATEWIRE — Wed., October 14, 2015

READ FULL EDITION

1.POLITICS:

Climate change emerges as a central campaign theme for Democrats

The Democratic hopefuls for president vowed to embrace forceful measures to combat climate change in their curtain raising debate last night without explaining how they would enlist the help of Republican lawmakers needed to enact their ambitious plans.

2.NATIONS:

Mexico tries to bridge U.N. climate talks roadblocks

Where some are planning walls, others are planning windows. Or rather, pipelines. Across the dusty 1,954-mile border between Mexico and the United States, international companies are gearing up to spend more than $10 billion on thousands of miles of steel tubes carrying cheap natural gas from Texas to hungry markets on the other side of the Rio Grande.

TODAY'S STORIES

3.EMISSIONS TRADING:
Calif. carbon offsets face slowdown in market development

4.WILDFIRES:
Climate skeptics more likely to prepare for wildfires -- study

5.ADVOCACY:
'Day of Action' mobilizes social justice activism on climate change

6.OCEANS:
Study of past climate shifts may provide a preview of impacts from warming Arctic

7.REGULATION:
Natural gas overreliance could cost customers, advocacy group warns

8.BUILDINGS:
Solar combined with battery storage can help low-income housing

9.REGULATION:
Utilities back Clean Power Plan as market pushes them away from coal

10.OCEANS:
Climate change may cause 'species collapse,' wipe out popular fish -- study

11.NEGOTIATIONS:
E.U. climate chief praises global emission pledges

12.PEOPLE:
Professor who issued dire environmental warnings turns optimistic about climate change

E&ETV'S ONPOINT

13.INTERNATIONAL:
CCAP's Helme discusses need for private financing to meet Paris goals

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ENERGYWIRE — Wed., October 14, 2015

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TOP STORIES

2.OIL:

Drillers face revaluation, with more financial woes in store

3.EARTHQUAKES:

EPA recommends further restrictions on Okla. disposal wells

4.ARCTIC:

Anti-drilling activists switch focus to Hilcorp

ELECTRICITY

5.TRANSMISSION:

Grid operators settle dispute over shared systems use

6.NATURAL GAS:

Fla., other gas-dependent states could leave ratepayers on the hook -- report

7.PEOPLE:

Attorney with FERC experience joins D.C. law firm

8.MICHIGAN:

25 coal plants retiring

9.UTILITIES:

Appalachian Power looks to shut 2 coal plants

OIL AND GAS

10.LAW:

Feds, tribe in settlement talks over fracking rule

11.NORTH DAKOTA:

HBO comedian John Oliver censures 'horrifying' Bakken regulatory environment

12.OFFSHORE DRILLING:

Mexico considers suspending deepwater efforts

13.ADVOCACY:

Texans keep up fight for cities' rights to ban fracking

14.WORKFORCE:

Oil field companies cut pay to avoid layoffs

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15.INTERNATIONAL:

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To: Stewart, Lori[Stewart.Lori@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/14/2015 2:55:13 PM
Subject: Re: Post VW call

This will keep til Friday

Sent from my iPhone

On Oct 14, 2015, at 10:17 AM, Stewart, Lori <Stewart.Lori@epa.gov> wrote:

> Janet and Chris, given the RFS and ICAO EEOB meetings it will be tough to have a call on VW after 4:00 tomorrow, unless you want to try to do it from EEOB between those meetings, from 5:30 to 6? Looks like Janet has a half hour open on Friday at 12:30 as an alternative.

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Wed 10/14/2015 3:16:39 PM
Subject: Volkswagen Clips 10/14/2015

AP (via Richmond Times-Dispatch):

http://www.richmond.com/news/national-world/article_d1bb33cb-66de-5b25-8782-053e6824d9eb.html

2016 VW diesels have new software affecting emissions tests

Posted: Wednesday, October 14, 2015 10:15 am

WASHINGTON (AP) — Volkswagen has disclosed to U.S. regulators that there is additional suspect software in its 2016 diesel models that would potentially help their exhaust systems run cleaner during government tests.

Volkswagen confirmed to The Associated Press that the "auxiliary emissions control device" at issue operates differently from the "defeat" device software included in the company's 2009 to 2015 models disclosed last month. That disclosure triggered the worldwide cheating scandal engulfing the world's largest automaker.

The newly revealed software makes a pollution control catalyst heat up faster, improving performance of the device that separates smog-causing nitrogen oxide into harmless nitrogen and oxygen gases.

VW spokeswoman Jeannine Ginivan said the new issue with the 2016 vehicles was first revealed last week to U.S. Environmental Protection Agency and California regulators.

"Volkswagen has disclosed, in the application process for the model year 2016 2.0 TDI models, an auxiliary emissions control device," Ginivan said. "This has the function of a warmup strategy which is subject to approval by the agencies. The agencies are currently evaluating this and Volkswagen is submitting additional information."

AP first reported last week that the EPA and California Air Resources Board are investigating "the nature and purpose" of additional software on the new VW models. Regulators have not yet determined whether the code is a defeat device installed specifically to cheat on emissions tests, said Janet McCabe, acting assistant EPA administrator for air quality.

"We have a long list of questions for VW about this," she said Tuesday at a dedication ceremony for a new heavy-duty truck testing lab in Ann Arbor, Michigan. "We're getting some answers from them, but we do not have all the answers yet."

Volkswagen already faced an ongoing criminal investigation and billions in fines for violating the Clean Air Act for its earlier emissions cheat, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

If it is determined the new issue is a second defeat device, that would call into question recent assertions by top VW executives that responsibility for the cheating scheme lay with a handful of rogue software developers who wrote the original code installed with the company's diesel engines starting with the 2009 model year.

The separate device included in the redesigned 2016 cars would appear to suggest a multi-year effort by the company to influence U.S. emissions tests that continued even after regulators began pressing the company last year about irregularities with the emissions produced by the older cars.

A congressional staffer briefed on the issue last week told AP that VW probably didn't need the additional software to meet government emissions standards, but that the device appears intended to ensure the 2016 cars would pass by wider margins. The staffer spoke on the

condition of anonymity because he was not authorized to talk publicly about the ongoing investigation.

The company's most senior U.S.-based executive announced in congressional testimony last week that the German automaker had withdrawn applications seeking certification of its 2016 diesels because of on-board software that hadn't been disclosed to regulators.

However, the statement by Volkswagen of America CEO Michael Horn left unclear whether the issue with the 2016 models was the same as that in the earlier models, or whether it potentially constituted a new violation. Manufacturers are required by law to disclose any devices affecting emissions controls as part of the process to receive the EPA certifications required to sell the cars in the country.

EPA's McCabe wouldn't say if VW's failure to disclose the software in its 2016 application for emissions certification was illegal. "I don't want to speak to any potential subjects of an enforcement activity," she said.

VW is now working with regulators to continue the certification process needed to sell the 2016 diesel cars.

The delay is bad news for Volkswagen dealers, who had been anticipating delivery of the new models to replace older inventory which they can no longer offer to customers. Thousands of 2016 Beetles, Golfs, Jettas and Passats will remain quarantined in U.S. ports until a fix can be developed, approved and carried out.

Matthew Daly contributed from Washington. Krisher reported from Ann Arbor, Michigan.

Fortune

http://fortune.com/2015/10/14/dozens-of-managers-implicated-in-volkswagen-scandal/

"Dozens" of managers implicated in Volkswagen scandal

by Geoffrey Smith

OCTOBER 14, 2015, 10:37 AM EDT

And there's more woe for VW as the designated head of its new North America region refuses to take up post.

The external investigation that Volkswagen AG VLKAY 0.41% commissioned is making alarmingly quick (and leaky) progress.

According to the German magazine and website Der Spiegel, the circle of managers with direct knowledge of how the company falsified the emissions performance of its diesel vehicles is much wider than the company had so far indicated. Last week, Michael Horn, head of the company's U.S. operations, had told a Congressional committee that the decision to install "defeat devices" that masked the actual level of emissions was taken by a small group, and wasn't a corporate decision.

Der Spiegel cited company sources as saying that "at least 30 people" were involved in the scandal, and that the final number may be higher. Earlier this month, VW's board had commissioned law firm Jones Day LLC to conduct an investigation into the affair, promising a rigorous clean-up. Spiegel's story referred to the first preliminary findings of that investigation. These aren't being made public yet.

It wasn't clear whether the company had suspended any more employees. According to media reports, the senior R&D managers at the group's three leading brands, VW, Audi and Porsche, have all been suspended while the investigation goes on.

A spokesman for Volkswagen didn't immediately respond to a request for comment.

In separate news Wednesday, it emerged that Winfried Vahland, who was slated to take over as head of the VW group's new North American division, is to leave the company at his own request.

The new structure was unveiled at the first board meeting after the resignation of CEO Martin Winterkorn, and was aimed at devolving more power away from the group's headquarters in Germany.

Škoda, the low-end, Czech-based unit of VW which Vahland has run for the last five years, said "differing views on the organisation of the new Group region have led to this decision." It added that it is "expressly not related to current events on the issue of diesel engines."

Vahland had been with the VW group for 25 years, and had run Czech-based Škoda since 2010. Before that he had been head of VW's regional operations in China. According to some reports, Winterkorn had pressed for Vahland to succeed him as CEO.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:17 AM
To: Allen, Laura
Subject: RE: Volkswagen Clips 10/14/2015

AP (via Chattanooga Free Time Press):

http://www.timesfreepress.com/news/breakingnews/story/2015/oct/14/after-pollution-scandal-volkswagen-focus-electric-vehicles/330444/

After pollution scandal, Volkswagen to focus on electric vehicles

October 14th, 2015 by Associated Press

The all-new Chattanooga built VW Passat TDI cruises on East Brow Road atop Signal Mountain early Wednesday afternoon. Staff photo by Dan Henry/Chattanooga Times Free Press

Volkswagen says it will shift its focus toward developing electric cars.

It aims to develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

Diess also said the company would reduce spending on investments by 1 billion euros ($1.1billion) and redouble efforts to cut other costs.

Volkswagen will expand its modular construction system — which involves sharing technical specifications and parts across different models to save money — to include new plug-in hybrid and electric vehicles.

The company additionally plans to turn the next version of its large Phaeton luxury sedan into an electric-only vehicle to demonstrate the company's technological competence.

The Phaeton, a project introduced by former CEO Ferdinand Piech, has been criticized as a money-loser. The Piech and Porsche families own the majority of voting shares in Volkswagen through a holding company.

"The Volkswagen brand is repositioning itself for the future," Diess said in a statement. "We are becoming more efficient, we are giving our product range and our core technologies a new focus, and we are creating room for forward-looking technologies by speeding up the efficiency program."

Diess is a recent hire from competitor BMW, where he oversaw development of new models including the i3 electric and i8 plug-in hybrid vehicles.

Volkswagen AG, whose other brands include Audi and Skoda, is facing a crisis after U.S. authorities said it evaded emissions checks on 482,000 vehicles. The company has set aside 6.5 billion euros ($7.3 billion) to cover the costs of recalls and fines. But analysts say the costs in terms of fines and lost sales will likely be considerably higher.

Earlier, the governor of Germany's Lower Saxony state, which holds a 20 percent stake in Volkswagen, said the automaker should have admitted earlier that it manipulated emissions data in the U.S. Volkswagen acknowledged the deception to U.S. regulators on Sept. 3, more than a year after researchers published a study showing the real-world emissions of two VW models were far higher than allowed.

Governor Stephan Weil told Lower Saxony's state legislature on Tuesday that "this confession should clearly have come a great deal earlier — another serious mistake," news agency dpa reported.

Weil sits on Volkswagen's board of directors. He has said that the state's representatives were "completely surprised" by the emissions scandal and vowed to work to protect jobs.

WSJ:

http://www.wsj.com/articles/volkswagen-north-america-chief-designate-quits-1444827950

Volkswagen North America Chief-Designate Quits

Winfied Vahland was head of Skoda brand

By SARAH SLOAT

Oct. 14, 2015 9:05 a.m. ET

FRANKFURT— Volkswagen AG parted ways with another senior executive Wednesday. Winfried Vahland is leaving the company due to differences over the auto maker's North America organization, which he was poised to oversee.

The automotive group, in the grips an international emissions-testing scandal, had designated Mr. Vahland, currently the head of Volkswagen's Czech Republic-based Skoda brand, as the new chief of its North America business last month.

"This decision is expressly not related to current events on the issue of diesel engines," Skoda said in a statement. Skoda said Mr. Vahland is leaving at his own request.

Volkswagen has been in disarray since mid-September, when it admitted to using software in millions of diesel cars that allow them to run cleaner in emissions tests than on the road. The disclosure, which came first for cars sold in the U.S., triggered a boardroom reshuffle, a profit warning and cutbacks in investment spending.

The group's supervisory board elected Hans Dieter Pötsch, the company's 64-year-old chief financial officer, as chairman last week, filing a post left open since April when former patriarch Ferdinand Piëch resigned. Matthias Müller, head of Volkswagen's Porsche brand, had replaced Martin Winterkorn as Volkswagen's CEO after Mr. Winterkorn resigned last month in the wake of the diesel-engine scandal.

From: Gong, Kristiene

Sent: Wednesday, October 14, 2015 10:02 AM
To: Allen, Laura
Subject: Volkswagen Clips 10/14/2015

USA Today:

http://www.usatoday.com/story/money/cars/2015/10/14/new-volkswagen-north-america-chief-winfried-vahland-out-after-three-weeks/73916418/

New Volkswagen North America chief Winfried Vahland out after three weeks

Nathan Bomey, USA TODAY 9:19 a.m. EDT October 14, 2015

Volkswagen's newly appointed head of North America is leaving the company less than three weeks after he was assigned to that position, injecting a new measure of instability as the company navigates an emissions scandal.

The sudden exit of Winfried Vahland gives the company's sweeping restructuring of its global operations a discombobulated feel, raising further questions about the future of its business in the U.S.

Vahland and Volkswagen had "differing views" on the company's new structure, the automaker said in a statement. His exit is "expressly not related" to the emissions scandal, VW said.

Vahland's swift appointment as head of the new North America region on Sept. 25 was billed as critical to creating a cohesive strategy for Volkswagen in one of the company's few weak spots. It came just a week after the U.S. Environmental Protection Agency exposed the fact that Volkswagen had installed software on vehicles to cheat emissions tests.

The company's U.S. chief, Michael Horn, who was set to report to Vahland, is staying in his current role.

Volkswagen did not immediately name a successor for Vahland, who also led Volkswagen's China operation for a period and was most recently chairman of the Skoda brand.

"In the last 25 years, Professor Vahland made a great contribution to the company," Volkswagen Group CEO Matthias Mueller said in a statement. "We respect his decision and thank him for his exceptional performance."

AP

http://bigstory.ap.org/article/24588210332a4d0b8f19490d0c9649e6/recently-named-head-vw-north-america-will-not-take-post

Recently named head of VW North America will not take post

By DAVID McHUGH and TOM KRISHER

Oct. 14, 2015 9:38 AM EDT

FRANKFURT, Germany (AP) — The recently named head of Volkswagen's North American business won't be taking up his new job - and has left the company.

The announcement comes as Volkswagen faces a scandal over rigging the results of emissions testing of its diesel vehicles in the U.S. It means that one of the company's most experienced managers will not be coming to lead the company's response in the United States as it faces possible heavy fines from the Environmental Protection Agency.

Volkswagen's Skoda division made the announcement about its chairman, Winfried Vahland, in a news release on Wednesday.

The release said that Vahland will not be moving to take over his new position carrying overall responsibility for North America. It said his decision to quit was not related to the scandal over the diesel engines.

On Sept. 24, Volkswagen announced a reorganization of its North American operations that put Vahland over country executives including Volkswagen's U.S. chief, Michael Horn. The announcement came the same day Volkswagen named Matthias Mueller as CEO after Martin Winterkorn stepped down from the job.

VW had said Horn would remain as president and CEO of Volkswagen Group of America, but its U.S., Canada and Mexico markets will be "combined and significantly strengthened" to form a new "North America region" led by Vahland.

Vahland, the former head of VW's crucial China business, was leaving because of "differing views on the organization of the new group region."

Mueller thanked him for 25 years of service and a "great contribution to the company."

"We respect his decision and thank him for his exceptional performance," Mueller was quoted as saying in the Skoda statement.

Skoda, based in the Czech Republic, is one of VW's brands, which also include Audi, SEAT, Lamborghini and Bentley.

Forbes:

http://www.forbes.com/sites/beltway/2015/10/13/how-a-carbon-tax-could-have-prevented-the-volkswagen-diesel-scandal/2/

How A Carbon Tax Could Have Prevented The Volkswagen Diesel Scandal

Howard Gleckman, CONTRIBUTOR

If anyone needed another example of why a carbon tax is a good idea, look no further than Volkswagen's diesel scandal. The automaker's efforts to game the current system are a case study in what's wrong with government attempts to reduce pollution with regulation and tax subsidies, rather than through a relatively straight-forward tax on carbon-based fuels.

The current system is complex mix of environmental carrots and sticks. The sticks include regulation such as fuel economy standards. The carrots include tax subsidies. One was the (now-expired) alternative motor vehicle tax credit that was available to specific models that met detailed fuel economy requirements. Two models of VW Jettas qualified for credits of $1,300 and the LA Times reported in September that the government paid as much as $51 million in credits to buyers of VW diesel cars.

Unable to limit emissions, give consumers the high performance they want, and meet fuel economy standards, VW cheated. As you know by now, the firm installed software in its diesel cars designed to fool routine emissions tests—which made the cars appear "cleaner" than they really were. In all, VW reportedly sold 500,000 cars in the US from 2009-2015 with the rogue software. Here is a helpful description from Vox explaining the whole sad story.

VW eventually got caught, of course. It faces penalties from EPA and potential criminal charges for violating the False Claims Act, as well as an investigation by the Senate Finance Committee. CEO Martin Winterkorn has resigned and the firm has stopped selling diesel cars in the US.

Still, a lot of this mess could have been avoided with a carbon tax. Such a levy could replace many—though not all– of these complex rules and eliminate most incentives for gaming. A carbon tax would not help reduce local air pollutants such as NOx so it would not replace all auto pollution regulations. But it could supplant those that aim to reduce carbon emissions from vehicles.

For drivers, the choice would be relative simply: You buy a carbon-based fuel, you pay a tax. The more carbon in the fuel, the more tax you pay. The manufacturer wouldn't need to hit a mandated fuel economy standard. No-one would need to worry about conflicting regulations.

Instead, consumers would likely respond to higher taxes by demanding cars that, one way or another, use less carbon-based fuel. We have lots of evidence that consumers are extremely responsive to changes in gasoline prices—the price goes up, they buy Priuses; it goes down, they switch to less fuel-efficient vehicles.

And with a big carbon tax, manufacturers will probably respond to consumer demands by producing low-carbon vehicles. The proof will be at the pump. If an automaker lies about its fuel efficiency, it will be immediately obvious: Consumers will be filling up their tanks more often than they expected. And government won't have to test carbon emissions from tens of millions of cars. It will just need to calculate the carbon content of their fuel.

There is one other classic argument for corrective taxes such as a carbon tax. Such a levy provides ongoing incentives for firms to enhance technology and continue to drive down emissions. But with regulation or subsidies, even honest producers are more likely to hit the mandated target—and stop.

This is not to suggest that carbon taxes are not without their own complex issues. My Tax Policy Center colleagues Donald Marron and Eric Toder have described some of the technical challenges. But overall, market mechanisms such as carbon taxes (or a cap-and-trade system) are far more efficient, and much less prone to cheating, than a system based on regulations and subsidies.

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-14/volkswagen-s-designated-north-america-chief-leaves-carmaker

Volkswagen's Designated North America Chief Leaves Carmaker

Christoph Rauwald

October 14, 2015 — 8:58 AM EDT

Volkswagen AG's designated North America chief turned down the job in the wake of a management revamp triggered by the diesel-emissions scandal.

Winfried Vahland, a company veteran who currently leads VW's Czech Skoda unit, decided to not take over the new post as had been planned and will leave the carmaker, Skoda said in an e-mailed statement.

Vahland was among the candidates to succeed former VW Chief Executive Officer Martin Winterkorn, who resigned last month, but the supervisory board favored former Porsche chief Matthias Mueller. Vahland is leaving Wolfsburg, Germany-based Volkswagen at his own request. His departure is unrelated to the investigations into the rigging of millions of diesel engines worldwide, Skoda said in the statement.

Volkswagen said Tuesday it will reduce annual investment by about 1 billion euros ($1.1 billion) at its namesake car brand as the automaker steps up a cost-cutting push to weather the impact of the diesel-emissions scandal.

VW is under increasing financial strain following revelations last month that it rigged diesel engines to circumvent emissions regulations. The company set aside 6.5 billion euros for repairs and to compensate customers, but has said that won't be enough. VW faces numerous lawsuits in the U.S., where it has lost money and struggled to become more than an also-ran despite rapid expansion elsewhere.

Vahland was appointed head of VW's North American operations as part of a restructuring plan pushed by Mueller and meant to shift more responsibility to brand and regional managers. VW wasn't immediately available to comment on whether it still planned to fill the post.

Business Insider:

http://www.businessinsider.com/r-bosch-sees-diesel-market-so-far-unharmed-by-volkswagen-scandal-2015-10

Bosch sees diesel market so far unharmed by Volkswagen scandal

RENNINGEN, Germany (Reuters) - German automotive supplier Robert Bosch [ROBG.UL] has not seen any change so far in the diesel car market as a result of an emissions scandal that has rocked Volkswagen , its chief executive said on Wednesday.

"It will depend, though, on an active campaign for diesel to quickly dispel the current uncertainty that many consumers are feeling," Volkmar Denner told reporters at the opening of a new research center in the German town of Renningen near Stuttgart.

German Economy Minister Sigmar Gabriel warned against condemning diesel technology overall but said Germany needed to do better in switching to alternative engines.

He said he favored introducing incentives to reduce the price difference between electric and conventional cars.

Volkswagen, Europe's largest carmaker, last month admitted to cheating U.S. diesel emissions tests, sparking a crisis that unseated its CEO and wiped around a quarter off its market value.

Bosch is the maker of a popular diesel engine management program used by several top automakers including VW, which U.S. officials said last week was not preprogrammed to detect when a vehicle was undergoing laboratory emissions testing.

But it is not clear what role Bosch played, how closely it worked with VW to modify the engine management software and how much it knew about VW's intentions to use software to cheat on emissions standards.

Denner declined to comment on the matter.

He added that VW had not started talks to demand lower prices, following a media report that VW planned to extract 3 billion euros in price cuts from its suppliers to help mitigate the costs of the scandal.

(Reporting by Ilona Wissenbach; Writing by Georgina Prodhan; Editing by Louise Heavens)

Detroit News:

http://www.detroitnews.com/story/business/autos/2015/10/13/ann-arbor-epa-lab-diesel-tests-vw-scandal/73888296/

Ann Arbor EPA lab tests other cars after VW scandal

Michael Martinez, The Detroit News 5:05 p.m. EDT October 13, 2015

Ann Arbor — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.

Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and rental companies in real-world driving conditions. The EPA also could take cars from manufacturers'

assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be testing a range of vehicles with a range of configurations and situations," McCabe told reporters at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle &

Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions

Reuters:

http://www.reuters.com/article/2015/10/13/us-volkswagen-emissions-epa-idUSKCN0S72R120151013

EPA hasn't decided if new software on 2016 VW diesels is legal

ANN ARBOR, MICH. | BY PAUL LIENERT

U.S. regulators haven't determined the legality of a new emission-control device on Volkswagen's (VOWG_p.DE) 2016 diesel models, a top official said on Tuesday.

Those models still have not been certified for sale by the U.S. Environmental Protection Agency.

The existence of the new software was made public last week by VW's top U.S. executive in testimony to a congressional subcommittee investigating the German automaker's diesel cheating scandal.

The company has not confirmed speculation that the new software was configured before the wider emissions scandal broke on Sept. 18.

"We have a long list of questions for VW," said EPA Assistant Administrator Janet McCabe at a media briefing here. "When we have all of the answers, we will be able to make a determination" on the whether the device is legal or considered to be a "defeat device" designed to circumvent U.S. emission rules.

VW last month admitted that it installed illegal software on its 2009-2015 U.S. diesel models that enabled the cars to pass laboratory tests, but dump higher-than-legal limits of pollutants in real-world driving.

VW told regulators only recently that some of its U.S. diesel models included a previously undisclosed software feature that could affect emission controls on the 2016 models, according to Michael Horn, president and CEO of Volkswagen Group of America. Horn told U.S. lawmakers last week that the company subsequently had withdrawn its application for EPA certification of its 2016 diesel models.

Asked for additional detail, a VW spokesperson on Monday said the software "has the function of a warmup strategy which is subject to approval" by EPA. Typical diesel emission control systems are designed to be most effective when the engine is warmed up.

The EPA defines such software as an "auxiliary emission control device," or AECD, and describes it as any device that can change the operation of the vehicle's emission control system.

The agency also requires automakers to disclose the existence of such a software device, including "a rationale for why it is not a defeat device."

VW on Monday said the EPA is evaluating the new software device, and that the automaker is "working with the regulators to continue the 2016 certification process" for VW vehicles equipped with the 2.0-liter diesel engine.

Daily Caller:

http://dailycaller.com/2015/10/13/volkswagen-lobbied-obama-administration-for-green-tax-credits/

Volkswagen Lobbied Obama Administration For Green Tax Credits

STEVE BIRR

11:41 AM 10/13/2015

As President Barack Obama pushed his green energy proposals for the auto-industry in 2011, Volkswagen was lobbying the administration for tax credits on its now tainted line of diesel vehicles.

Volkswagen wanted a green tax credit that applies to electric cars to be given to their diesel line as well. The Environmental Protection Agency, however, refused to go along with Volkswagen's plan and also declined Toyota's request to apply the same tax credit to their hybrid electric cars.

EPA documents from 2009 and 2010 show that Volkswagen supported the Obama administration's plan to reduce carbon dioxide emissions from automobiles. Former VW CEO Stefan Jacoby wrote to the EPA in 2010 praising their "leadership on this important subject." Jacoby, along with the EPA and other auto-makers, said they would "aim to make substantial annual progress in reducing transportation sector greenhouse gas emissions and fossil fuel consumption consistent with the Obama Administration's energy and climate security goals."

While Volkswagen was publicly backing White House efforts to tackle global warming and push green vehicles, the automaker was quietly lobbying behind the scenes to get government subsidies — the political price for the company's support of Obama's agenda. But the EPA refused to play ball, and Volkswagen withdrew its support for Obama's green vehicle push, according to The New York Times.

Margo Oge, the former director of the EPA Office of Transportation and Air Quality who worked closely with auto-makers on these proposals, told The New York Times that Volkswagen "wanted a special deal for diesel cars that we now know weren't even meeting the standard." Oge suggested that Volkswagen thought their diesel technology was superior to electric or hybrid alternatives, saying, "These people had religion, and that religion was diesel."

When Obama announced his plan to reduce carbon dioxide emissions from cars, Volkswagen was one of the only major automakers to not sign a letter of support for the president's agenda. The New York Times reports that much of this attitude came from overseas.

"My sense was that things were being dictated by Germany," said Oge.

Without a tax credit or subsidy, Volkswagen was going to have a tougher time meeting regulatory standards on emissions while still being able to advertise their diesel vehicles' good fuel economy and relatively low price. These reasons might have played a role in Volkswagen using "defeat devices" to get around EPA emissions tests.

Despite Volkswagen's efforts to get government assistance for their diesel line, their lobbying footprint in America remains relatively small, which could hurt them as this scandal moves forward. Volkswagen spent just $1.2 million on lobbying in 2014, a number dwarfed by General Motors which spends an average of $8.5 million a year on lobbying.

GM just recently settled with the government over the fact that they knowingly hid information about a faulty ignition switch that was linked directly to the deaths of 174 people. They were fined only $900 million and no one at GM was ever charged. Volkswagen currently faces up to $18 billion in potential fines.

To: Stewart, Lori[Stewart.Lori@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
From: Grundler, Christopher
Sent: Wed 10/14/2015 2:55:13 PM
Subject: Re: Post VW call

This will keep til Friday

Sent from my iPhone

On Oct 14, 2015, at 10:17 AM, Stewart, Lori <Stewart.Lori@epa.gov> wrote:

> Janet and Chris, given the RFS and ICAO EEOB meetings it will be tough to have a call on VW after 4:00 tomorrow, unless you want to try to do it from EEOB between those meetings, from 5:30 to 6? Looks like Janet has a half hour open on Friday at 12:30 as an alternative.

From: Atkinson, Emily
Required Attendees: Hengst, Benjamin; Bunker, Byron; Grundler, Christopher; Stewart, Lori
Location: WJC-N 5400 + Dial: 1-202-564-1700; Conference ID: Non-Responsive ; Participant Code: Non-Responsive
Importance: High
Subject: Canceled: VW Discussion
Start Date/Time: Fri 10/16/2015 4:30:00 PM
End Date/Time: Fri 10/16/2015 5:00:00 PM
Re: Post VW call

To: McCabe, Janet; Grundler, Chris; Hengst, Ben; Bunker, Byron; Stewart, Lori

To: Stewart, Lori[Stewart.Lori@epa.gov]
Cc: McCabe, Janet[McCabe.Janet@epa.gov]; Atkinson, Emily[Atkinson.Emily@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]
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To: Atkinson, Emily[Atkinson.Emily@epa.gov]
From: Huffman, Linda
Sent: Wed 10/7/2015 1:04:38 PM
Subject: Today's Meeting Participants

Cynthia Giles

Phillip Brooks

Evan Belser

Rosemarie Kelley

Susan Shinkman

Linda Huffman

Executive Assistant

Office of Enforcement and Compliance Assurance

U.S. EPA

Washington, D.C. 20460

202-564-3139

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202-564-3139

From: McCabe, Janet
Required Attendees: Grundler, Christopher; Hengst, Benjamin; Bunker, Byron; Giles-AA, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan; Werner, Jacqueline; Niebling, William
Optional Attendees: Huffman, Linda; Cook, Leila; Kaul, Meetu
Location: Conference Call 1-866-299-3188; Participant Code: Non-Responsive
Importance: Normal
Subject: VW Update
Categories: Green Category
Start Date/Time: Fri 10/16/2015 4:30:00 PM
End Date/Time: Fri 10/16/2015 5:00:00 PM
Today's Meeting Participants

To: Grundler, Christopher; Hengst, Benjamin; Bunker, Byron; Giles-AA, Cynthia; Brooks, Phillip; Belser, Evan; Kelley, Rosemarie; Shinkman, Susan; Werner, Jacqueline; Niebling, William
Cc: Huffman, Linda; Cook, Leila; Kaul, Meetu
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Cc: Purchia, Liz[Purchia.Liz@epa.gov]; Allen, Laura[Allen.Laura@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Conger, Nick
Sent: Wed 10/14/2015 3:35:08 PM
Subject: FW: Volkswagen Clips 10/14/2015

Ex. 5, 7

We also need to respond to additional WSJ questions, per my last email.

Nick

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 11:17 AM
To: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia; Purchia, Liz
Subject: Volkswagen Clips 10/14/2015

AP (via Richmond Times-Dispatch):

http://www.richmond.com/news/national-world/article_d1bb33cb-66de-5b25-8782-053e6824d9eb.html

2016 VW diesels have new software affecting emissions tests

Posted: Wednesday, October 14, 2015 10:15 am

WASHINGTON (AP) — Volkswagen has disclosed to U.S. regulators that there is additional suspect software in its 2016 diesel models that would potentially help their exhaust systems run cleaner during government tests.

Volkswagen confirmed to The Associated Press that the "auxiliary emissions control device" at issue operates differently from the "defeat" device software included in the company's 2009 to 2015 models disclosed last month. That disclosure triggered the worldwide cheating scandal engulfing the world's largest automaker.

The newly revealed software makes a pollution control catalyst heat up faster, improving performance of the device that separates smog-causing nitrogen oxide into harmless nitrogen and oxygen gases.

VW spokeswoman Jeannine Ginivan said the new issue with the 2016 vehicles was first revealed last week to U.S. Environmental Protection Agency and California regulators.

"Volkswagen has disclosed, in the application process for the model year 2016 2.0 TDI models, an auxiliary emissions control device," Ginivan said. "This has the function of a warmup strategy which is subject to approval by the agencies. The agencies are currently evaluating this and Volkswagen is submitting additional information."

AP first reported last week that the EPA and California Air Resources Board are investigating "the nature and purpose" of additional software on the new VW models. Regulators have not yet determined whether the code is a defeat device installed specifically to cheat on emissions tests, said Janet McCabe, acting assistant EPA administrator for air quality.

"We have a long list of questions for VW about this," she said Tuesday at a dedication ceremony for a new heavy-duty truck testing lab in Ann Arbor, Michigan. "We're getting some answers from them, but we do not have all the answers yet."

Volkswagen already faced an ongoing criminal investigation and billions in fines for violating the Clean Air Act for its earlier emissions cheat, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

If it is determined the new issue is a second defeat device, that would call into question recent assertions by top VW executives that responsibility for the cheating scheme lay with a handful of rogue software developers who wrote the original code installed with the company's diesel engines starting with the 2009 model year.

The separate device included in the redesigned 2016 cars would appear to suggest a multi-year effort by the company to influence U.S. emissions tests that continued even after regulators began pressing the company last year about irregularities with the emissions produced by the older cars.

A congressional staffer briefed on the issue last week told AP that VW probably didn't need the additional software to meet government emissions standards, but that the device appears intended to ensure the 2016 cars would pass by wider margins. The staffer spoke on the condition of anonymity because he was not authorized to talk publicly about the ongoing investigation.

The company's most senior U.S.-based executive announced in congressional testimony last week that the German automaker had withdrawn applications seeking certification of its 2016 diesels because of on-board software that hadn't been disclosed to regulators.

However, the statement by Volkswagen of America CEO Michael Horn left unclear whether the issue with the 2016 models was the same as that in the earlier models, or whether it potentially constituted a new violation. Manufacturers are required by law to disclose any devices affecting

emissions controls as part of the process to receive the EPA certifications required to sell the cars in the country.

EPA's McCabe wouldn't say if VW's failure to disclose the software in its 2016 application for emissions certification was illegal. "I don't want to speak to any potential subjects of an enforcement activity," she said.

VW is now working with regulators to continue the certification process needed to sell the 2016 diesel cars.

The delay is bad news for Volkswagen dealers, who had been anticipating delivery of the new models to replace older inventory which they can no longer offer to customers. Thousands of 2016 Beetles, Golfs, Jettas and Passats will remain quarantined in U.S. ports until a fix can be developed, approved and carried out.

Matthew Daly contributed from Washington. Krisher reported from Ann Arbor, Michigan.

Fortune

http://fortune.com/2015/10/14/dozens-of-managers-implicated-in-volkswagen-scandal/

"Dozens" of managers implicated in Volkswagen scandal

by Geoffrey Smith

OCTOBER 14, 2015, 10:37 AM EDT

And there's more woe for VW as the designated head of its new North America region refuses to take up post.

The external investigation that Volkswagen AG VLKAY 0.41% commissioned is making alarmingly quick (and leaky) progress.

According to the German magazine and website Der Spiegel, the circle of managers with direct knowledge of how the company falsified the emissions performance of its diesel vehicles is much wider than the company had so far indicated. Last week, Michael Horn, head of the company's U.S. operations, had told a Congressional committee that the decision to install "defeat devices" that masked the actual level of emissions was taken by a small group, and wasn't a corporate decision.

Der Spiegel cited company sources as saying that "at least 30 people" were involved in the scandal, and that the final number may be higher. Earlier this month, VW's board had commissioned law firm Jones Day LLC to conduct an investigation into the affair, promising a rigorous clean-up. Spiegel's story referred to the first preliminary findings of that investigation. These aren't being made public yet.

It wasn't clear whether the company had suspended any more employees. According to media reports, the senior R&D managers at the group's three leading brands, VW, Audi and Porsche, have all been suspended while the investigation goes on.

A spokesman for Volkswagen didn't immediately respond to a request for comment.

In separate news Wednesday, it emerged that Winfried Vahland, who was slated to take over as head of the VW group's new North American division, is to leave the company at his own request.

The new structure was unveiled at the first board meeting after the resignation of CEO Martin Winterkorn, and was aimed at devolving more power away from the group's headquarters in Germany.

Škoda, the low-end, Czech-based unit of VW which Vahland has run for the last five years, said "differing views on the organisation of the new Group region have led to this decision." It added that it is "expressly not related to current events on the issue of diesel engines."

Vahland had been with the VW group for 25 years, and had run Czech-based Škoda since 2010. Before that he had been head of VW's regional operations in China. According to some reports, Winterkorn had pressed for Vahland to succeed him as CEO.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:17 AM
To: Allen, Laura
Subject: RE: Volkswagen Clips 10/14/2015

AP (via Chattanooga Free Time Press):

http://www.timesfreepress.com/news/breakingnews/story/2015/oct/14/after-pollution-scandal-volkswagen-focus-electric-vehicles/330444/

After pollution scandal, Volkswagen to focus on electric vehicles

October 14th, 2015 by Associated Press

The all-new Chattanooga built VW Passat TDI cruises on East Brow Road atop Signal Mountain early Wednesday afternoon. Staff photo by Dan Henry/Chattanooga Times Free Press

Volkswagen says it will shift its focus toward developing electric cars.

It aims to develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

Diess also said the company would reduce spending on investments by 1 billion euros ($1.1billion) and redouble efforts to cut other costs.

Volkswagen will expand its modular construction system — which involves sharing technical specifications and parts across different models to save money — to include new plug-in hybrid and electric vehicles.

The company additionally plans to turn the next version of its large Phaeton luxury sedan into an electric-only vehicle to demonstrate the company's technological competence.

The Phaeton, a project introduced by former CEO Ferdinand Piech, has been criticized as a money-loser. The Piech and Porsche families own the majority of voting shares in Volkswagen through a holding company.

"The Volkswagen brand is repositioning itself for the future," Diess said in a statement. "We are becoming more efficient, we are giving our product range and our core technologies a new focus, and we are creating room for forward-looking technologies by speeding up the efficiency program."

Diess is a recent hire from competitor BMW, where he oversaw development of new models including the i3 electric and i8 plug-in hybrid vehicles.

Volkswagen AG, whose other brands include Audi and Skoda, is facing a crisis after U.S. authorities said it evaded emissions checks on 482,000 vehicles. The company has set aside 6.5 billion euros ($7.3 billion) to cover the costs of recalls and fines. But analysts say the costs in terms of fines and lost sales will likely be considerably higher.

Earlier, the governor of Germany's Lower Saxony state, which holds a 20 percent stake in Volkswagen, said the automaker should have admitted earlier that it manipulated emissions data in the U.S. Volkswagen acknowledged the deception to U.S. regulators on Sept. 3, more than a year after researchers published a study showing the real-world emissions of two VW models were far higher than allowed.

Governor Stephan Weil told Lower Saxony's state legislature on Tuesday that "this confession should clearly have come a great deal earlier — another serious mistake," news agency dpa reported.

Weil sits on Volkswagen's board of directors. He has said that the state's representatives were "completely surprised" by the emissions scandal and vowed to work to protect jobs.

WSJ:

http://www.wsj.com/articles/volkswagen-north-america-chief-designate-quits-1444827950

Volkswagen North America Chief-Designate Quits

Winfied Vahland was head of Skoda brand

By SARAH SLOAT

Oct. 14, 2015 9:05 a.m. ET

FRANKFURT— Volkswagen AG parted ways with another senior executive Wednesday.

Winfried Vahland is leaving the company due to differences over the auto maker's North America organization, which he was poised to oversee.

The automotive group, in the grips an international emissions-testing scandal, had designated Mr. Vahland, currently the head of Volkswagen's Czech Republic-based Skoda brand, as the new chief of its North America business last month.

"This decision is expressly not related to current events on the issue of diesel engines," Skoda said in a statement. Skoda said Mr. Vahland is leaving at his own request.

Volkswagen has been in disarray since mid-September, when it admitted to using software in millions of diesel cars that allow them to run cleaner in emissions tests than on the road. The disclosure, which came first for cars sold in the U.S., triggered a boardroom reshuffle, a profit warning and cutbacks in investment spending.

The group's supervisory board elected Hans Dieter Pötsch, the company's 64-year-old chief financial officer, as chairman last week, filing a post left open since April when former patriarch Ferdinand Piëch resigned. Matthias Müller, head of Volkswagen's Porsche brand, had replaced Martin Winterkorn as Volkswagen's CEO after Mr. Winterkorn resigned last month in the wake of the diesel-engine scandal.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:02 AM
To: Allen, Laura
Subject: Volkswagen Clips 10/14/2015

USA Today:

http://www.usatoday.com/story/money/cars/2015/10/14/new-volkswagen-north-america-chief-winfried-vahland-out-after-three-weeks/73916418/

New Volkswagen North America chief Winfried Vahland out after three weeks

Nathan Bomey, USA TODAY 9:19 a.m. EDT October 14, 2015

Volkswagen's newly appointed head of North America is leaving the company less than three weeks after he was assigned to that position, injecting a new measure of instability as the company navigates an emissions scandal.

The sudden exit of Winfried Vahland gives the company's sweeping restructuring of its global operations a discombobulated feel, raising further questions about the future of its business in the U.S.

Vahland and Volkswagen had "differing views" on the company's new structure, the automaker said in a statement. His exit is "expressly not related" to the emissions scandal, VW said.

Vahland's swift appointment as head of the new North America region on Sept. 25 was billed as critical to creating a cohesive strategy for Volkswagen in one of the company's few weak spots. It came just a week after the U.S. Environmental Protection Agency exposed the fact that Volkswagen had installed software on vehicles to cheat emissions tests.

The company's U.S. chief, Michael Horn, who was set to report to Vahland, is staying in his current role.

Volkswagen did not immediately name a successor for Vahland, who also led Volkswagen's China operation for a period and was most recently chairman of the Skoda brand.

"In the last 25 years, Professor Vahland made a great contribution to the company," Volkswagen Group CEO Matthias Mueller said in a statement. "We respect his decision and thank him for his exceptional performance."

AP

http://bigstory.ap.org/article/24588210332a4d0b8f19490d0c9649e6/recently-named-head-vw-north-america-will-not-take-post

Recently named head of VW North America will not take post

By DAVID McHUGH and TOM KRISHER

Oct. 14, 2015 9:38 AM EDT

FRANKFURT, Germany (AP) — The recently named head of Volkswagen's North American business won't be taking up his new job - and has left the company.

The announcement comes as Volkswagen faces a scandal over rigging the results of emissions testing of its diesel vehicles in the U.S. It means that one of the company's most experienced managers will not be coming to lead the company's response in the United States as it faces possible heavy fines from the Environmental Protection Agency.

Volkswagen's Skoda division made the announcement about its chairman, Winfried Vahland, in a news release on Wednesday.

The release said that Vahland will not be moving to take over his new position carrying overall responsibility for North America. It said his decision to quit was not related to the scandal over the diesel engines.

On Sept. 24, Volkswagen announced a reorganization of its North American operations that put Vahland over country executives including Volkswagen's U.S. chief, Michael Horn. The announcement came the same day Volkswagen named Matthias Mueller as CEO after Martin Winterkorn stepped down from the job.

VW had said Horn would remain as president and CEO of Volkswagen Group of America, but its U.S., Canada and Mexico markets will be "combined and significantly strengthened" to form a new "North America region" led by Vahland.

Vahland, the former head of VW's crucial China business, was leaving because of "differing views on the organization of the new group region."

Mueller thanked him for 25 years of service and a "great contribution to the company."

"We respect his decision and thank him for his exceptional performance," Mueller was quoted as saying in the Skoda statement.

Skoda, based in the Czech Republic, is one of VW's brands, which also include Audi, SEAT, Lamborghini and Bentley.

Forbes:

http://www.forbes.com/sites/beltway/2015/10/13/how-a-carbon-tax-could-have-prevented-the-volkswagen-diesel-scandal/2/

How A Carbon Tax Could Have Prevented The Volkswagen Diesel Scandal

Howard Gleckman, CONTRIBUTOR

If anyone needed another example of why a carbon tax is a good idea, look no further than Volkswagen's diesel scandal. The automaker's efforts to game the current system are a case study in what's wrong with government attempts to reduce pollution with regulation and tax subsidies, rather than through a relatively straight-forward tax on carbon-based fuels.

The current system is complex mix of environmental carrots and sticks. The sticks include regulation such as fuel economy standards. The carrots include tax subsidies. One was the (now-expired) alternative motor vehicle tax credit that was available to specific models that met detailed fuel economy requirements. Two models of VW Jettas qualified for credits of $1,300 and the LA Times reported in September that the government paid as much as $51 million in credits to buyers of VW diesel cars.

Unable to limit emissions, give consumers the high performance they want, and meet fuel economy standards, VW cheated. As you know by now, the firm installed software in its diesel cars designed to fool routine emissions tests—which made the cars appear "cleaner" than they really were. In all, VW reportedly sold 500,000 cars in the US from 2009-2015 with the rogue software. Here is a helpful description from Vox explaining the whole sad story.

VW eventually got caught, of course. It faces penalties from EPA and potential criminal charges for violating the False Claims Act, as well as an investigation by the Senate Finance Committee. CEO Martin Winterkorn has resigned and the firm has stopped selling diesel cars in the US.

Still, a lot of this mess could have been avoided with a carbon tax. Such a levy could replace many—though not all– of these complex rules and eliminate most incentives for gaming. A carbon tax would not help reduce local air pollutants such as NOx so it would not replace all auto pollution regulations. But it could supplant those that aim to reduce carbon emissions from vehicles.

For drivers, the choice would be relative simply: You buy a carbon-based fuel, you pay a tax. The more carbon in the fuel, the more tax you pay. The manufacturer wouldn't need to hit a mandated fuel economy standard. No-one would need to worry about conflicting regulations.

Instead, consumers would likely respond to higher taxes by demanding cars that, one way or another, use less carbon-based fuel. We have lots of evidence that consumers are extremely responsive to changes in gasoline prices—the price goes up, they buy Priuses; it goes down, they switch to less fuel-efficient vehicles.

And with a big carbon tax, manufacturers will probably respond to consumer demands by

producing low-carbon vehicles. The proof will be at the pump. If an automaker lies about its fuel efficiency, it will be immediately obvious: Consumers will be filling up their tanks more often than they expected. And government won't have to test carbon emissions from tens of millions of cars. It will just need to calculate the carbon content of their fuel.

There is one other classic argument for corrective taxes such as a carbon tax. Such a levy provides ongoing incentives for firms to enhance technology and continue to drive down emissions. But with regulation or subsidies, even honest producers are more likely to hit the mandated target—and stop.

This is not to suggest that carbon taxes are not without their own complex issues. My Tax Policy Center colleagues Donald Marron and Eric Toder have described some of the technical challenges. But overall, market mechanisms such as carbon taxes (or a cap-and-trade system) are far more efficient, and much less prone to cheating, than a system based on regulations and subsidies.

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-14/volkswagen-s-designated-north-america-chief-leaves-carmaker

Volkswagen's Designated North America Chief Leaves Carmaker

Christoph Rauwald

October 14, 2015 — 8:58 AM EDT

Volkswagen AG's designated North America chief turned down the job in the wake of a management revamp triggered by the diesel-emissions scandal.

Winfried Vahland, a company veteran who currently leads VW's Czech Skoda unit, decided to not take over the new post as had been planned and will leave the carmaker, Skoda said in an e-

mailed statement.

Vahland was among the candidates to succeed former VW Chief Executive Officer Martin Winterkorn, who resigned last month, but the supervisory board favored former Porsche chief Matthias Mueller. Vahland is leaving Wolfsburg, Germany-based Volkswagen at his own request. His departure is unrelated to the investigations into the rigging of millions of diesel engines worldwide, Skoda said in the statement.

Volkswagen said Tuesday it will reduce annual investment by about 1 billion euros ($1.1 billion) at its namesake car brand as the automaker steps up a cost-cutting push to weather the impact of the diesel-emissions scandal.

VW is under increasing financial strain following revelations last month that it rigged diesel engines to circumvent emissions regulations. The company set aside 6.5 billion euros for repairs and to compensate customers, but has said that won't be enough. VW faces numerous lawsuits in the U.S., where it has lost money and struggled to become more than an also-ran despite rapid expansion elsewhere.

Vahland was appointed head of VW's North American operations as part of a restructuring plan pushed by Mueller and meant to shift more responsibility to brand and regional managers. VW wasn't immediately available to comment on whether it still planned to fill the post.

Business Insider:

http://www.businessinsider.com/r-bosch-sees-diesel-market-so-far-unharmed-by-volkswagen-scandal-2015-10

Bosch sees diesel market so far unharmed by Volkswagen scandal

RENNINGEN, Germany (Reuters) - German automotive supplier Robert Bosch [ROBG.UL] has

not seen any change so far in the diesel car market as a result of an emissions scandal that has rocked Volkswagen , its chief executive said on Wednesday.

"It will depend, though, on an active campaign for diesel to quickly dispel the current uncertainty that many consumers are feeling," Volkmar Denner told reporters at the opening of a new research center in the German town of Renningen near Stuttgart.

German Economy Minister Sigmar Gabriel warned against condemning diesel technology overall but said Germany needed to do better in switching to alternative engines.

He said he favored introducing incentives to reduce the price difference between electric and conventional cars.

Volkswagen, Europe's largest carmaker, last month admitted to cheating U.S. diesel emissions tests, sparking a crisis that unseated its CEO and wiped around a quarter off its market value.

Bosch is the maker of a popular diesel engine management program used by several top automakers including VW, which U.S. officials said last week was not preprogrammed to detect when a vehicle was undergoing laboratory emissions testing.

But it is not clear what role Bosch played, how closely it worked with VW to modify the engine management software and how much it knew about VW's intentions to use software to cheat on emissions standards.

Denner declined to comment on the matter.

He added that VW had not started talks to demand lower prices, following a media report that VW planned to extract 3 billion euros in price cuts from its suppliers to help mitigate the costs of the scandal.

(Reporting by Ilona Wissenbach; Writing by Georgina Prodhan; Editing by Louise Heavens)

Detroit News:

http://www.detroitnews.com/story/business/autos/2015/10/13/ann-arbor-epa-lab-diesel-tests-vw-scandal/73888296/

Ann Arbor EPA lab tests other cars after VW scandal

Michael Martinez, The Detroit News 5:05 p.m. EDT October 13, 2015

Ann Arbor — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.

Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and rental companies in real-world driving conditions. The EPA also could take cars from manufacturers' assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be testing a range of vehicles with a range of configurations and situations," McCabe told reporters at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle & Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions

Reuters:

http://www.reuters.com/article/2015/10/13/us-volkswagen-emissions-epa-idUSKCN0S72R120151013

EPA hasn't decided if new software on 2016 VW diesels is legal

ANN ARBOR, MICH. | BY PAUL LIENERT

U.S. regulators haven't determined the legality of a new emission-control device on Volkswagen's (VOWG_p.DE) 2016 diesel models, a top official said on Tuesday.

Those models still have not been certified for sale by the U.S. Environmental Protection Agency.

The existence of the new software was made public last week by VW's top U.S. executive in testimony to a congressional subcommittee investigating the German automaker's diesel cheating scandal.

The company has not confirmed speculation that the new software was configured before the wider emissions scandal broke on Sept. 18.

"We have a long list of questions for VW," said EPA Assistant Administrator Janet McCabe at a media briefing here. "When we have all of the answers, we will be able to make a determination" on the whether the device is legal or considered to be a "defeat device" designed to circumvent U.S. emission rules.

VW last month admitted that it installed illegal software on its 2009-2015 U.S. diesel models that enabled the cars to pass laboratory tests, but dump higher-than-legal limits of pollutants in real-world driving.

VW told regulators only recently that some of its U.S. diesel models included a previously undisclosed software feature that could affect emission controls on the 2016 models, according to Michael Horn, president and CEO of Volkswagen Group of America. Horn told U.S. lawmakers last week that the company subsequently had withdrawn its application for EPA certification of its 2016 diesel models.

Asked for additional detail, a VW spokesperson on Monday said the software "has the function of a warmup strategy which is subject to approval" by EPA. Typical diesel emission control systems are designed to be most effective when the engine is warmed up.

The EPA defines such software as an "auxiliary emission control device," or AECD, and describes it as any device that can change the operation of the vehicle's emission control system.

The agency also requires automakers to disclose the existence of such a software device, including "a rationale for why it is not a defeat device."

VW on Monday said the EPA is evaluating the new software device, and that the automaker is "working with the regulators to continue the 2016 certification process" for VW vehicles equipped with the 2.0-liter diesel engine.

Daily Caller:

http://dailycaller.com/2015/10/13/volkswagen-lobbied-obama-administration-for-green-tax-credits/

Volkswagen Lobbied Obama Administration For Green Tax Credits

STEVE BIRR

11:41 AM 10/13/2015

As President Barack Obama pushed his green energy proposals for the auto-industry in 2011, Volkswagen was lobbying the administration for tax credits on its now tainted line of diesel vehicles.

Volkswagen wanted a green tax credit that applies to electric cars to be given to their diesel line as well. The Environmental Protection Agency, however, refused to go along with Volkswagen's plan and also declined Toyota's request to apply the same tax credit to their hybrid electric cars.

EPA documents from 2009 and 2010 show that Volkswagen supported the Obama administration's plan to reduce carbon dioxide emissions from automobiles. Former VW CEO Stefan Jacoby wrote to the EPA in 2010 praising their "leadership on this important subject." Jacoby, along with the EPA and other auto-makers, said they would "aim to make substantial annual progress in reducing transportation sector greenhouse gas emissions and fossil fuel consumption consistent with the Obama Administration's energy and climate security goals."

While Volkswagen was publicly backing White House efforts to tackle global warming and push green vehicles, the automaker was quietly lobbying behind the scenes to get government subsidies — the political price for the company's support of Obama's agenda. But the EPA refused to play ball, and Volkswagen withdrew its support for Obama's green vehicle push, according to The New York Times.

Margo Oge, the former director of the EPA Office of Transportation and Air Quality who worked closely with auto-makers on these proposals, told The New York Times that Volkswagen "wanted a special deal for diesel cars that we now know weren't even meeting the standard." Oge suggested that Volkswagen thought their diesel technology was superior to electric or hybrid alternatives, saying, "These people had religion, and that religion was diesel."

When Obama announced his plan to reduce carbon dioxide emissions from cars, Volkswagen was one of the only major automakers to not sign a letter of support for the president's agenda. The New York Times reports that much of this attitude came from overseas.

"My sense was that things were being dictated by Germany," said Oge.

Without a tax credit or subsidy, Volkswagen was going to have a tougher time meeting regulatory standards on emissions while still being able to advertise their diesel vehicles' good fuel economy and relatively low price. These reasons might have played a role in Volkswagen using "defeat devices" to get around EPA emissions tests.

Despite Volkswagen's efforts to get government assistance for their diesel line, their lobbying footprint in America remains relatively small, which could hurt them as this scandal moves forward. Volkswagen spent just $1.2 million on lobbying in 2014, a number dwarfed by General Motors which spends an average of $8.5 million a year on lobbying.

GM just recently settled with the government over the fact that they knowingly hid information about a faulty ignition switch that was linked directly to the deaths of 174 people. They were fined only $900 million and no one at GM was ever charged. Volkswagen currently faces up to $18 billion in potential fines.

To: Purchia, Liz[Purchia.Liz@epa.gov]
Cc: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: Gong, Kristiene
Sent: Wed 10/14/2015 3:39:37 PM
Subject: RE: Volkswagen Clips 10/14/2015

There was this article (and I think a few more) from last week that mentioned the AECD:

NY Times:

http://www.nytimes.com/2015/10/09/business/international/vw-diesel-emissions-scandal-congressional-hearing.html?_r=0

Regulators Investigating 2nd VW Computer Program on Emissions

By DANIELLE IVORY and KEITH BRADSHEROCT. 8, 2015

WASHINGTON — Federal and California regulators have begun an investigation into a second computer program in Volkswagen's diesel cars that also affects the operation of the cars' emission controls.

Volkswagen said that it had withdrawn 2016 models of its diesel cars from environmental certification in the United States because the company should have disclosed the software and sought regulators' approval, but had not done so.

The disclosure of the software was made in testimony by the head of Volkswagen's American unit, Michael Horn, before a House Energy and Commerce subcommittee hearing, and later confirmed by the Environmental Protection Agency and the California Air Resources Board.

The software qualifies under state and federal laws as a so-called auxiliary emissions control device — something that modifies the performance of emissions equipment. Volkswagen and regulators declined to say whether this software was intended to defeat emissions control tests, like the software that the automaker already admitted last month that it had installed in 11 million diesel cars since the 2009 model year.

"VW did very recently provide E.P.A. with very preliminary information on an auxiliary emissions control device that VW said was included in one or more model years," said Nick Conger, an agency spokesman. He added that federal and California regulators "are investigating the nature and purpose of this recently identified device."

Volkswagen is already struggling with the spiraling cost and growing damage to its image from last month's revelation that it had installed software to detect when a car was undergoing an emissions test and minimize harmful emissions. When not being tested, the cars would emit up to 40 times the allowable levels of pollution.

Volkswagen and regulators refrained from characterizing the second software program in any way. The automaker gave no indication of whether it was also devised to defeat emissions tests.

"In Volkswagen Group of America's recent discussions with the regulators, we described to the E.P.A. and C.A.R.B. that our emissions control strategy also included a software feature that should be disclosed to and approved by them," the automaker said.

Stanley Young, a spokesman for the California Air Resources Board, said the state agency was investigating the nature of the second device, but declined to provide specifics because Volkswagen's application "is still pending." Mr. Young said that while Volkswagen has withdrawn its 2016 application with federal regulators, it has not withdrawn the similar application filed with California regulators.

"We're still going through all the information they provided and determining the next step," he said.

Under normal circumstances, automakers are allowed to use the auxiliary emissions control devices under deals negotiated with regulators that provide for higher emissions in very specific circumstances (like going up a steep hill, or in very cold weather). But they must be disclosed.

Mr. Young said he could not comment on exactly when Volkswagen disclosed the existence of its auxiliary emissions control device, or A.E.C.D.

"What we don't know yet is if the 2016 A.E.C.D. is also a defeat device, or is a device that meets the guidance previously given by E.P.A.," said John German, a senior fellow specializing in emissions and efficiency technology at the International Council on Clean Transportation, the nonprofit group that first noticed that the real-world emissions of Volkswagen diesels in the United States were far above regulatory limits.

Federal regulators warned manufacturers of heavy-duty trucks in 1998 that it would strictly scrutinize any devices that interfered with the normal operation of emissions control equipment, after finding that they had installed systems similar to what Volkswagen disclosed last month in its diesel cars.

Dan Becker, the director of the Safe Climate Campaign at the Center for Auto Safety, a nonprofit Washington research group, said that Volkswagen's new admission was a potential violation of the law.

"They put it in their vehicles, and then they signed a certification petition to the regulator saying what they put in their vehicles and didn't mention it," he said. "It's certainly a material omission."

Lawmakers did not discuss Volkswagen's admission at length during the hearing. But Representative Fred Upton, Republican of Michigan, openly wondered if Volkswagen was skirting regulations in other ways. "If they were willing to cut corners here, what else have they done?" he asked.

In addition to disclosing the second investigation in his opening testimony, Mr. Horn of Volkswagen laid out the automaker's plans to fix the cars currently affected and cautioned the panel that owners might have to wait a year or two.

Most of the more than 480,000 affected cars in the United States will need a "major fix," he said, including a hardware and software change. That repair, which would be applicable to almost 70 percent of those vehicles, may consume as much as 10 hours of work per car and might not get started until next year. The remaining vehicles are expected to be fixed next year, he said.

"This is pretty shocking for people," said Representative Jan Schakowsky, a Democrat of Illinois, expressing dismay at the scandal and demanding a specific timeline for fixes. "Asking customers for patience is really just not sufficient."

Some lawmakers asked Mr. Horn why Volkswagen did not replace the vehicles — a costly proposition — and, although he emphasized repairs, he said Volkswagen might consider an option like a buyback.

"Our plan is not to buy back the inventory," he said. "Our plan is to fix the cars."

From: Purchia, Liz
Sent: Wednesday, October 14, 2015 11:36 AM
To: Gong, Kristiene
Cc: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia
Subject: Re: Volkswagen Clips 10/14/2015

Is this news on the AECD the first time it's being reported?

Liz Purchia

U.S. EPA

202-564-6691

202-841-2230

On Oct 14, 2015, at 11:16 AM, Gong, Kristiene <Gong.Kristiene@epa.gov> wrote:

AP (via Richmond Times-Dispatch):

http://www.richmond.com/news/national-world/article_d1bb33cb-66de-5b25-8782-053e6824d9eb.html

2016 VW diesels have new software affecting emissions tests

Posted: Wednesday, October 14, 2015 10:15 am

WASHINGTON (AP) — Volkswagen has disclosed to U.S. regulators that there is additional suspect software in its 2016 diesel models that would potentially help their exhaust systems run cleaner during government tests.

Volkswagen confirmed to The Associated Press that the "auxiliary emissions control device" at issue operates differently from the "defeat" device software included in the company's 2009 to 2015 models disclosed last month. That disclosure triggered the worldwide cheating scandal engulfing the world's largest automaker.

The newly revealed software makes a pollution control catalyst heat up faster, improving performance of the device that separates smog-causing nitrogen oxide into harmless nitrogen and oxygen gases.

VW spokeswoman Jeannine Ginivan said the new issue with the 2016 vehicles was first revealed last week to U.S. Environmental Protection Agency and California regulators.

"Volkswagen has disclosed, in the application process for the model year 2016 2.0 TDI models, an auxiliary emissions control device," Ginivan said. "This has the function of a warmup strategy

which is subject to approval by the agencies. The agencies are currently evaluating this and Volkswagen is submitting additional information."

AP first reported last week that the EPA and California Air Resources Board are investigating "the nature and purpose" of additional software on the new VW models. Regulators have not yet determined whether the code is a defeat device installed specifically to cheat on emissions tests, said Janet McCabe, acting assistant EPA administrator for air quality.

"We have a long list of questions for VW about this," she said Tuesday at a dedication ceremony for a new heavy-duty truck testing lab in Ann Arbor, Michigan. "We're getting some answers from them, but we do not have all the answers yet."

Volkswagen already faced an ongoing criminal investigation and billions in fines for violating the Clean Air Act for its earlier emissions cheat, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

If it is determined the new issue is a second defeat device, that would call into question recent assertions by top VW executives that responsibility for the cheating scheme lay with a handful of rogue software developers who wrote the original code installed with the company's diesel engines starting with the 2009 model year.

The separate device included in the redesigned 2016 cars would appear to suggest a multi-year effort by the company to influence U.S. emissions tests that continued even after regulators began pressing the company last year about irregularities with the emissions produced by the older cars.

A congressional staffer briefed on the issue last week told AP that VW probably didn't need the additional software to meet government emissions standards, but that the device appears intended to ensure the 2016 cars would pass by wider margins. The staffer spoke on the condition of anonymity because he was not authorized to talk publicly about the ongoing investigation.

The company's most senior U.S.-based executive announced in congressional testimony last week that the German automaker had withdrawn applications seeking certification of its 2016 diesels because of on-board software that hadn't been disclosed to regulators.

However, the statement by Volkswagen of America CEO Michael Horn left unclear whether the issue with the 2016 models was the same as that in the earlier models, or whether it potentially constituted a new violation. Manufacturers are required by law to disclose any devices affecting emissions controls as part of the process to receive the EPA certifications required to sell the cars in the country.

EPA's McCabe wouldn't say if VW's failure to disclose the software in its 2016 application for emissions certification was illegal. "I don't want to speak to any potential subjects of an enforcement activity," she said.

VW is now working with regulators to continue the certification process needed to sell the 2016 diesel cars.

The delay is bad news for Volkswagen dealers, who had been anticipating delivery of the new models to replace older inventory which they can no longer offer to customers. Thousands of 2016 Beetles, Golfs, Jettas and Passats will remain quarantined in U.S. ports until a fix can be developed, approved and carried out.

Matthew Daly contributed from Washington. Krisher reported from Ann Arbor, Michigan.

Fortune

http://fortune.com/2015/10/14/dozens-of-managers-implicated-in-volkswagen-scandal/

"Dozens" of managers implicated in Volkswagen scandal

by Geoffrey Smith

OCTOBER 14, 2015, 10:37 AM EDT

And there's more woe for VW as the designated head of its new North America region refuses to take up post.

The external investigation that Volkswagen AG VLKAY 0.41% commissioned is making alarmingly quick (and leaky) progress.

According to the German magazine and website Der Spiegel, the circle of managers with direct knowledge of how the company falsified the emissions performance of its diesel vehicles is much wider than the company had so far indicated. Last week, Michael Horn, head of the company's U.S. operations, had told a Congressional committee that the decision to install "defeat devices" that masked the actual level of emissions was taken by a small group, and wasn't a corporate decision.

Der Spiegel cited company sources as saying that "at least 30 people" were involved in the scandal, and that the final number may be higher. Earlier this month, VW's board had commissioned law firm Jones Day LLC to conduct an investigation into the affair, promising a rigorous clean-up. Spiegel's story referred to the first preliminary findings of that investigation. These aren't being made public yet.

It wasn't clear whether the company had suspended any more employees. According to media reports, the senior R&D managers at the group's three leading brands, VW, Audi and Porsche, have all been suspended while the investigation goes on.

A spokesman for Volkswagen didn't immediately respond to a request for comment.

In separate news Wednesday, it emerged that Winfried Vahland, who was slated to take over as head of the VW group's new North American division, is to leave the company at his own request.

The new structure was unveiled at the first board meeting after the resignation of CEO Martin Winterkorn, and was aimed at devolving more power away from the group's headquarters in Germany.

Škoda, the low-end, Czech-based unit of VW which Vahland has run for the last five years, said "differing views on the organisation of the new Group region have led to this decision." It added that it is "expressly not related to current events on the issue of diesel engines."

Vahland had been with the VW group for 25 years, and had run Czech-based Škoda since 2010. Before that he had been head of VW's regional operations in China. According to some reports, Winterkorn had pressed for Vahland to succeed him as CEO.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:17 AM
To: Allen, Laura
Subject: RE: Volkswagen Clips 10/14/2015

AP (via Chattanooga Free Time Press):

http://www.timesfreepress.com/news/breakingnews/story/2015/oct/14/after-pollution-scandal-volkswagen-focus-electric-vehicles/330444/

After pollution scandal, Volkswagen to focus on electric vehicles

October 14th, 2015 by Associated Press

The all-new Chattanooga built VW Passat TDI cruises on East Brow Road atop Signal Mountain early Wednesday afternoon. Staff photo by Dan Henry/Chattanooga Times Free Press

Volkswagen says it will shift its focus toward developing electric cars.

It aims to develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

Diess also said the company would reduce spending on investments by 1 billion euros ($1.1billion) and redouble efforts to cut other costs.

Volkswagen will expand its modular construction system — which involves sharing technical specifications and parts across different models to save money — to include new plug-in hybrid and electric vehicles.

The company additionally plans to turn the next version of its large Phaeton luxury sedan into an electric-only vehicle to demonstrate the company's technological competence.

The Phaeton, a project introduced by former CEO Ferdinand Piech, has been criticized as a money-loser. The Piech and Porsche families own the majority of voting shares in Volkswagen through a holding company.

"The Volkswagen brand is repositioning itself for the future," Diess said in a statement. "We are becoming more efficient, we are giving our product range and our core technologies a new focus,

and we are creating room for forward-looking technologies by speeding up the efficiency program."

Diess is a recent hire from competitor BMW, where he oversaw development of new models including the i3 electric and i8 plug-in hybrid vehicles.

Volkswagen AG, whose other brands include Audi and Skoda, is facing a crisis after U.S. authorities said it evaded emissions checks on 482,000 vehicles. The company has set aside 6.5 billion euros ($7.3 billion) to cover the costs of recalls and fines. But analysts say the costs in terms of fines and lost sales will likely be considerably higher.

Earlier, the governor of Germany's Lower Saxony state, which holds a 20 percent stake in Volkswagen, said the automaker should have admitted earlier that it manipulated emissions data in the U.S. Volkswagen acknowledged the deception to U.S. regulators on Sept. 3, more than a year after researchers published a study showing the real-world emissions of two VW models were far higher than allowed.

Governor Stephan Weil told Lower Saxony's state legislature on Tuesday that "this confession should clearly have come a great deal earlier — another serious mistake," news agency dpa reported.

Weil sits on Volkswagen's board of directors. He has said that the state's representatives were "completely surprised" by the emissions scandal and vowed to work to protect jobs.

WSJ:

http://www.wsj.com/articles/volkswagen-north-america-chief-designate-quits-1444827950

Volkswagen North America Chief-Designate Quits

Winfied Vahland was head of Skoda brand

By SARAH SLOAT

Oct. 14, 2015 9:05 a.m. ET

FRANKFURT— Volkswagen AG parted ways with another senior executive Wednesday. Winfried Vahland is leaving the company due to differences over the auto maker's North America organization, which he was poised to oversee.

The automotive group, in the grips an international emissions-testing scandal, had designated Mr. Vahland, currently the head of Volkswagen's Czech Republic-based Skoda brand, as the new chief of its North America business last month.

"This decision is expressly not related to current events on the issue of diesel engines," Skoda said in a statement. Skoda said Mr. Vahland is leaving at his own request.

Volkswagen has been in disarray since mid-September, when it admitted to using software in millions of diesel cars that allow them to run cleaner in emissions tests than on the road. The disclosure, which came first for cars sold in the U.S., triggered a boardroom reshuffle, a profit warning and cutbacks in investment spending.

The group's supervisory board elected Hans Dieter Pötsch, the company's 64-year-old chief financial officer, as chairman last week, filing a post left open since April when former patriarch Ferdinand Piëch resigned. Matthias Müller, head of Volkswagen's Porsche brand, had replaced Martin Winterkorn as Volkswagen's CEO after Mr. Winterkorn resigned last month in the wake of the diesel-engine scandal.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:02 AM
To: Allen, Laura
Subject: Volkswagen Clips 10/14/2015

USA Today:

http://www.usatoday.com/story/money/cars/2015/10/14/new-volkswagen-north-america-chief-winfried-vahland-out-after-three-weeks/73916418/

New Volkswagen North America chief Winfried Vahland out after three weeks

Nathan Bomey, USA TODAY 9:19 a.m. EDT October 14, 2015

Volkswagen's newly appointed head of North America is leaving the company less than three weeks after he was assigned to that position, injecting a new measure of instability as the company navigates an emissions scandal.

The sudden exit of Winfried Vahland gives the company's sweeping restructuring of its global operations a discombobulated feel, raising further questions about the future of its business in the U.S.

Vahland and Volkswagen had "differing views" on the company's new structure, the automaker said in a statement. His exit is "expressly not related" to the emissions scandal, VW said.

Vahland's swift appointment as head of the new North America region on Sept. 25 was billed as critical to creating a cohesive strategy for Volkswagen in one of the company's few weak spots. It came just a week after the U.S. Environmental Protection Agency exposed the fact that Volkswagen had installed software on vehicles to cheat emissions tests.

The company's U.S. chief, Michael Horn, who was set to report to Vahland, is staying in his current role.

Volkswagen did not immediately name a successor for Vahland, who also led Volkswagen's China operation for a period and was most recently chairman of the Skoda brand.

"In the last 25 years, Professor Vahland made a great contribution to the company," Volkswagen Group CEO Matthias Mueller said in a statement. "We respect his decision and thank him for his exceptional performance."

AP

http://bigstory.ap.org/article/24588210332a4d0b8f19490d0c9649e6/recently-named-head-vw-north-america-will-not-take-post

Recently named head of VW North America will not take post

By DAVID McHUGH and TOM KRISHER

Oct. 14, 2015 9:38 AM EDT

FRANKFURT, Germany (AP) — The recently named head of Volkswagen's North American business won't be taking up his new job - and has left the company.

The announcement comes as Volkswagen faces a scandal over rigging the results of emissions testing of its diesel vehicles in the U.S. It means that one of the company's most experienced managers will not be coming to lead the company's response in the United States as it faces possible heavy fines from the Environmental Protection Agency.

Volkswagen's Skoda division made the announcement about its chairman, Winfried Vahland, in a news release on Wednesday.

The release said that Vahland will not be moving to take over his new position carrying overall responsibility for North America. It said his decision to quit was not related to the scandal over the diesel engines.

On Sept. 24, Volkswagen announced a reorganization of its North American operations that put Vahland over country executives including Volkswagen's U.S. chief, Michael Horn. The announcement came the same day Volkswagen named Matthias Mueller as CEO after Martin Winterkorn stepped down from the job.

VW had said Horn would remain as president and CEO of Volkswagen Group of America, but its U.S., Canada and Mexico markets will be "combined and significantly strengthened" to form a new "North America region" led by Vahland.

Vahland, the former head of VW's crucial China business, was leaving because of "differing views on the organization of the new group region."

Mueller thanked him for 25 years of service and a "great contribution to the company."

"We respect his decision and thank him for his exceptional performance," Mueller was quoted as saying in the Skoda statement.

Skoda, based in the Czech Republic, is one of VW's brands, which also include Audi, SEAT, Lamborghini and Bentley.

Forbes:

http://www.forbes.com/sites/beltway/2015/10/13/how-a-carbon-tax-could-have-prevented-the-volkswagen-diesel-scandal/2/

How A Carbon Tax Could Have Prevented The Volkswagen Diesel Scandal

Howard Gleckman, CONTRIBUTOR

If anyone needed another example of why a carbon tax is a good idea, look no further than Volkswagen's diesel scandal. The automaker's efforts to game the current system are a case study in what's wrong with government attempts to reduce pollution with regulation and tax subsidies, rather than through a relatively straight-forward tax on carbon-based fuels.

The current system is complex mix of environmental carrots and sticks. The sticks include regulation such as fuel economy standards. The carrots include tax subsidies. One was the (now-expired) alternative motor vehicle tax credit that was available to specific models that met detailed fuel economy requirements. Two models of VW Jettas qualified for credits of $1,300 and the LA Times reported in September that the government paid as much as $51 million in credits to buyers of VW diesel cars.

Unable to limit emissions, give consumers the high performance they want, and meet fuel economy standards, VW cheated. As you know by now, the firm installed software in its diesel cars designed to fool routine emissions tests—which made the cars appear "cleaner" than they really were. In all, VW reportedly sold 500,000 cars in the US from 2009-2015 with the rogue software. Here is a helpful description from Vox explaining the whole sad story.

VW eventually got caught, of course. It faces penalties from EPA and potential criminal charges for violating the False Claims Act, as well as an investigation by the Senate Finance Committee. CEO Martin Winterkorn has resigned and the firm has stopped selling diesel cars in the US.

Still, a lot of this mess could have been avoided with a carbon tax. Such a levy could replace many—though not all– of these complex rules and eliminate most incentives for gaming. A carbon tax would not help reduce local air pollutants such as NOx so it would not replace all auto pollution regulations. But it could supplant those that aim to reduce carbon emissions from vehicles.

For drivers, the choice would be relative simply: You buy a carbon-based fuel, you pay a tax. The more carbon in the fuel, the more tax you pay. The manufacturer wouldn't need to hit a mandated fuel economy standard. No-one would need to worry about conflicting regulations.

Instead, consumers would likely respond to higher taxes by demanding cars that, one way or another, use less carbon-based fuel. We have lots of evidence that consumers are extremely responsive to changes in gasoline prices—the price goes up, they buy Priuses; it goes down, they switch to less fuel-efficient vehicles.

And with a big carbon tax, manufacturers will probably respond to consumer demands by producing low-carbon vehicles. The proof will be at the pump. If an automaker lies about its fuel efficiency, it will be immediately obvious: Consumers will be filling up their tanks more often than they expected. And government won't have to test carbon emissions from tens of millions of cars. It will just need to calculate the carbon content of their fuel.

There is one other classic argument for corrective taxes such as a carbon tax. Such a levy provides ongoing incentives for firms to enhance technology and continue to drive down emissions. But with regulation or subsidies, even honest producers are more likely to hit the mandated target—and stop.

This is not to suggest that carbon taxes are not without their own complex issues. My Tax Policy Center colleagues Donald Marron and Eric Toder have described some of the technical challenges. But overall, market mechanisms such as carbon taxes (or a cap-and-trade system) are far more efficient, and much less prone to cheating, than a system based on regulations and subsidies.

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-14/volkswagen-s-designated-north-america-chief-leaves-carmaker

Volkswagen's Designated North America Chief Leaves Carmaker

Christoph Rauwald

October 14, 2015 — 8:58 AM EDT

Volkswagen AG's designated North America chief turned down the job in the wake of a management revamp triggered by the diesel-emissions scandal.

Winfried Vahland, a company veteran who currently leads VW's Czech Skoda unit, decided to not take over the new post as had been planned and will leave the carmaker, Skoda said in an e-mailed statement.

Vahland was among the candidates to succeed former VW Chief Executive Officer Martin Winterkorn, who resigned last month, but the supervisory board favored former Porsche chief Matthias Mueller. Vahland is leaving Wolfsburg, Germany-based Volkswagen at his own request. His departure is unrelated to the investigations into the rigging of millions of diesel engines worldwide, Skoda said in the statement.

Volkswagen said Tuesday it will reduce annual investment by about 1 billion euros ($1.1 billion) at its namesake car brand as the automaker steps up a cost-cutting push to weather the impact of the diesel-emissions scandal.

VW is under increasing financial strain following revelations last month that it rigged diesel engines to circumvent emissions regulations. The company set aside 6.5 billion euros for repairs and to compensate customers, but has said that won't be enough. VW faces numerous lawsuits in the U.S., where it has lost money and struggled to become more than an also-ran despite rapid expansion elsewhere.

Vahland was appointed head of VW's North American operations as part of a restructuring plan pushed by Mueller and meant to shift more responsibility to brand and regional managers. VW wasn't immediately available to comment on whether it still planned to fill the post.

Business Insider:

http://www.businessinsider.com/r-bosch-sees-diesel-market-so-far-unharmed-by-volkswagen-

scandal-2015-10

Bosch sees diesel market so far unharmed by Volkswagen scandal

RENNINGEN, Germany (Reuters) - German automotive supplier Robert Bosch [ROBG.UL] has not seen any change so far in the diesel car market as a result of an emissions scandal that has rocked Volkswagen , its chief executive said on Wednesday.

"It will depend, though, on an active campaign for diesel to quickly dispel the current uncertainty that many consumers are feeling," Volkmar Denner told reporters at the opening of a new research center in the German town of Renningen near Stuttgart.

German Economy Minister Sigmar Gabriel warned against condemning diesel technology overall but said Germany needed to do better in switching to alternative engines.

He said he favored introducing incentives to reduce the price difference between electric and conventional cars.

Volkswagen, Europe's largest carmaker, last month admitted to cheating U.S. diesel emissions tests, sparking a crisis that unseated its CEO and wiped around a quarter off its market value.

Bosch is the maker of a popular diesel engine management program used by several top automakers including VW, which U.S. officials said last week was not preprogrammed to detect when a vehicle was undergoing laboratory emissions testing.

But it is not clear what role Bosch played, how closely it worked with VW to modify the engine management software and how much it knew about VW's intentions to use software to cheat on emissions standards.

Denner declined to comment on the matter.

He added that VW had not started talks to demand lower prices, following a media report that VW planned to extract 3 billion euros in price cuts from its suppliers to help mitigate the costs of the scandal.

(Reporting by Ilona Wissenbach; Writing by Georgina Prodhan; Editing by Louise Heavens)

Detroit News:

http://www.detroitnews.com/story/business/autos/2015/10/13/ann-arbor-epa-lab-diesel-tests-vw-scandal/73888296/

Ann Arbor EPA lab tests other cars after VW scandal

Michael Martinez, The Detroit News 5:05 p.m. EDT October 13, 2015

Ann Arbor — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.

Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and rental companies in real-world driving conditions. The EPA also could take cars from manufacturers' assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be

testing a range of vehicles with a range of configurations and situations," McCabe told reporters at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle & Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions

Reuters:

http://www.reuters.com/article/2015/10/13/us-volkswagen-emissions-epa-idUSKCN0S72R120151013

EPA hasn't decided if new software on 2016 VW diesels is legal

ANN ARBOR, MICH. | BY PAUL LIENERT

U.S. regulators haven't determined the legality of a new emission-control device on Volkswagen's (VOWG_p.DE) 2016 diesel models, a top official said on Tuesday.

Those models still have not been certified for sale by the U.S. Environmental Protection Agency.

The existence of the new software was made public last week by VW's top U.S. executive in testimony to a congressional subcommittee investigating the German automaker's diesel cheating scandal.

The company has not confirmed speculation that the new software was configured before the wider emissions scandal broke on Sept. 18.

"We have a long list of questions for VW," said EPA Assistant Administrator Janet McCabe at a media briefing here. "When we have all of the answers, we will be able to make a determination" on the whether the device is legal or considered to be a "defeat device" designed to circumvent U.S. emission rules.

VW last month admitted that it installed illegal software on its 2009-2015 U.S. diesel models that enabled the cars to pass laboratory tests, but dump higher-than-legal limits of pollutants in real-world driving.

VW told regulators only recently that some of its U.S. diesel models included a previously undisclosed software feature that could affect emission controls on the 2016 models, according to Michael Horn, president and CEO of Volkswagen Group of America. Horn told U.S. lawmakers last week that the company subsequently had withdrawn its application for EPA certification of its 2016 diesel models.

Asked for additional detail, a VW spokesperson on Monday said the software "has the function of a warmup strategy which is subject to approval" by EPA. Typical diesel emission control systems are designed to be most effective when the engine is warmed up.

The EPA defines such software as an "auxiliary emission control device," or AECD, and describes it as any device that can change the operation of the vehicle's emission control system.

The agency also requires automakers to disclose the existence of such a software device, including "a rationale for why it is not a defeat device."

VW on Monday said the EPA is evaluating the new software device, and that the automaker is "working with the regulators to continue the 2016 certification process" for VW vehicles equipped with the 2.0-liter diesel engine.

Daily Caller:

http://dailycaller.com/2015/10/13/volkswagen-lobbied-obama-administration-for-green-tax-credits/

Volkswagen Lobbied Obama Administration For Green Tax Credits

STEVE BIRR

11:41 AM 10/13/2015

As President Barack Obama pushed his green energy proposals for the auto-industry in 2011, Volkswagen was lobbying the administration for tax credits on its now tainted line of diesel vehicles.

Volkswagen wanted a green tax credit that applies to electric cars to be given to their diesel line as well. The Environmental Protection Agency, however, refused to go along with Volkswagen's plan and also declined Toyota's request to apply the same tax credit to their hybrid electric cars.

EPA documents from 2009 and 2010 show that Volkswagen supported the Obama administration's plan to reduce carbon dioxide emissions from automobiles. Former VW CEO Stefan Jacoby wrote to the EPA in 2010 praising their "leadership on this important subject." Jacoby, along with the EPA and other auto-makers, said they would "aim to make substantial annual progress in reducing transportation sector greenhouse gas emissions and fossil fuel consumption consistent with the Obama Administration's energy and climate security goals."

While Volkswagen was publicly backing White House efforts to tackle global warming and push green vehicles, the automaker was quietly lobbying behind the scenes to get government subsidies — the political price for the company's support of Obama's agenda. But the EPA refused to play ball, and Volkswagen withdrew its support for Obama's green vehicle push, according to The New York Times.

Margo Oge, the former director of the EPA Office of Transportation and Air Quality who worked closely with auto-makers on these proposals, told The New York Times that Volkswagen "wanted a special deal for diesel cars that we now know weren't even meeting the standard." Oge suggested that Volkswagen thought their diesel technology was superior to electric or hybrid alternatives, saying, "These people had religion, and that religion was diesel."

When Obama announced his plan to reduce carbon dioxide emissions from cars, Volkswagen was one of the only major automakers to not sign a letter of support for the president's agenda. The New York Times reports that much of this attitude came from overseas.

"My sense was that things were being dictated by Germany," said Oge.

Without a tax credit or subsidy, Volkswagen was going to have a tougher time meeting regulatory standards on emissions while still being able to advertise their diesel vehicles' good fuel economy and relatively low price. These reasons might have played a role in Volkswagen using "defeat devices" to get around EPA emissions tests.

Despite Volkswagen's efforts to get government assistance for their diesel line, their lobbying footprint in America remains relatively small, which could hurt them as this scandal moves forward. Volkswagen spent just $1.2 million on lobbying in 2014, a number dwarfed by General Motors which spends an average of $8.5 million a year on lobbying.

GM just recently settled with the government over the fact that they knowingly hid information about a faulty ignition switch that was linked directly to the deaths of 174 people. They were fined only $900 million and no one at GM was ever charged. Volkswagen currently faces up to $18 billion in potential fines.

To: Purchia, Liz[Purchia.Liz@epa.gov]; Gong, Kristiene[Gong.Kristiene@epa.gov]
Cc: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]
From: Conger, Nick
Sent: Wed 10/14/2015 3:41:05 PM
Subject: RE: Volkswagen Clips 10/14/2015

This is first explanation about how the AECD may function, I believe.

Nick Conger

Deputy Press Secretary

Office of the Administrator

U.S. Environmental Protection Agency

Office: (202) 564-6287

Cell: (202) 412-2655

From: Purchia, Liz
Sent: Wednesday, October 14, 2015 11:36 AM
To: Gong, Kristiene
Cc: Allen, Laura; Abrams, Dan; Conger, Nick; Senn, John; Millett, John; Birgfeld, Erin; Hull, George; Valentine, Julia; Grantham, Nancy; StClair, Christie; Davis, Jay; Bunker, Byron; Cohen, Janet; Brooks, Phillip; Hengst, Benjamin; Grundler, Christopher; Giles-AA, Cynthia
Subject: Re: Volkswagen Clips 10/14/2015

Is this news on the AECD the first time it's being reported?

Liz Purchia

U.S. EPA

202-564-6691

202-841-2230

On Oct 14, 2015, at 11:16 AM, Gong, Kristiene <Gong.Kristiene@epa.gov> wrote:

AP (via Richmond Times-Dispatch):

http://www.richmond.com/news/national-world/article_d1bb33cb-66de-5b25-8782-053e6824d9eb.html

2016 VW diesels have new software affecting emissions tests

Posted: Wednesday, October 14, 2015 10:15 am

WASHINGTON (AP) — Volkswagen has disclosed to U.S. regulators that there is additional suspect software in its 2016 diesel models that would potentially help their exhaust systems run cleaner during government tests.

Volkswagen confirmed to The Associated Press that the "auxiliary emissions control device" at issue operates differently from the "defeat" device software included in the company's 2009 to 2015 models disclosed last month. That disclosure triggered the worldwide cheating scandal engulfing the world's largest automaker.

The newly revealed software makes a pollution control catalyst heat up faster, improving performance of the device that separates smog-causing nitrogen oxide into harmless nitrogen and oxygen gases.

VW spokeswoman Jeannine Ginivan said the new issue with the 2016 vehicles was first revealed last week to U.S. Environmental Protection Agency and California regulators.

"Volkswagen has disclosed, in the application process for the model year 2016 2.0 TDI models, an auxiliary emissions control device," Ginivan said. "This has the function of a warmup strategy which is subject to approval by the agencies. The agencies are currently evaluating this and

Volkswagen is submitting additional information."

AP first reported last week that the EPA and California Air Resources Board are investigating "the nature and purpose" of additional software on the new VW models. Regulators have not yet determined whether the code is a defeat device installed specifically to cheat on emissions tests, said Janet McCabe, acting assistant EPA administrator for air quality.

"We have a long list of questions for VW about this," she said Tuesday at a dedication ceremony for a new heavy-duty truck testing lab in Ann Arbor, Michigan. "We're getting some answers from them, but we do not have all the answers yet."

Volkswagen already faced an ongoing criminal investigation and billions in fines for violating the Clean Air Act for its earlier emissions cheat, as well as a raft of state investigations and class-action lawsuits filed on behalf of customers.

If it is determined the new issue is a second defeat device, that would call into question recent assertions by top VW executives that responsibility for the cheating scheme lay with a handful of rogue software developers who wrote the original code installed with the company's diesel engines starting with the 2009 model year.

The separate device included in the redesigned 2016 cars would appear to suggest a multi-year effort by the company to influence U.S. emissions tests that continued even after regulators began pressing the company last year about irregularities with the emissions produced by the older cars.

A congressional staffer briefed on the issue last week told AP that VW probably didn't need the additional software to meet government emissions standards, but that the device appears intended to ensure the 2016 cars would pass by wider margins. The staffer spoke on the condition of anonymity because he was not authorized to talk publicly about the ongoing investigation.

The company's most senior U.S.-based executive announced in congressional testimony last

week that the German automaker had withdrawn applications seeking certification of its 2016 diesels because of on-board software that hadn't been disclosed to regulators.

However, the statement by Volkswagen of America CEO Michael Horn left unclear whether the issue with the 2016 models was the same as that in the earlier models, or whether it potentially constituted a new violation. Manufacturers are required by law to disclose any devices affecting emissions controls as part of the process to receive the EPA certifications required to sell the cars in the country.

EPA's McCabe wouldn't say if VW's failure to disclose the software in its 2016 application for emissions certification was illegal. "I don't want to speak to any potential subjects of an enforcement activity," she said.

VW is now working with regulators to continue the certification process needed to sell the 2016 diesel cars.

The delay is bad news for Volkswagen dealers, who had been anticipating delivery of the new models to replace older inventory which they can no longer offer to customers. Thousands of 2016 Beetles, Golfs, Jettas and Passats will remain quarantined in U.S. ports until a fix can be developed, approved and carried out.

Matthew Daly contributed from Washington. Krisher reported from Ann Arbor, Michigan.

Fortune

http://fortune.com/2015/10/14/dozens-of-managers-implicated-in-volkswagen-scandal/

"Dozens" of managers implicated in Volkswagen scandal

by Geoffrey Smith

OCTOBER 14, 2015, 10:37 AM EDT

And there's more woe for VW as the designated head of its new North America region refuses to take up post.

The external investigation that Volkswagen AG VLKAY 0.41% commissioned is making alarmingly quick (and leaky) progress.

According to the German magazine and website Der Spiegel, the circle of managers with direct knowledge of how the company falsified the emissions performance of its diesel vehicles is much wider than the company had so far indicated. Last week, Michael Horn, head of the company's U.S. operations, had told a Congressional committee that the decision to install "defeat devices" that masked the actual level of emissions was taken by a small group, and wasn't a corporate decision.

Der Spiegel cited company sources as saying that "at least 30 people" were involved in the scandal, and that the final number may be higher. Earlier this month, VW's board had commissioned law firm Jones Day LLC to conduct an investigation into the affair, promising a rigorous clean-up. Spiegel's story referred to the first preliminary findings of that investigation. These aren't being made public yet.

It wasn't clear whether the company had suspended any more employees. According to media reports, the senior R&D managers at the group's three leading brands, VW, Audi and Porsche, have all been suspended while the investigation goes on.

A spokesman for Volkswagen didn't immediately respond to a request for comment.

In separate news Wednesday, it emerged that Winfried Vahland, who was slated to take over as head of the VW group's new North American division, is to leave the company at his own request.

The new structure was unveiled at the first board meeting after the resignation of CEO Martin Winterkorn, and was aimed at devolving more power away from the group's headquarters in Germany.

Škoda, the low-end, Czech-based unit of VW which Vahland has run for the last five years, said "differing views on the organisation of the new Group region have led to this decision." It added that it is "expressly not related to current events on the issue of diesel engines."

Vahland had been with the VW group for 25 years, and had run Czech-based Škoda since 2010. Before that he had been head of VW's regional operations in China. According to some reports, Winterkorn had pressed for Vahland to succeed him as CEO.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:17 AM
To: Allen, Laura
Subject: RE: Volkswagen Clips 10/14/2015

AP (via Chattanooga Free Time Press):

http://www.timesfreepress.com/news/breakingnews/story/2015/oct/14/after-pollution-scandal-volkswagen-focus-electric-vehicles/330444/

After pollution scandal, Volkswagen to focus on electric vehicles

October 14th, 2015 by Associated Press

The all-new Chattanooga built VW Passat TDI cruises on East Brow Road atop Signal Mountain early Wednesday afternoon. Staff photo by Dan Henry/Chattanooga Times Free Press

Volkswagen says it will shift its focus toward developing electric cars.

It aims to develop new hybrid and electric vehicles in response to its emissions scandal.

The new steps were part of a plan to confront the company's scandal over cars that were equipped with computer software that let them evade U.S. emissions tests.

Volkswagen division head Herbert Diess said in a statement Tuesday the company would change its approach to diesel emissions in Europe and North America and adopt so-called selective catalytic converter technology, or SCR. That is a system that injects the chemical substance urea into the exhaust stream to neutralize harmful nitrogen oxides.

He said that change would come "as soon as possible."

Diess also said the company would reduce spending on investments by 1 billion euros ($1.1billion) and redouble efforts to cut other costs.

Volkswagen will expand its modular construction system — which involves sharing technical specifications and parts across different models to save money — to include new plug-in hybrid and electric vehicles.

The company additionally plans to turn the next version of its large Phaeton luxury sedan into an electric-only vehicle to demonstrate the company's technological competence.

The Phaeton, a project introduced by former CEO Ferdinand Piech, has been criticized as a money-loser. The Piech and Porsche families own the majority of voting shares in Volkswagen through a holding company.

"The Volkswagen brand is repositioning itself for the future," Diess said in a statement. "We are becoming more efficient, we are giving our product range and our core technologies a new focus, and we are creating room for forward-looking technologies by speeding up the efficiency

program."

Diess is a recent hire from competitor BMW, where he oversaw development of new models including the i3 electric and i8 plug-in hybrid vehicles.

Volkswagen AG, whose other brands include Audi and Skoda, is facing a crisis after U.S. authorities said it evaded emissions checks on 482,000 vehicles. The company has set aside 6.5 billion euros ($7.3 billion) to cover the costs of recalls and fines. But analysts say the costs in terms of fines and lost sales will likely be considerably higher.

Earlier, the governor of Germany's Lower Saxony state, which holds a 20 percent stake in Volkswagen, said the automaker should have admitted earlier that it manipulated emissions data in the U.S. Volkswagen acknowledged the deception to U.S. regulators on Sept. 3, more than a year after researchers published a study showing the real-world emissions of two VW models were far higher than allowed.

Governor Stephan Weil told Lower Saxony's state legislature on Tuesday that "this confession should clearly have come a great deal earlier — another serious mistake," news agency dpa reported.

Weil sits on Volkswagen's board of directors. He has said that the state's representatives were "completely surprised" by the emissions scandal and vowed to work to protect jobs.

WSJ:

http://www.wsj.com/articles/volkswagen-north-america-chief-designate-quits-1444827950

Volkswagen North America Chief-Designate Quits

Winfied Vahland was head of Skoda brand

By SARAH SLOAT

Oct. 14, 2015 9:05 a.m. ET

FRANKFURT— Volkswagen AG parted ways with another senior executive Wednesday. Winfried Vahland is leaving the company due to differences over the auto maker's North America organization, which he was poised to oversee.

The automotive group, in the grips an international emissions-testing scandal, had designated Mr. Vahland, currently the head of Volkswagen's Czech Republic-based Skoda brand, as the new chief of its North America business last month.

"This decision is expressly not related to current events on the issue of diesel engines," Skoda said in a statement. Skoda said Mr. Vahland is leaving at his own request.

Volkswagen has been in disarray since mid-September, when it admitted to using software in millions of diesel cars that allow them to run cleaner in emissions tests than on the road. The disclosure, which came first for cars sold in the U.S., triggered a boardroom reshuffle, a profit warning and cutbacks in investment spending.

The group's supervisory board elected Hans Dieter Pötsch, the company's 64-year-old chief financial officer, as chairman last week, filing a post left open since April when former patriarch Ferdinand Piëch resigned. Matthias Müller, head of Volkswagen's Porsche brand, had replaced Martin Winterkorn as Volkswagen's CEO after Mr. Winterkorn resigned last month in the wake of the diesel-engine scandal.

From: Gong, Kristiene
Sent: Wednesday, October 14, 2015 10:02 AM
To: Allen, Laura
Subject: Volkswagen Clips 10/14/2015

USA Today:

http://www.usatoday.com/story/money/cars/2015/10/14/new-volkswagen-north-america-chief-winfried-vahland-out-after-three-weeks/73916418/

New Volkswagen North America chief Winfried Vahland out after three weeks

Nathan Bomey, USA TODAY 9:19 a.m. EDT October 14, 2015

Volkswagen's newly appointed head of North America is leaving the company less than three weeks after he was assigned to that position, injecting a new measure of instability as the company navigates an emissions scandal.

The sudden exit of Winfried Vahland gives the company's sweeping restructuring of its global operations a discombobulated feel, raising further questions about the future of its business in the U.S.

Vahland and Volkswagen had "differing views" on the company's new structure, the automaker said in a statement. His exit is "expressly not related" to the emissions scandal, VW said.

Vahland's swift appointment as head of the new North America region on Sept. 25 was billed as critical to creating a cohesive strategy for Volkswagen in one of the company's few weak spots. It came just a week after the U.S. Environmental Protection Agency exposed the fact that Volkswagen had installed software on vehicles to cheat emissions tests.

The company's U.S. chief, Michael Horn, who was set to report to Vahland, is staying in his current role.

Volkswagen did not immediately name a successor for Vahland, who also led Volkswagen's China operation for a period and was most recently chairman of the Skoda brand.

"In the last 25 years, Professor Vahland made a great contribution to the company," Volkswagen Group CEO Matthias Mueller said in a statement. "We respect his decision and thank him for his exceptional performance."

AP

http://bigstory.ap.org/article/24588210332a4d0b8f19490d0c9649e6/recently-named-head-vw-north-america-will-not-take-post

Recently named head of VW North America will not take post

By DAVID McHUGH and TOM KRISHER

Oct. 14, 2015 9:38 AM EDT

FRANKFURT, Germany (AP) — The recently named head of Volkswagen's North American business won't be taking up his new job - and has left the company.

The announcement comes as Volkswagen faces a scandal over rigging the results of emissions testing of its diesel vehicles in the U.S. It means that one of the company's most experienced managers will not be coming to lead the company's response in the United States as it faces possible heavy fines from the Environmental Protection Agency.

Volkswagen's Skoda division made the announcement about its chairman, Winfried Vahland, in a news release on Wednesday.

The release said that Vahland will not be moving to take over his new position carrying overall responsibility for North America. It said his decision to quit was not related to the scandal over the diesel engines.

On Sept. 24, Volkswagen announced a reorganization of its North American operations that put Vahland over country executives including Volkswagen's U.S. chief, Michael Horn. The announcement came the same day Volkswagen named Matthias Mueller as CEO after Martin Winterkorn stepped down from the job.

VW had said Horn would remain as president and CEO of Volkswagen Group of America, but its U.S., Canada and Mexico markets will be "combined and significantly strengthened" to form a new "North America region" led by Vahland.

Vahland, the former head of VW's crucial China business, was leaving because of "differing views on the organization of the new group region."

Mueller thanked him for 25 years of service and a "great contribution to the company."

"We respect his decision and thank him for his exceptional performance," Mueller was quoted as saying in the Skoda statement.

Skoda, based in the Czech Republic, is one of VW's brands, which also include Audi, SEAT, Lamborghini and Bentley.

Forbes:

http://www.forbes.com/sites/beltway/2015/10/13/how-a-carbon-tax-could-have-prevented-the-volkswagen-diesel-scandal/2/

How A Carbon Tax Could Have Prevented The Volkswagen Diesel Scandal

Howard Gleckman, CONTRIBUTOR

If anyone needed another example of why a carbon tax is a good idea, look no further than Volkswagen's diesel scandal. The automaker's efforts to game the current system are a case study in what's wrong with government attempts to reduce pollution with regulation and tax subsidies, rather than through a relatively straight-forward tax on carbon-based fuels.

The current system is complex mix of environmental carrots and sticks. The sticks include regulation such as fuel economy standards. The carrots include tax subsidies. One was the (now-expired) alternative motor vehicle tax credit that was available to specific models that met detailed fuel economy requirements. Two models of VW Jettas qualified for credits of $1,300 and the LA Times reported in September that the government paid as much as $51 million in credits to buyers of VW diesel cars.

Unable to limit emissions, give consumers the high performance they want, and meet fuel economy standards, VW cheated. As you know by now, the firm installed software in its diesel cars designed to fool routine emissions tests—which made the cars appear "cleaner" than they really were. In all, VW reportedly sold 500,000 cars in the US from 2009-2015 with the rogue software. Here is a helpful description from Vox explaining the whole sad story.

VW eventually got caught, of course. It faces penalties from EPA and potential criminal charges for violating the False Claims Act, as well as an investigation by the Senate Finance Committee. CEO Martin Winterkorn has resigned and the firm has stopped selling diesel cars in the US.

Still, a lot of this mess could have been avoided with a carbon tax. Such a levy could replace many—though not all– of these complex rules and eliminate most incentives for gaming. A carbon tax would not help reduce local air pollutants such as NOx so it would not replace all auto pollution regulations. But it could supplant those that aim to reduce carbon emissions from vehicles.

For drivers, the choice would be relative simply: You buy a carbon-based fuel, you pay a tax. The more carbon in the fuel, the more tax you pay. The manufacturer wouldn't need to hit a mandated fuel economy standard. No-one would need to worry about conflicting regulations.

Instead, consumers would likely respond to higher taxes by demanding cars that, one way or another, use less carbon-based fuel. We have lots of evidence that consumers are extremely responsive to changes in gasoline prices—the price goes up, they buy Priuses; it goes down, they switch to less fuel-efficient vehicles.

And with a big carbon tax, manufacturers will probably respond to consumer demands by producing low-carbon vehicles. The proof will be at the pump. If an automaker lies about its fuel efficiency, it will be immediately obvious: Consumers will be filling up their tanks more often than they expected. And government won't have to test carbon emissions from tens of millions of cars. It will just need to calculate the carbon content of their fuel.

There is one other classic argument for corrective taxes such as a carbon tax. Such a levy provides ongoing incentives for firms to enhance technology and continue to drive down emissions. But with regulation or subsidies, even honest producers are more likely to hit the mandated target—and stop.

This is not to suggest that carbon taxes are not without their own complex issues. My Tax Policy Center colleagues Donald Marron and Eric Toder have described some of the technical challenges. But overall, market mechanisms such as carbon taxes (or a cap-and-trade system) are far more efficient, and much less prone to cheating, than a system based on regulations and subsidies.

Bloomberg:

http://www.bloomberg.com/news/articles/2015-10-14/volkswagen-s-designated-north-america-chief-leaves-carmaker

Volkswagen's Designated North America Chief Leaves Carmaker

Christoph Rauwald

October 14, 2015 — 8:58 AM EDT

Volkswagen AG's designated North America chief turned down the job in the wake of a management revamp triggered by the diesel-emissions scandal.

Winfried Vahland, a company veteran who currently leads VW's Czech Skoda unit, decided to not take over the new post as had been planned and will leave the carmaker, Skoda said in an e-mailed statement.

Vahland was among the candidates to succeed former VW Chief Executive Officer Martin Winterkorn, who resigned last month, but the supervisory board favored former Porsche chief Matthias Mueller. Vahland is leaving Wolfsburg, Germany-based Volkswagen at his own request. His departure is unrelated to the investigations into the rigging of millions of diesel engines worldwide, Skoda said in the statement.

Volkswagen said Tuesday it will reduce annual investment by about 1 billion euros ($1.1 billion) at its namesake car brand as the automaker steps up a cost-cutting push to weather the impact of the diesel-emissions scandal.

VW is under increasing financial strain following revelations last month that it rigged diesel engines to circumvent emissions regulations. The company set aside 6.5 billion euros for repairs and to compensate customers, but has said that won't be enough. VW faces numerous lawsuits in the U.S., where it has lost money and struggled to become more than an also-ran despite rapid expansion elsewhere.

Vahland was appointed head of VW's North American operations as part of a restructuring plan pushed by Mueller and meant to shift more responsibility to brand and regional managers. VW wasn't immediately available to comment on whether it still planned to fill the post.

Business Insider:

http://www.businessinsider.com/r-bosch-sees-diesel-market-so-far-unharmed-by-volkswagen-scandal-2015-10

Bosch sees diesel market so far unharmed by Volkswagen scandal

RENNINGEN, Germany (Reuters) - German automotive supplier Robert Bosch [ROBG.UL] has not seen any change so far in the diesel car market as a result of an emissions scandal that has rocked Volkswagen , its chief executive said on Wednesday.

"It will depend, though, on an active campaign for diesel to quickly dispel the current uncertainty that many consumers are feeling," Volkmar Denner told reporters at the opening of a new research center in the German town of Renningen near Stuttgart.

German Economy Minister Sigmar Gabriel warned against condemning diesel technology overall but said Germany needed to do better in switching to alternative engines.

He said he favored introducing incentives to reduce the price difference between electric and conventional cars.

Volkswagen, Europe's largest carmaker, last month admitted to cheating U.S. diesel emissions tests, sparking a crisis that unseated its CEO and wiped around a quarter off its market value.

Bosch is the maker of a popular diesel engine management program used by several top automakers including VW, which U.S. officials said last week was not preprogrammed to detect when a vehicle was undergoing laboratory emissions testing.

But it is not clear what role Bosch played, how closely it worked with VW to modify the engine management software and how much it knew about VW's intentions to use software to cheat on emissions standards.

Denner declined to comment on the matter.

He added that VW had not started talks to demand lower prices, following a media report that VW planned to extract 3 billion euros in price cuts from its suppliers to help mitigate the costs of the scandal.

(Reporting by Ilona Wissenbach; Writing by Georgina Prodhan; Editing by Louise Heavens)

Detroit News:

http://www.detroitnews.com/story/business/autos/2015/10/13/ann-arbor-epa-lab-diesel-tests-vw-scandal/73888296/

Ann Arbor EPA lab tests other cars after VW scandal

Michael Martinez, The Detroit News 5:05 p.m. EDT October 13, 2015

Ann Arbor — The Environmental Protection Agency on Tuesday said it's begun testing other automakers' vehicles in the wake of Volkswagen AG's massive diesel-testing scandal. Some of those tests are being done at the agency's emissions testing lab in Ann Arbor.

Janet McCabe, assistant administrator of the EPA's office of air and radiation, said the agency is "upping our game" following VW's admission last month that it cheated on emissions tests for more than 11 million diesel cars worldwide. The EPA said late last month it would conduct more spot checks of light-duty cars and trucks, testing vehicles owned by individuals and rental companies in real-world driving conditions. The EPA also could take cars from manufacturers' assembly lines.

"We're focused on diesel right now, but ... we're becoming the unpredictable EPA, so we'll be testing a range of vehicles with a range of configurations and situations," McCabe told reporters

at a Wednesday technology showcase event.

The EPA sent letters to automakers late last month, warning that it will take further steps to prevent fraud. New safeguards will "detect any kind of defeat devices" that might turn off pollution-control equipment, Chris Grundler, the head of the EPA's office of transportation and air quality, said. He called the new tests part of an "evolution" of enforcement.

McCabe declined to say if the agency discovered that any other automakers have used defeat devices. "When we finish that process we'll be able to talk about the results," she said.

The California Air Resources Board and Environment Canada also are conducting real-world vehicle emissions testing, and all three facilities plan to share the results.

McCabe said the EPA isn't necessarily looking at software that could potentially trigger the defeat devices, which VW used to evade tests on its diesel vehicles.

"Our focus is on what's coming out of the tailpipe, which is how our standards are set and what the cars need to be measured up against," she said. "What we're focused on is whether they meet the standards that are in our rules."

McCabe was in Ann Arbor Wednesday to celebrate the launch of the EPA's new heavy-duty truck chassis dynamometer, a $3 million piece of equipment built in Germany that allows the agency to perform emissions tests on full-size heavy-duty trucks. Previously, the EPA had to spend about a week removing truck engines to run the tests.

The new dynamometer is housed in part of the agency's 200,000-square-foot National Vehicle & Fuel Emissions lab in Ann Arbor. The lab includes a number of emissions testing rooms that run simulations on cars, trucks and even small equipment like lawn mowers in a wide range of climates and conditions

Reuters:

http://www.reuters.com/article/2015/10/13/us-volkswagen-emissions-epa-idUSKCN0S72R120151013

EPA hasn't decided if new software on 2016 VW diesels is legal

ANN ARBOR, MICH. | BY PAUL LIENERT

U.S. regulators haven't determined the legality of a new emission-control device on Volkswagen's (VOWG_p.DE) 2016 diesel models, a top official said on Tuesday.

Those models still have not been certified for sale by the U.S. Environmental Protection Agency.

The existence of the new software was made public last week by VW's top U.S. executive in testimony to a congressional subcommittee investigating the German automaker's diesel cheating scandal.

The company has not confirmed speculation that the new software was configured before the wider emissions scandal broke on Sept. 18.

"We have a long list of questions for VW," said EPA Assistant Administrator Janet McCabe at a media briefing here. "When we have all of the answers, we will be able to make a determination" on the whether the device is legal or considered to be a "defeat device" designed to circumvent U.S. emission rules.

VW last month admitted that it installed illegal software on its 2009-2015 U.S. diesel models that enabled the cars to pass laboratory tests, but dump higher-than-legal limits of pollutants in real-world driving.

VW told regulators only recently that some of its U.S. diesel models included a previously undisclosed software feature that could affect emission controls on the 2016 models, according to Michael Horn, president and CEO of Volkswagen Group of America. Horn told U.S. lawmakers last week that the company subsequently had withdrawn its application for EPA certification of its 2016 diesel models.

Asked for additional detail, a VW spokesperson on Monday said the software "has the function of a warmup strategy which is subject to approval" by EPA. Typical diesel emission control systems are designed to be most effective when the engine is warmed up.

The EPA defines such software as an "auxiliary emission control device," or AECD, and describes it as any device that can change the operation of the vehicle's emission control system.

The agency also requires automakers to disclose the existence of such a software device, including "a rationale for why it is not a defeat device."

VW on Monday said the EPA is evaluating the new software device, and that the automaker is "working with the regulators to continue the 2016 certification process" for VW vehicles equipped with the 2.0-liter diesel engine.

Daily Caller:

http://dailycaller.com/2015/10/13/volkswagen-lobbied-obama-administration-for-green-tax-credits/

Volkswagen Lobbied Obama Administration For Green Tax Credits

STEVE BIRR

11:41 AM 10/13/2015

As President Barack Obama pushed his green energy proposals for the auto-industry in 2011, Volkswagen was lobbying the administration for tax credits on its now tainted line of diesel vehicles.

Volkswagen wanted a green tax credit that applies to electric cars to be given to their diesel line as well. The Environmental Protection Agency, however, refused to go along with Volkswagen's plan and also declined Toyota's request to apply the same tax credit to their hybrid electric cars.

EPA documents from 2009 and 2010 show that Volkswagen supported the Obama administration's plan to reduce carbon dioxide emissions from automobiles. Former VW CEO Stefan Jacoby wrote to the EPA in 2010 praising their "leadership on this important subject." Jacoby, along with the EPA and other auto-makers, said they would "aim to make substantial annual progress in reducing transportation sector greenhouse gas emissions and fossil fuel consumption consistent with the Obama Administration's energy and climate security goals."

While Volkswagen was publicly backing White House efforts to tackle global warming and push green vehicles, the automaker was quietly lobbying behind the scenes to get government subsidies — the political price for the company's support of Obama's agenda. But the EPA refused to play ball, and Volkswagen withdrew its support for Obama's green vehicle push, according to The New York Times.

Margo Oge, the former director of the EPA Office of Transportation and Air Quality who worked closely with auto-makers on these proposals, told The New York Times that Volkswagen "wanted a special deal for diesel cars that we now know weren't even meeting the standard." Oge suggested that Volkswagen thought their diesel technology was superior to electric or hybrid alternatives, saying, "These people had religion, and that religion was diesel."

When Obama announced his plan to reduce carbon dioxide emissions from cars, Volkswagen was one of the only major automakers to not sign a letter of support for the president's agenda. The New York Times reports that much of this attitude came from overseas.

"My sense was that things were being dictated by Germany," said Oge.

Without a tax credit or subsidy, Volkswagen was going to have a tougher time meeting regulatory standards on emissions while still being able to advertise their diesel vehicles' good fuel economy and relatively low price. These reasons might have played a role in Volkswagen using "defeat devices" to get around EPA emissions tests.

Despite Volkswagen's efforts to get government assistance for their diesel line, their lobbying footprint in America remains relatively small, which could hurt them as this scandal moves forward. Volkswagen spent just $1.2 million on lobbying in 2014, a number dwarfed by General Motors which spends an average of $8.5 million a year on lobbying.

GM just recently settled with the government over the fact that they knowingly hid information about a faulty ignition switch that was linked directly to the deaths of 174 people. They were fined only $900 million and no one at GM was ever charged. Volkswagen currently faces up to $18 billion in potential fines.

To: Snyder, Jim[Snyder.Jim@epa.gov]
Cc: richard.thomas@vw.com[richard.thomas@vw.com]
From: Good, David
Sent: Wed 10/14/2015 3:47:09 PM
Subject: FW: Audi A3 e-tron ultra - Is it a blended or non-blended (parallel) PHEV?
monroney(18) A3 e-tron ultra.pdf

Jim,

When you tested the vehicle was it blended or non-blended?

My notes from an 11/20/2013 meeting indicate it was a parallel (blended) PHEV but the engine didn't come on during UDDS and Hwy testing.

[The label format is for a non-blended PHEV.]

Dave

From: Thomas, Richard (EEO) [mailto:Richard.Thomas@vw.com]
Sent: Friday, September 25, 2015 2:25 PM
To: Good, David
Cc: Snyder, Jim
Subject: Audi A3 e-tron ultra

Hi Dave;

As your requested, attached is a sample of the fuel economy label for the 2106 Audi A3 e-tron ultra. Please let me now if you have any concerns and that all the required data has been properly displayed. The factory has told me that it is a non-blended PHEV, I believe this point was already pointed out to EPA in an A3 e-tron presentation in early August.

Best regards,

Richard

Richard E. Thomas

Senior Emission Certification Specialist

Engineering & Environmental Office (EEO)

Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4213

Fax: 248 754 4207

mailto: Richard.Thomas@VW.com

LOC:
Exterior:

Dealer Stock Status:

VIN: Ex. 6
Interior:

MODEL: 8VA5PX-2016 Audi A3 Sportback 1.4T FWD e-tron S tronic
2015268-TEST LABEL

2016 Audi A3 Sportback 1.4T FWD e-tron S tronic

Audi
Truth in Engineering

STANDARD EQUIPMENT (unless replaced by options)

TECHNICAL
- 1.4 TFSI®, 4 CYL., PHEV, 204hp / 258lb-ft combined
- 6-speed S tronic® transmission
- 16" 15-spoke-Y-design wheels, 205/55 summer tires
- ESC (Electronic Stability Control) with secondary collision brake a
- Disc brakes, ventilated front & solid rear discs
- ABS (Anti-lock brake system) with brake assist
- Electromechanical speed-sensitive power steering
- TPMS (tire pressure monitoring system)

COMFORT/CONVENIENCE
- Panoramic sunroof w/ retractable sunshade
- Audi xenon plus headlights w/ LED DRLs & taillights
- Rain & light sensor
- Power adjustable exterior mirrors
- 12-way power adjustable driver seat including lumbar adjustment
- 60/40 split-folding rear seat
- Leather seating surfaces
- Dual-zone automatic climate control
- 3-spoke leather-wrapped multifunction steering wheel
- Audi sound system
- AM/FM/SAT/1CD audio w/ SD card reader & aux-in
- SIRIUS® satellite radio (w/ three-month complimentary subscripti
- Preparation for mobile phone (Bluetooth®)
- Driver information system
- Parking system plus with rearview camera
- Mobile charging unit
- Audi drive select
- LED interior lighting package

SAFETY/SECURITY
- Driver and front passenger advanced airbag supplemental restrai
- Driver and front passenger knee airbags
- Driver and front-passenger seat-mounted thorax side airbags
- Sideguard® inflatable curtain airbags
- Rear side airbags
- Driver 3-point safety belts with automatic pretensioning and force
- Front passenger 3-point safety belts with Automatic Locking Retr automatic pre-tensioning, and force limiters
- Rear outboard 3-point safety belts with Automatic Locking Retrac automatic pre-tensioning
- Rear center 3-point safety belt with Automatic Locking Retractor (
- Lower Anchors and Tethers for Children (LATCH) in rear
- Rear child safety locks
- Anti-theft vehicle alarm system

WARRANTY/MAINTENANCE
- 4 Year/50,000 mile (whichever occurs first) New Vehicle Limited

URER'S SUGGESTED RETAIL PRICE

Sportback 1.4T FWD e-tron S tronic $

)PTIONS

harge

RNMENT 5-STAR SAFETY R

ORPOR

Method:

EPA
DOT Fuel E

Plug-In Hybrid Vehicle
Electricity-Gasoline

Compact Cars range from 14 to 116 MPG. The best vehicle rates 119 MPGe.

Electricity
Charge Time: 2.5 hours (240V)
86 MPGe
38 kW-hrs per 100 miles
combined city/highway

Gasoline Only
39 MPG
2.8 gallons per 100 miles
combined city/highway

Driving Range
All electric range | Gasoline only
0 5 10 **17** miles 22 430

You **save**
$3,750
in fuel costs

Annual fuel **cost**
$1,050

Fuel Economy & Greenhou

1 10 8

This vehicle emits 99 grams of CO_2
distributing fuel & electricity also cr

Calculate personalized estimates and compare vehicles

Smartphone QR Code™

To: Allen, Laura[Allen.Laura@epa.gov]; Abrams, Dan[Abrams.Dan@epa.gov]; Conger, Nick[Conger.Nick@epa.gov]; Senn, John[Senn.John@epa.gov]; Millett, John[Millett.John@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Hull, George[Hull.George@epa.gov]; Valentine, Julia[Valentine.Julia@epa.gov]; Grantham, Nancy[Grantham.Nancy@epa.gov]; StClair, Christie[StClair.Christie@epa.gov]; Davis, Jay[Davis.Jay@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Cohen, Janet[cohen.janet@epa.gov]; Brooks, Phillip[Brooks.Phillip@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Giles-AA, Cynthia[Giles-AA.Cynthia@epa.gov]; Purchia, Liz[Purchia.Liz@epa.gov]
From: Gong, Kristiene
Sent: Wed 10/14/2015 3:51:56 PM
Subject: NVFEL Technology Showcase Clips 10/14/2015

MLive:

http://www.mlive.com/news/ann-arbor/index.ssf/2015/10/epa_unveils_new_heavy_duty_emi.html

EPA unveils new heavy-duty emissions-testing equipment at Ann Arbor lab

Ben Freed | benfreed@mlive.com on October 14, 2015 at 5:38 AM

At its annual Vehicle Technology Showcase, the National Vehicle and Fuel Emissions Laboratory in Ann Arbor unveiled a new tool for testing pollutants from heavy duty trucks.

The new chassis dynamometer is a massive treadmill for trucks that will help the lab simulate driving conditions and measure emissions in a real-time setting.

Before acquiring the $3 million machine, the lab had performed the tests by either removing the truck's engines—a difficult and time-consuming process—or installing portable engine measurement systems and driving the trucks on the road.

The Environmental Protection Agency, which runs the lab, will continue to use the other methods in addition to the chassis dynamometer, but this will allow for the testing of more trucks in shorter timeframes.

"Heavy duty trucks is the fastest growing transportation sector right now," Janet McCabe, who president Barack Obama has nominated to be assistant and administrator of the Office of Air and Radiation at the EPA, said.

"We move a lot of freight. It's amazing really how much is moved around our country and around the world."

Since the revelation in September that Volkswagen had installed software on its diesel cars that recognized when they were being tested on the chassis dynamometers, the EPA has focused on becoming more unpredictable testers. McCabe said the continued use of road and engine tests will be part of that strategy.

McCabe spoke just before a heavy duty truck was driven through a ceremonial banner and onto the new machine. She said the EPA has been working to improve standards and testing for heavy duty vehicles.

"Standards only help if they actually work out in practice," she said.

"That's why you need facilities like this. This facility is going to be a huge, huge element of our ability to move forward in curbing emissions."

Detroit News:

http://www.detroitnews.com/story/business/autos/2015/10/13/ann-arbor-epa-lab-diesel-tests-vw-scandal/73888296/

Ann Arbor EPA lab tests other cars after VW scandal

Michael Martinez, The Detroit News 5:05 p.m. EDT October 13, 2015

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To: Brooks, Phillip[Brooks.Phillip@epa.gov]
From: Tim Cheyne
Sent: Wed 10/14/2015 4:00:26 PM
Subject: Re: Expert Briefing: The VW diesel emissions crisis

VW market share, impacts and original emissions test data

No Images? **Click here**

Dear Phillip

I hope you're well, I wondered if you had reviewed the email below regarding the VW diesel emissions crisis.

The information in the media on VW is plentiful but often lacks detail and accuracy. Integer's Expert Briefing: The VW diesel emissions crisis goes beyond an account of what happened; it looks at the implications and consequences of VW's actions, not just for VW but for the diesel emissions industry as a whole.

This crisis will continue to impact the diesel emissions industry and your strategies need to account for this. This report offers a comprehensive solution providing crucial insights into what you can expect from the diesel industry - post VW crisis. Order securely online, email us or call +44 20 7503 1265 to discuss this report.

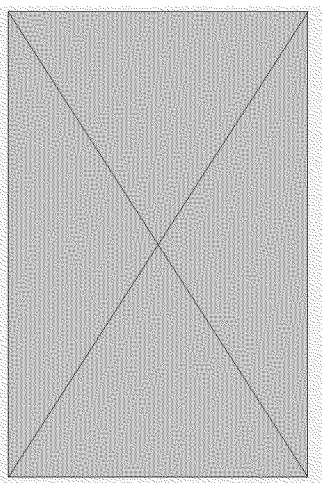
Kind regards,
Tim Cheyne - Director Environment & Emissions
Integer Research

NEW from Integer Research - Expert Briefing: The VW Diesel Emissions Crisis

Dear Phillip,

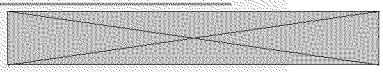
Volkswagen's (VW) recent 'defeat device' admission is one of the biggest scandals to hit the global emissions control market. This shock development is causing a great deal of uncertainty for all industry players.

Our emissions team have reacted quickly to prepare a comprehensive Expert Briefing exploring the issues in greater detail, offering vital primary research data and covering key areas, including:



Price: $950
Format: Powerpoint

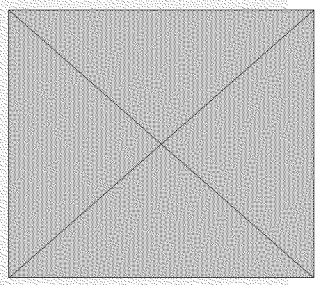
Overview >>
Free Extracts >>
Table of Contents >>



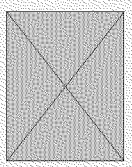
The report includes:

- The implications of the latest data from VW and from US customs
- Regulations and Electronic Control Units (ECUs) and fuel economy tests conducted by any independent group to date.
- How the rest of VW's business is likely to be affected
- The structure of emissions and CO2/fuel economy regulation in Europe
- The likelihood of active use of defeat devices by VW and others in Europe
- Implications for emissions regulations and diesel technology in Europe

Order online >>



User-friendly Powerpoint format



Cut through the media noise - acquire independent market data and expert analysis

We have seen much reported so far, and no doubt there will be more to come. All of which reinforces the need across the industry for trusted (no irony intended) data on what is actually happening and more importantly what it all means.

Why Integer?
Integer Research has spent over a decade analysing the diesel emissions sector. Our suite of leading conferences and range of high-quality publications and expert consulting services act as our credentials. Investing in our new Expert Briefing: The VW diesel emissions crisis >> will

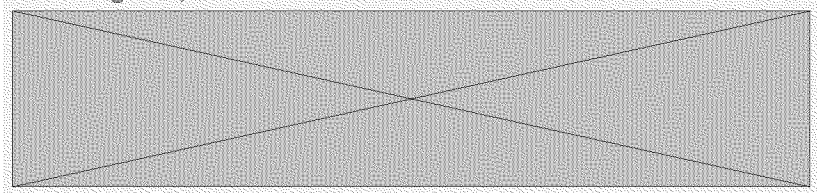
help answer your questions and provide vital clarity for your business.

You can order the briefing securely online today >> or alternatively, email us or call on +44 20 7503 1265.

I also look forward to seeing as many of you as possible at our forthcoming Integer Emissions Summit & DEF Forum USA 2015 >> in Chicago, 27-29 October, where we will also have a member of the VW emissions team presenting at the event.

If you have any questions regarding the impact of the VW story please don't hesitate to get in touch.

Kind regards,



Tim Cheyne
Director - Environment & Emissions

Sent by Integer Research
Invicta House, 108-114 Golden Lane London, EC1Y 0TL, UK
www.integer-research.com
You are receiving this message because you are a key figure in the emissions control industry
Preferences | **Unsubscribe**

To: Grundler, Christopher[grundler.christopher@epa.gov]
From: Ex. 7
Sent: Wed 10/14/2015 4:01:20 PM
Subject: RE: Call me when u have a moment re: VW

Will try for you between meetings.

-----Original Message-----
From: Grundler, Christopher [mailto:grundler.christopher@epa.gov]
Sent: Wednesday, October 14, 2015 8:53 AM
To: Ex. 7
Subject: Call me when u have a moment re: VW

Sent from my iPhone

To: Ex. 7
From: Grundler, Christopher
Sent: Wed 10/14/2015 4:04:33 PM
Subject: Re: Call me when u have a moment re: VW

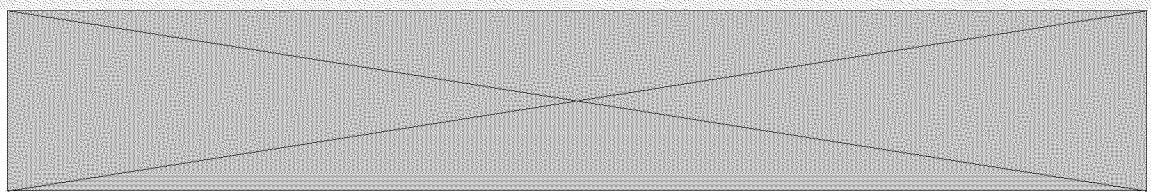
Thx. Use this #: **Ex. 6**

Sent from my iPhone

> On Oct 14, 2015, at 12:01 PM, Ex. 7 wrote:
>
> Will try for you between meetings.
>
> -----Original Message-----
> From: Grundler, Christopher [mailto:grundler.christopher@epa.gov]
> Sent: Wednesday, October 14, 2015 8:53 AM
> To: Ex. 7
> Subject: Call me when u have a moment re: VW
>
>
>
> Sent from my iPhone

To: Pidgeon, Bill[pidgeon.bill@epa.gov]
From: Green Car Reports
Sent: Wed 10/14/2015 4:04:41 PM
Subject: Green Car Report Daily Headlines

Email not displaying correctly? View it in your browser.



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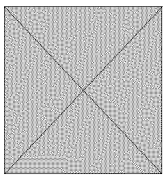
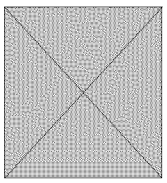
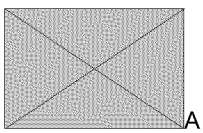




The latest from your friends at GCR:

Electric VW, Secret Software, Prius Info, Car Charging Rates: Today's Car News

Oct 14, 2015 03:30 pm | feedback@highgearmedia.com (John Voelcker)

 A bit more information on the 2016 Prius has emerged, Volkswagen plans to build its own electric luxury car, and why software secrecy could impede investigation of the VW diesel scandal. All this and more today on Green Car Reports. As part of Volkswagen's electrification plans (which we covered yesterday), it will build an all-electric VW Phaeton...

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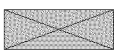
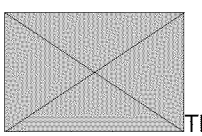


Carmakers Lobby To Keep Software Secret, Despite VW Emission Scandal

Oct 14, 2015 01:00 pm | feedback@highgearmedia.com (Stephen Edelstein)

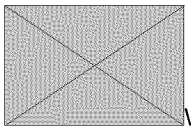
 The software that allowed Volkswagen diesel cars to cheat on emissions tests was not found by government regulators. Instead, its effects were discovered by researchers at West Virginia University, working with the

International Council on Clean Transportation. Confronted with on-road emission levels far higher than its test results, VW finally...

comments | read more

Buying An Electric Car: Why Charging Rate, DC Quick-Charging Matter

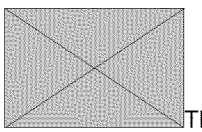
Oct 14, 2015 12:00 pm | feedback@highgearmedia.com (John Voelcker)

 We all know how to compare horsepower, acceleration, and gas mileage. Practical car buyers know to look at cargo volume, too. But when it comes to buying your first electric car, there are a few things you need to know about charging. Like the better-known measurements, the rate at which a plug-in car can charge its battery is a specification you...

comments | read more

2016 Toyota Prius: Some Model And Trim Level Information Revealed

Oct 14, 2015 11:30 am | feedback@highgearmedia.com (John Voelcker)

 The 2016 Toyota Prius hybrid has made its world debuts and should arrive at U.S. dealers starting around January. But specific details have been surprisingly sparse. Yesterday, Toyota released a few specifications at an event in Japan. Now, we've learned more about the car's different trim levels and paint colors. DON'T MISS: 2016 Toyota Prius: A...

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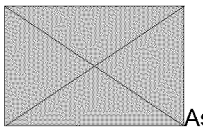
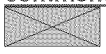
Next Volkswagen Phaeton To Go Electric (As VW Slashes Spending)

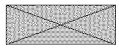
Oct 14, 2015 11:00 am | feedback@highgearmedia.com

(Stephen Edelstein)

 As it reels from the ongoing diesel-emissions cheating scandal, Volkswagen is cutting spending and putting future expansion and development projects on hold. But apparently there's one future vehicle that will continue to progress despite of these circumstances. As part of an announcement regarding near-term strategy released yesterday, the...

comments | read more





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Update your profile

To: Good, David[good.david@epa.gov]
Cc: richard.thomas@vw.com[richard.thomas@vw.com]; Rodgers, William (EEO)[William.Rodgers@vw.com]
From: Snyder, Jim
Sent: Wed 10/14/2015 4:38:21 PM
Subject: RE: Audi A3 e-tron ultra - Is it a blended or non-blended (parallel) PHEV?

Dave, correct, the engine didn't turn on during the CD tests but I think it may come on during on-road driving if the load request is high enough.

Jim

From: Good, David
Sent: Wednesday, October 14, 2015 11:47 AM
To: Snyder, Jim
Cc: richard.thomas@vw.com
Subject: FW: Audi A3 e-tron ultra - Is it a blended or non-blended (parallel) PHEV?

Jim,

When you tested the vehicle was it blended or non-blended?

My notes from an 11/20/2013 meeting indicate it was a parallel (blended) PHEV but the engine didn't come on during UDDS and Hwy testing.

[The label format is for a non-blended PHEV.]

Dave

From: Thomas, Richard (EEO) [mailto:Richard.Thomas@vw.com]
Sent: Friday, September 25, 2015 2:25 PM
To: Good, David

Cc: Snyder, Jim
Subject: Audi A3 e-tron ultra

Hi Dave;

As your requested, attached is a sample of the fuel economy label for the 2106 Audi A3 e-tron ultra. Please let me now if you have any concerns and that all the required data has been properly displayed. The factory has told me that it is a non-blended PHEV, I believe this point was already pointed out to EPA in an A3 e-tron presentation in early August.

Best regards,

Richard

Richard E. Thomas

Senior Emission Certification Specialist

Engineering & Environmental Office (EEO)

Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4213

Fax: 248 754 4207

mailto: Richard.Thomas@VW.com

To: Snyder, Jim[Snyder.Jim@epa.gov]
From: Rodgers, William (EEO)
Sent: Wed 10/14/2015 4:41:57 PM
Subject: RE: Audi A3 e-tron ultra - Is it a blended or non-blended (parallel) PHEV?

Hi Jim, Have you seen any CD data yet?

Regards,

Bill Rodgers

Emissions Certification Engineer

Volkswagen Group

3800 Hamlin Rd

Auburn Hills, MI 48326

p. (248) 754-4219

From: Snyder, Jim [mailto:Snyder.Jim@epa.gov]
Sent: Wednesday, October 14, 2015 12:38 PM
To: Good, David
Cc: Thomas, Richard (EEO); Rodgers, William (EEO)
Subject: RE: Audi A3 e-tron ultra - Is it a blended or non-blended (parallel) PHEV?

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Sent: Wednesday, October 14, 2015 11:47 AM

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Cc: richard.thomas@vw.com
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To: Good, David
Cc: Snyder, Jim
Subject: Audi A3 e-tron ultra

Hi Dave;

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Best regards,

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Volkswagen Group of America, Inc.

3800 Hamlin Road

Auburn Hills, MI 48326

Phone: 248 754 4213

Fax: 248 754 4207

mailto: Richard.Thomas@VW.com

To: Rodgers, William (EEO)[William.Rodgers@vw.com]
Cc: Giles, Michael (EEO)[michael.giles@vw.com]
From: Snyder, Jim
Sent: Wed 10/14/2015 4:42:06 PM
Subject: FW: Audi HWY Charge Depleting test Results
VW_PHEV_CD_HWY_100815_Hioki.xlsx

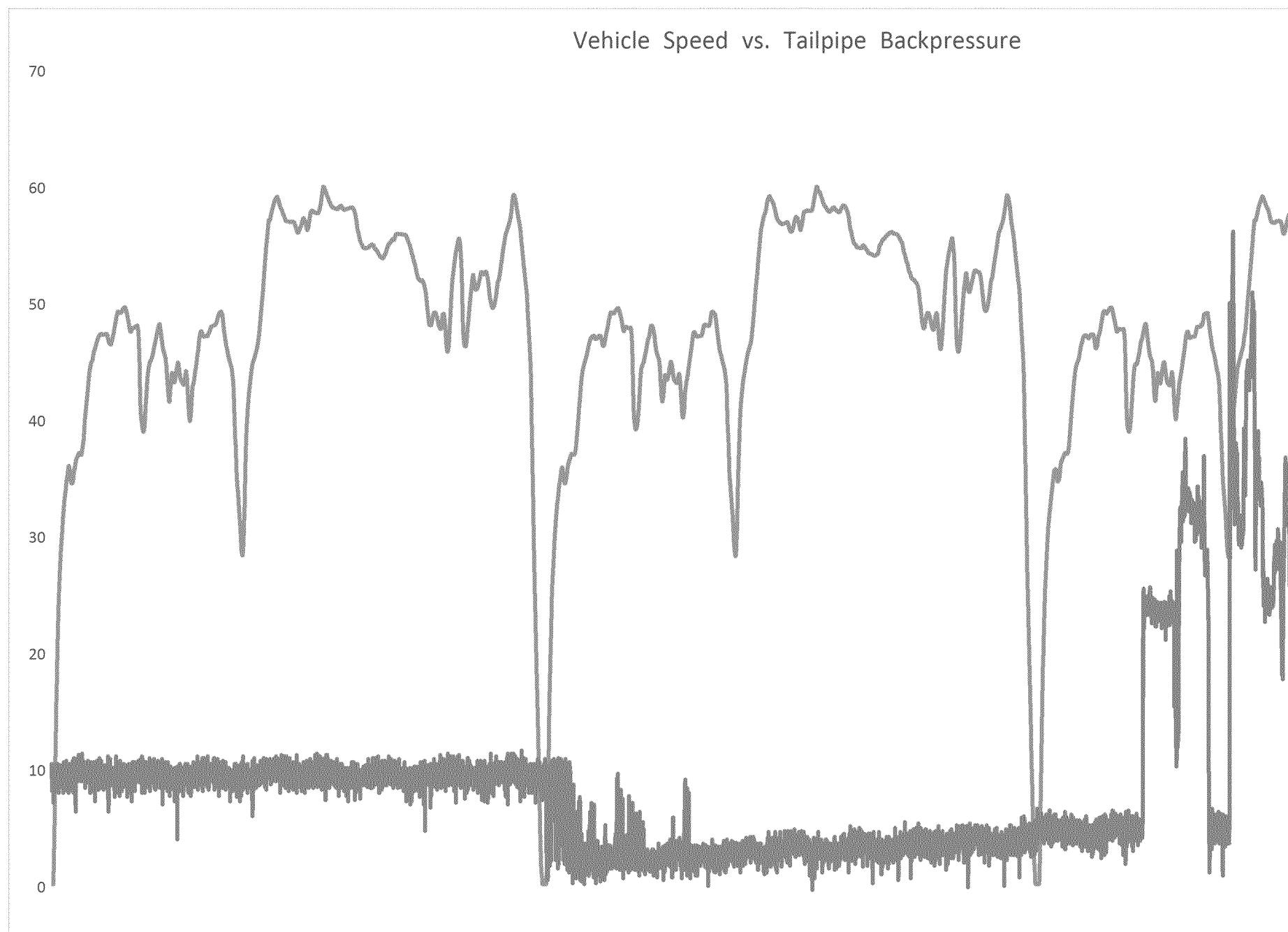
Here's the electrical data. I should get the T/P data today too. I also reminded them about the UDDS results.

From: Smithson, Arlene
Sent: Wednesday, October 14, 2015 11:45 AM
To: Snyder, Jim
Subject: Audi HWY Charge Depleting test Results

Hi, Jim:

Attached is the data of the HWY Charge Depleting test. Please let me know if you also need the emissions reports to deliver them to you since we cannot get that data through Verify.

Yours, Arlene


Vehicle Speed vs. Tailpipe Backpressure
70
60
50
40
30
20
10
0

TraceTime	DynoSpeed	TpBkPress	ExhaustFlo	HPM_Urm	HPM_Idc1	HPM_P1	HPM_IH1	HPM_IH1p	HPM_IH1n
FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT
s	mi/hr	inH2O	scfm	V	A	kW	Ah	Ah	Ah
0	0	-0.595	0.018	0	0	0	0	0	0
0	0	-0.595	0.018	0	1.18	0	0	0	0
0	0	-0.618	-0.265	0	1.18	0	0	0	0
0	0	-0.618	-0.265	0	1.22	0	0	0	0
0.1	0	-0.615	0.106	0	1.22	0	0	0	0
0.2	0	-0.593	-0.607	0	1.22	0	0	0	0
0.3	0	-0.6	-0.268	0	1.26	0	0	0	0
0.4	0	-0.6	-0.367	0	1.26	0	0	0	0
0.5	0	-0.6	0.102	0	1.23	0	0	0	0
0.6	0	-0.62	0.226	0	1.23	0	0	0	0
0.7	0	-0.62	-0.162	0	1.21	0	0	0	0
0.8	0	-0.64	-1.024	0	1.21	0	0	0	0
0.9	0	-0.635	-0.727	0	1.19	0	0	0	0
1	0	-0.635	-0.664	0	1.19	0	0	0	0
1.1	0	-0.63	-1.236	0	1.21	0	0	0	0
1.2	0	-0.62	-0.735	0	1.21	0	0	0	0
1.3	0	-0.615	-0.897	0	1.19	0	0	0	0
1.4	0	-0.615	-1.063	0	1.19	0	0	0	0
1.5	0	-0.615	-0.632	0	1.18	0	0.001	0.001	0
1.6	0	-0.615	-1.165	0	1.18	0	0.001	0.001	0
1.7	0	-0.608	-0.752	0	1.73	0	0.001	0.001	0
1.8	0	-0.605	-1.024	0	1.73	0	0.001	0.001	0
1.9	0	-0.608	-0.915	0	1.71	0	0.001	0.001	0
2	0	-0.625	-0.982	0	1.71	0	0.001	0.001	0
2.1	0	-0.623	-0.494	0	1.83	0	0.001	0.001	0
2.2	0	-0.623	-0.593	0	1.83	0	0.001	0.001	0
2.3	0	-0.628	-1.473	0	2.09	0	0.001	0.001	0
2.4	0	-0.653	-0.865	0	2.09	0	0.001	0.001	0
2.5	0	-0.653	0.233	0	3.46	0	0.001	0.001	0
2.6	0.099	-0.628	-0.978	0	3.46	0	0.001	0.001	0
2.7	0.168	-0.633	-1.307	0	6.75	0	0.001	0.001	0
2.8	0.292	-0.65	-0.65	0	6.75	0	0.001	0.001	0
2.9	0.454	-0.66	-0.65	0	7.22	0	0.002	0.002	0
3	0.721	-0.638	-0.406	0	7.22	0	0.002	0.002	0
3.1	0.951	-0.638	-1.059	0	8.53	0	0.002	0.002	0
3.2	1.205	-0.65	-1.307	0	8.53	0	0.002	0.002	0
3.3	1.473	-0.628	-0.081	0	10.46	0	0.003	0.003	0
3.4	1.727	-0.61	-0.975	0	10.46	0	0.003	0.003	0
3.5	2.001	-0.61	-1.187	0	13.82	0	0.004	0.004	0
3.6	2.28	-0.615	-0.448	0	13.82	0	0.004	0.004	0
3.7	2.585	-0.615	-0.604	0	16.69	0	0.004	0.004	0
3.8	2.883	-0.62	-0.975	0	16.69	0	0.004	0.004	0
3.9	3.188	-0.63	-0.487	0	21.42	0	0.006	0.006	0
4	3.505	-0.63	-0.83	0	21.42	0	0.006	0.006	0

4.1	3.84	-0.628	-0.547	0	26.07	0	0.007	0.007	0
4.2	4.188	-0.62	-1.264	0	26.07	0	0.007	0.007	0
4.3	4.555	-0.62	-0.643	0	26.07	0	0.007	0.007	0
4.4	4.909	-0.613	-1.098	0	30.08	0	0.009	0.009	0
4.5	5.288	-0.613	-0.992	0	36.39	0	0.011	0.011	0
4.6	5.679	-0.623	-0.731	0	36.39	0	0.011	0.011	0
4.7	6.089	-0.605	-0.731	0	46.05	0	0.013	0.013	0
4.8	6.524	-0.608	-1.303	0	46.05	0	0.013	0.013	0
4.9	6.953	-0.608	-0.745	0	53.31	0	0.016	0.016	0
5	7.388	-0.605	-0.565	0	53.31	0	0.016	0.016	0
5.1	7.829	-0.613	-0.964	0	56.23	0	0.019	0.019	0
5.2	8.289	-0.613	-0.565	0	56.23	0	0.019	0.019	0
5.3	8.736	-0.605	-0.777	0	57.28	0	0.022	0.022	0
5.4	9.184	-0.6	-0.876	0	57.28	0	0.022	0.022	0
5.5	9.631	-0.6	-0.862	0	57.68	0	0.025	0.025	0
5.6	10.072	-0.633	-0.65	0	57.68	0	0.025	0.025	0
5.7	10.489	-0.623	-0.431	0	56.87	0	0.028	0.028	0
5.8	10.849	-0.623	-1.067	0	56.87	0	0.028	0.028	0
5.9	11.166	-0.63	-1.141	0	55.83	0	0.031	0.031	0
6	11.446	-0.625	-0.816	0	55.83	0	0.031	0.031	0
6.1	11.7	-0.625	-1.052	0	56.87	0	0.035	0.035	0
6.2	11.999	-0.615	-1.084	0	56.87	0	0.035	0.035	0
6.3	12.34	-0.618	-0.961	0	50.75	0	0.038	0.038	0
6.4	12.651	-0.64	-0.816	0	50.75	0	0.038	0.038	0
6.5	12.943	-0.64	-0.78	0	54.82	0	0.041	0.041	0
6.6	13.241	-0.635	-0.247	0	54.82	0	0.041	0.041	0
6.7	13.552	-0.635	-0.675	0	58.73	0	0.044	0.044	0
6.8	13.869	-0.61	-1.67	0	58.73	0	0.044	0.044	0
6.9	14.186	-0.613	-0.706	0	61.85	0	0.047	0.047	0
7	14.503	-0.613	-0.735	0	61.85	0	0.047	0.047	0
7.1	14.832	-0.613	-0.388	0	63.29	0	0.051	0.051	0
7.2	15.155	-0.6	-0.65	0	63.29	0	0.051	0.051	0
7.3	15.472	-0.6	-1.483	0	64.75	0	0.054	0.054	0
7.4	15.789	-0.633	-0.975	0	64.75	0	0.054	0.054	0
7.5	16.1	-0.633	-0.357	0	66.29	0	0.058	0.058	0
7.6	16.423	-0.638	-0.59	0	66.29	0	0.058	0.058	0
7.7	16.721	-0.608	-0.802	0	67.55	0	0.062	0.062	0
7.8	17.013	-0.593	-1.042	0	67.55	0	0.062	0.062	0
7.9	17.305	-0.593	-1.247	0	70.7	0	0.066	0.066	0
8	17.591	-0.605	-0.936	0	70.7	0	0.066	0.066	0
8.1	17.864	-0.615	-0.759	0	82.88	0	0.07	0.07	0
8.2	18.094	-0.615	-0.244	0	82.88	0	0.07	0.07	0
8.3	18.343	-0.608	-1.07	0	66.73	0	0.074	0.074	0
8.4	18.61	-0.615	-0.699	0	66.73	0	0.074	0.074	0
8.5	18.865	-0.615	-0.636	0	66.73	0	0.074	0.074	0
8.6	19.113	-0.618	-0.745	0	68.46	0	0.078	0.078	0
8.7	19.368	-0.605	-0.611	0	69.4	0	0.082	0.082	0

8.8	19.629	-0.62	-1.289	0	69.4	0	0.082	0.082	0
8.9	19.878	-0.625	-0.798	0	69.91	0	0.086	0.086	0
9	20.132	-0.608	-0.162	0	69.91	0	0.086	0.086	0
9.1	20.387	-0.608	-1.169	0	72.85	0	0.09	0.09	0
9.2	20.642	-0.613	-0.961	0	72.85	0	0.09	0.09	0
9.3	20.897	-0.63	-0.844	0	69.98	0	0.093	0.093	0
9.4	21.145	-0.63	-0.417	0	69.98	0	0.093	0.093	0
9.5	21.375	-0.635	-0.392	0	66.09	0	0.097	0.097	0
9.6	21.605	-0.625	-1.003	0	66.09	0	0.097	0.097	0
9.7	21.829	-0.625	-1.021	0	66.97	0	0.101	0.101	0
9.8	22.052	-0.593	-1.402	0	66.97	0	0.101	0.101	0
9.9	22.276	-0.6	-1.317	0	67.96	0	0.105	0.105	0
10	22.494	-0.6	-1.003	0	67.96	0	0.105	0.105	0
10.1	22.711	-0.635	-0.343	0	66.86	0	0.108	0.108	0
10.2	22.929	-0.63	-0.392	0	66.86	0	0.108	0.108	0
10.3	23.127	-0.63	-0.83	0	62.02	0	0.112	0.112	0
10.4	23.32	-0.603	-1.293	0	62.02	0	0.112	0.112	0
10.5	23.506	-0.603	-1.331	0	61.01	0	0.115	0.115	0
10.6	23.693	-0.61	-0.802	0	61.36	0	0.117	0.117	0
10.7	23.873	-0.615	-0.83	0	62.54	0	0.119	0.119	0
10.8	24.053	-0.605	-0.742	0	62.54	0	0.119	0.119	0
10.9	24.246	-0.605	-1.084	0	64.38	0	0.122	0.122	0
11	24.432	-0.643	-0.759	0	64.38	0	0.122	0.122	0
11.1	24.619	-0.64	0.014	0	62.99	0	0.126	0.126	0
11.2	24.799	-0.64	-0.989	0	58.12	0	0.127	0.127	0
11.3	24.967	-0.613	-0.717	0	52.34	0	0.129	0.129	0
11.4	25.11	-0.61	-1.07	0	52.34	0	0.129	0.129	0
11.5	25.259	-0.61	-1.07	0	52.43	0	0.132	0.132	0
11.6	25.389	-0.608	-0.664	0	53.12	0	0.133	0.133	0
11.7	25.532	-0.613	-1.127	0	55.14	0	0.135	0.135	0
11.8	25.675	-0.62	-1.187	0	55.14	0	0.135	0.135	0
11.9	25.818	-0.613	-0.593	0	67.53	0	0.138	0.138	0
12	25.955	-0.598	-0.417	0	67.53	0	0.138	0.138	0
12.1	26.085	-0.598	-1.497	0	51.25	0	0.141	0.141	0
12.2	26.209	-0.633	-0.872	0	51.56	0	0.143	0.143	0
12.3	26.327	-0.618	-0.162	0	50.39	0	0.144	0.144	0
12.4	26.446	-0.618	-0.876	0	50.39	0	0.144	0.144	0
12.5	26.564	-0.605	-1.483	0	49.2	0	0.147	0.147	0
12.6	26.682	-0.618	-0.975	0	49.2	0	0.147	0.147	0
12.7	26.794	-0.618	-0.501	0	49.2	0	0.147	0.147	0
12.8	26.905	-0.615	-0.664	0	48.66	0	0.15	0.15	0
12.9	27.023	-0.618	-1.003	0	49.8	0	0.152	0.152	0
13	27.141	-0.618	-0.858	0	49.8	0	0.152	0.152	0
13.1	27.253	-0.61	-0.374	0	49.43	0	0.155	0.155	0
13.2	27.371	-0.595	-0.904	0	49.43	0	0.155	0.155	0
13.3	27.489	-0.605	-0.989	0	49.41	0	0.158	0.158	0
13.4	27.608	-0.623	-1.201	0	49.41	0	0.158	0.158	0

13.5	27.719	-0.623	-0.258	0	50.34	0	0.161	0.161	0
13.6	27.831	-0.613	-0.869	0	50.34	0	0.161	0.161	0
13.7	27.949	-0.615	-1.155	0	50.32	0	0.163	0.163	0
13.8	28.067	-0.62	-0.89	0	50.32	0	0.163	0.163	0
13.9	28.179	-0.62	-0.565	0	50.32	0	0.166	0.166	0
14	28.291	-0.613	-1.155	0	50.32	0	0.166	0.166	0
14.1	28.403	-0.618	-0.83	0	50.26	0	0.169	0.169	0
14.2	28.515	-0.618	-0.989	0	50.26	0	0.169	0.169	0
14.3	28.62	-0.625	-0.65	0	50.06	0	0.172	0.172	0
14.4	28.732	-0.608	-0.487	0	50.06	0	0.172	0.172	0
14.5	28.832	-0.608	-1.07	0	45.22	0	0.174	0.174	0
14.6	28.925	-0.6	-1.218	0	41.6	0	0.176	0.176	0
14.7	29.012	-0.61	-0.731	0	40.42	0	0.177	0.177	0
14.8	29.093	-0.61	-0.788	0	40.24	0	0.178	0.178	0
14.9	29.167	-0.62	-0.459	0	40.14	0	0.179	0.179	0
15	29.248	-0.63	-0.989	0	40.14	0	0.179	0.179	0
15.1	29.323	-0.63	-0.258	0	40.22	0	0.181	0.181	0
15.2	29.403	-0.613	-0.745	0	40.22	0	0.181	0.181	0
15.3	29.478	-0.605	-0.865	0	40.32	0	0.183	0.183	0
15.4	29.552	-0.605	-0.788	0	40.32	0	0.183	0.183	0
15.5	29.627	-0.613	-0.83	0	40.86	0	0.186	0.186	0
15.6	29.702	-0.618	-0.519	0	40.86	0	0.186	0.186	0
15.7	29.77	-0.618	-0.872	0	43.38	0	0.188	0.188	0
15.8	29.844	-0.61	-1.028	0	43.38	0	0.188	0.188	0
15.9	29.913	-0.598	-0.731	0	46.24	0	0.191	0.191	0
16	29.987	-0.598	-1.07	0	46.24	0	0.191	0.191	0
16.1	30.062	-0.618	-1.035	0	39.87	0	0.193	0.193	0
16.2	30.13	-0.613	-0.579	0	39.87	0	0.193	0.193	0
16.3	30.192	-0.613	-0.745	0	39.98	0	0.195	0.195	0
16.4	30.261	-0.605	-1.42	0	39.98	0	0.195	0.195	0
16.5	30.335	-0.605	-0.759	0	43.72	0	0.197	0.197	0
16.6	30.41	-0.603	-1.003	0	43.72	0	0.197	0.197	0
16.7	30.503	-0.62	-0.989	0	48.7	0	0.2	0.2	0
16.8	30.584	-0.623	-0.664	0	48.7	0	0.2	0.2	0
16.9	30.677	-0.623	-0.516	0	48.7	0	0.2	0.2	0
17	30.77	-0.623	-0.989	0	49.12	0	0.203	0.203	0
17.1	30.87	-0.633	-0.915	0	50.24	0	0.206	0.206	0
17.2	30.975	-0.633	-0.664	0	50.24	0	0.206	0.206	0
17.3	31.062	-0.618	-0.664	0	51.15	0	0.208	0.208	0
17.4	31.156	-0.628	-1.056	0	51.15	0	0.208	0.208	0
17.5	31.255	-0.635	-0.89	0	51.16	0	0.211	0.211	0
17.6	31.354	-0.613	-0.501	0	49.84	0	0.213	0.213	0
17.7	31.448	-0.6	-1.084	0	48.49	0	0.214	0.214	0
17.8	31.535	-0.61	-1.441	0	48.49	0	0.214	0.214	0
17.9	31.622	-0.643	-1.169	0	45.92	0	0.217	0.217	0
18	31.702	-0.643	-0.078	0	45.92	0	0.217	0.217	0
18.1	31.783	-0.643	-0.417	0	44.06	0	0.219	0.219	0

18.2	31.864	-0.625	-1.483	0	43.95	0	0.22	0.22	0
18.3	31.932	-0.603	-0.904	0	43.92	0	0.221	0.221	0
18.4	32.007	-0.603	-1.07	0	43.06	0	0.223	0.223	0
18.5	32.075	-0.59	-1.384	0	43.07	0	0.224	0.224	0
18.6	32.15	-0.615	-0.463	0	43.07	0	0.224	0.224	0
18.7	32.224	-0.615	-0.65	0	42.99	0	0.226	0.226	0
18.8	32.293	-0.593	-0.547	0	42.99	0	0.226	0.226	0
18.9	32.361	-0.593	-1.398	0	43.01	0	0.229	0.229	0
19	32.429	-0.593	-1.275	0	43.01	0	0.229	0.229	0
19.1	32.504	-0.598	-0.417	0	43.04	0	0.231	0.231	0
19.2	32.572	-0.598	-0.731	0	43.04	0	0.231	0.231	0
19.3	32.641	-0.598	-1.194	0	43.01	0	0.233	0.233	0
19.4	32.709	-0.625	-0.106	0	43.01	0	0.233	0.233	0
19.5	32.784	-0.625	-0.244	0	40.83	0	0.236	0.236	0
19.6	32.846	-0.61	-1.141	0	40.83	0	0.236	0.236	0
19.7	32.902	-0.613	-1.112	0	38.31	0	0.238	0.238	0
19.8	32.958	-0.615	-0.745	0	38.31	0	0.238	0.238	0
19.9	33.013	-0.598	-0.551	0	36.62	0	0.24	0.24	0
20	33.063	-0.603	-0.83	0	36.62	0	0.24	0.24	0
20.1	33.113	-0.613	-1.07	0	33.95	0	0.242	0.242	0
20.2	33.156	-0.613	-0.664	0	33.95	0	0.242	0.242	0
20.3	33.2	-0.613	-0.95	0	33.91	0	0.244	0.244	0
20.4	33.243	-0.615	-0.904	0	33.91	0	0.244	0.244	0
20.5	33.287	-0.603	-0.343	0	33.93	0	0.246	0.246	0
20.6	33.324	-0.598	-0.699	0	33.93	0	0.246	0.246	0
20.7	33.368	-0.62	-1.155	0	33.91	0	0.247	0.247	0
20.8	33.411	-0.618	-0.731	0	33.92	0	0.248	0.248	0
20.9	33.448	-0.615	-0.078	0	33.97	0	0.249	0.249	0
21	33.492	-0.618	-1.056	0	33.87	0	0.25	0.25	0
21.1	33.535	-0.618	-0.685	0	33.87	0	0.25	0.25	0
21.2	33.573	-0.623	-0.745	0	33.88	0	0.251	0.251	0
21.3	33.616	-0.61	-0.258	0	33.93	0	0.253	0.253	0
21.4	33.66	-0.61	-0.989	0	33.93	0	0.253	0.253	0
21.5	33.697	-0.618	-0.975	0	34.64	0	0.255	0.255	0
21.6	33.74	-0.628	-0.191	0	34.64	0	0.255	0.255	0
21.7	33.79	-0.628	-0.417	0	39.48	0	0.257	0.257	0
21.8	33.84	-0.628	-1.218	0	39.48	0	0.257	0.257	0
21.9	33.902	-0.633	-0.731	0	42.28	0	0.259	0.259	0
22	33.964	-0.633	-0.664	0	42.28	0	0.259	0.259	0
22.1	34.026	-0.605	-0.83	0	42.23	0	0.262	0.262	0
22.2	34.088	-0.608	-1.317	0	42.23	0	0.262	0.262	0
22.3	34.151	-0.605	-0.858	0	42.19	0	0.264	0.264	0
22.4	34.206	-0.603	-0.869	0	42.19	0	0.264	0.264	0
22.5	34.269	-0.603	-1.07	0	41.28	0	0.266	0.266	0
22.6	34.325	-0.588	-1.021	0	41.28	0	0.266	0.266	0
22.7	34.38	-0.61	-1.218	0	39.72	0	0.269	0.269	0
22.8	34.436	-0.62	-0.212	0	39.72	0	0.269	0.269	0

22.9	34.486	-0.62	-0.463	0	38.87	0	0.271	0.271	0
23	34.536	-0.613	-0.745	0	38.87	0	0.271	0.271	0
23.1	34.586	-0.623	-0.904	0	38.87	0	0.273	0.273	0
23.2	34.641	-0.623	-0.664	0	38.87	0	0.274	0.274	0
23.3	34.691	-0.598	-0.65	0	38.92	0	0.275	0.275	0
23.4	34.741	-0.595	-1.398	0	38.81	0	0.276	0.276	0
23.5	34.791	-0.595	-0.593	0	37.12	0	0.277	0.277	0
23.6	34.834	-0.598	-0.759	0	33.87	0	0.278	0.278	0
23.7	34.884	-0.6	-0.565	0	30.14	0	0.279	0.279	0
23.8	34.909	-0.61	-0.745	0	30.14	0	0.279	0.279	0
23.9	34.933	-0.618	-0.579	0	26.74	0	0.281	0.281	0
24	34.952	-0.64	-0.487	0	26.74	0	0.281	0.281	0
24.1	34.977	-0.64	-0.618	0	26.71	0	0.282	0.282	0
24.2	34.996	-0.623	0.222	0	26.71	0	0.282	0.282	0
24.3	35.014	-0.61	-1.084	0	26.69	0	0.284	0.284	0
24.4	35.033	-0.608	-1.028	0	26.69	0	0.284	0.284	0
24.5	35.058	-0.608	-0.759	0	29.55	0	0.285	0.285	0
24.6	35.083	-0.623	-0.844	0	29.55	0	0.285	0.285	0
24.7	35.12	-0.623	-0.579	0	34.86	0	0.287	0.287	0
24.8	35.157	-0.598	-0.579	0	34.86	0	0.287	0.287	0
24.9	35.207	-0.608	-1.084	0	40.07	0	0.289	0.289	0
25	35.257	-0.608	-0.696	0	40.07	0	0.289	0.289	0
25.1	35.319	-0.62	-0.177	0	43.84	0	0.292	0.292	0
25.2	35.381	-0.608	-0.579	0	43.84	0	0.292	0.292	0
25.3	35.443	-0.608	-1.413	0	43.84	0	0.292	0.292	0
25.4	35.511	-0.603	-0.678	0	44.46	0	0.294	0.294	0
25.5	35.574	-0.603	-0.788	0	43.78	0	0.297	0.297	0
25.6	35.636	-0.603	-1.021	0	43.78	0	0.297	0.297	0
25.7	35.685	-0.615	-0.403	0	37.7	0	0.299	0.299	0
25.8	35.735	-0.61	-0.565	0	37.7	0	0.299	0.299	0
25.9	35.766	-0.61	-0.989	0	30.54	0	0.3	0.3	0
26	35.797	-0.613	-0.816	0	30.54	0	0.3	0.3	0
26.1	35.822	-0.61	-0.579	0	29.56	0	0.302	0.302	0
26.2	35.847	-0.61	-0.83	0	29.56	0	0.302	0.302	0
26.3	35.872	-0.643	-1.169	0	29.33	0	0.304	0.304	0
26.4	35.897	-0.635	-0.162	0	29.33	0	0.304	0.304	0
26.5	35.915	-0.63	-0.501	0	22.53	0	0.305	0.305	0
26.6	35.921	-0.62	-0.968	0	18.1	0	0.306	0.306	0
26.7	35.921	-0.613	-0.904	0	15.81	0	0.306	0.306	0
26.8	35.915	-0.598	-0.869	0	15.81	0	0.306	0.306	0
26.9	35.903	-0.595	-0.883	0	13.35	0	0.307	0.307	0
27	35.884	-0.6	-0.989	0	13.35	0	0.307	0.307	0
27.1	35.866	-0.6	-0.745	0	10.44	0	0.307	0.307	0
27.2	35.841	-0.61	-0.805	0	10.44	0	0.307	0.307	0
27.3	35.816	-0.598	-0.618	0	8.42	0	0.308	0.308	0
27.4	35.785	-0.598	-1.275	0	8.42	0	0.308	0.308	0
27.5	35.754	-0.593	-0.83	0	9.83	0	0.308	0.308	0

27.6	35.729	-0.615	-0.89	0	9.83	0	0.308	0.308	0
27.7	35.698	-0.615	-0.83	0	2.75	0	0.309	0.309	0
27.8	35.673	-0.603	-0.501	0	2.75	0	0.309	0.309	0
27.9	35.636	-0.595	-1.07	0	0	0	0.309	0.309	0
28	35.586	-0.595	-1.278	0	0	0	0.309	0.309	0
28.1	35.542	-0.615	-0.431	0	0.68	0	0.309	0.309	0
28.2	35.493	-0.623	-0.579	0	0.68	0	0.309	0.309	0
28.3	35.443	-0.618	-0.759	0	0.65	0	0.309	0.309	0
28.4	35.393	-0.608	-0.639	0	0.65	0	0.309	0.309	0
28.5	35.35	-0.608	-1.07	0	0.65	0	0.309	0.309	0
28.6	35.3	-0.605	-0.731	0	0.65	0	0.309	0.309	0
28.7	35.25	-0.608	-0.904	0	0.66	0	0.309	0.309	0
28.8	35.201	-0.61	-0.784	0	0.66	0	0.309	0.309	0
28.9	35.151	-0.61	-0.759	0	0.68	0	0.309	0.309	0
29	35.101	-0.61	-0.745	0	0.68	0	0.309	0.309	0
29.1	35.052	-0.62	-0.918	0	0.68	0	0.309	0.309	0
29.2	35.002	-0.62	-1.035	0	0.67	0	0.309	0.309	0
29.3	34.952	-0.595	-0.417	0	0.69	0	0.309	0.309	0
29.4	34.902	-0.6	-1.232	0	0.69	0	0.309	0.309	0
29.5	34.859	-0.6	-0.95	0	0.69	0	0.309	0.309	0
29.6	34.809	-0.61	-0.431	0	0.69	0	0.309	0.309	0
29.7	34.766	-0.618	-0.618	0	0.55	0	0.309	0.309	0
29.8	34.716	-0.63	-0.664	0	0.55	0	0.309	0.309	0
29.9	34.666	-0.62	-0.551	0	0.54	0	0.309	0.309	0
30	34.623	-0.605	-0.699	0	0.54	0	0.309	0.309	0
30.1	34.573	-0.605	-1.356	0	1.63	0	0.309	0.309	0
30.2	34.523	-0.595	-0.964	0	1.63	0	0.309	0.309	0
30.3	34.486	-0.61	-0.869	0	11.14	0	0.31	0.31	0
30.4	34.461	-0.61	-0.593	0	11.14	0	0.31	0.31	0
30.5	34.449	-0.625	-0.046	0	14.66	0	0.31	0.31	0
30.6	34.443	-0.608	-0.844	0	14.66	0	0.31	0.31	0
30.7	34.436	-0.608	-1.247	0	16.08	0	0.311	0.311	0
30.8	34.43	-0.61	-0.431	0	16.08	0	0.311	0.311	0
30.9	34.424	-0.605	-0.678	0	17.31	0	0.312	0.312	0
31	34.424	-0.605	-1.169	0	17.31	0	0.312	0.312	0
31.1	34.424	-0.62	-0.932	0	19.9	0	0.313	0.313	0
31.2	34.43	-0.615	-0.431	0	19.9	0	0.313	0.313	0
31.3	34.43	-0.603	-0.724	0	19.92	0	0.314	0.314	0
31.4	34.436	-0.605	-1.169	0	19.92	0	0.314	0.314	0
31.5	34.436	-0.605	-0.865	0	17.63	0	0.315	0.315	0
31.6	34.436	-0.615	-0.417	0	17.34	0	0.316	0.316	0
31.7	34.436	-0.608	-0.745	0	17.35	0	0.316	0.316	0
31.8	34.43	-0.613	-1.07	0	17.35	0	0.316	0.316	0
31.9	34.43	-0.613	-0.717	0	18.99	0	0.317	0.317	0
32	34.43	-0.61	-0.463	0	18.99	0	0.317	0.317	0
32.1	34.436	-0.615	-0.745	0	20.55	0	0.319	0.319	0
32.2	34.443	-0.615	-0.579	0	21.03	0	0.319	0.319	0

32.3	34.449	-0.598	-0.682	0	21.26	0	0.32	0.32	0
32.4	34.455	-0.588	-0.745	0	22.19	0	0.32	0.32	0
32.5	34.461	-0.588	-1.201	0	23.42	0	0.321	0.321	0
32.6	34.48	-0.628	-0.265	0	23.42	0	0.321	0.321	0
32.7	34.499	-0.64	-0.201	0	27.72	0	0.322	0.322	0
32.8	34.517	-0.638	-0.844	0	27.72	0	0.322	0.322	0
32.9	34.542	-0.618	-0.533	0	29.33	0	0.324	0.324	0
33	34.573	-0.608	-1.232	0	29.33	0	0.324	0.324	0
33.1	34.604	-0.608	-1.218	0	31.32	0	0.326	0.326	0
33.2	34.635	-0.605	-1.035	0	31.32	0	0.326	0.326	0
33.3	34.673	-0.623	-0.989	0	34.2	0	0.328	0.328	0
33.4	34.71	-0.623	-0.745	0	34.2	0	0.328	0.328	0
33.5	34.753	-0.62	-0.258	0	34.31	0	0.33	0.33	0
33.6	34.784	-0.608	-1.116	0	34.31	0	0.33	0.33	0
33.7	34.828	-0.625	-0.953	0	34.31	0	0.33	0.33	0
33.8	34.884	-0.643	-0.501	0	41.32	0	0.332	0.332	0
33.9	34.946	-0.638	-0.791	0	43.81	0	0.334	0.334	0
34	35.008	-0.638	-0.463	0	43.81	0	0.334	0.334	0
34.1	35.064	-0.605	-1.247	0	47.16	0	0.337	0.337	0
34.2	35.145	-0.6	-1.084	0	47.16	0	0.337	0.337	0
34.3	35.219	-0.6	-0.745	0	48.84	0	0.339	0.339	0
34.4	35.281	-0.59	-0.579	0	48.84	0	0.339	0.339	0
34.5	35.362	-0.59	-0.918	0	48.68	0	0.342	0.342	0
34.6	35.431	-0.6	-0.579	0	48.68	0	0.342	0.342	0
34.7	35.499	-0.585	-0.258	0	41.05	0	0.345	0.345	0
34.8	35.555	-0.583	-0.904	0	41.05	0	0.345	0.345	0
34.9	35.592	-0.583	-1.398	0	25.44	0	0.346	0.346	0
35	35.611	-0.593	-0.431	0	23.14	0	0.347	0.347	0
35.1	35.617	-0.588	-0.417	0	22.94	0	0.347	0.347	0
35.2	35.629	-0.588	-1.116	0	22.85	0	0.348	0.348	0
35.3	35.636	-0.605	-0.724	0	22.86	0	0.349	0.349	0
35.4	35.642	-0.603	-0.374	0	22.86	0	0.349	0.349	0
35.5	35.654	-0.603	-0.759	0	22.82	0	0.35	0.35	0
35.6	35.66	-0.613	-0.805	0	22.82	0	0.35	0.35	0
35.7	35.667	-0.608	-0.343	0	23.33	0	0.351	0.351	0
35.8	35.679	-0.61	-0.533	0	23.33	0	0.351	0.351	0
35.9	35.692	-0.598	-0.607	0	27.61	0	0.353	0.353	0
36	35.71	-0.593	-0.579	0	27.61	0	0.353	0.353	0
36.1	35.735	-0.593	-1.155	0	34.42	0	0.355	0.355	0
36.2	35.779	-0.61	-0.593	0	34.42	0	0.355	0.355	0
36.3	35.816	-0.59	-0.653	0	36.3	0	0.357	0.357	0
36.4	35.859	-0.585	-1.18	0	36.3	0	0.357	0.357	0
36.5	35.903	-0.585	-1.183	0	36.31	0	0.359	0.359	0
36.6	35.94	-0.608	-0.399	0	36.31	0	0.359	0.359	0
36.7	35.99	-0.608	-0.388	0	36.28	0	0.361	0.361	0
36.8	36.027	-0.613	-0.745	0	36.28	0	0.361	0.361	0
36.9	36.064	-0.603	-0.622	0	36.34	0	0.363	0.363	0

37	36.102	-0.603	-0.918	0	36.34	0	0.363	0.363	0
37.1	36.145	-0.653	-1.074	0	36.35	0	0.365	0.365	0
37.2	36.182	-0.675	-0.388	0	36.38	0	0.366	0.366	0
37.3	36.232	-0.633	0.523	0	35.72	0	0.367	0.367	0
37.4	36.269	-0.598	-1.247	0	33.79	0	0.368	0.368	0
37.5	36.307	-0.598	-2.091	0	30.04	0	0.368	0.368	0
37.6	36.332	-0.603	-0.417	0	29.63	0	0.369	0.369	0
37.7	36.356	-0.605	-0.343	0	29.62	0	0.37	0.37	0
37.8	36.381	-0.615	-1.084	0	29.44	0	0.371	0.371	0
37.9	36.4	-0.615	-0.593	0	29.44	0	0.371	0.371	0
38	36.425	-0.6	-0.562	0	29.6	0	0.372	0.372	0
38.1	36.45	-0.595	-0.918	0	28.63	0	0.373	0.373	0
38.2	36.468	-0.595	-0.904	0	28.63	0	0.373	0.373	0
38.3	36.487	-0.608	-0.593	0	27.19	0	0.375	0.375	0
38.4	36.506	-0.62	-0.664	0	27.19	0	0.375	0.375	0
38.5	36.518	-0.62	-0.516	0	25.47	0	0.376	0.376	0
38.6	36.53	-0.61	-0.417	0	25.47	0	0.376	0.376	0
38.7	36.543	-0.62	-1.003	0	24.76	0	0.378	0.378	0
38.8	36.555	-0.618	-1.003	0	24.76	0	0.378	0.378	0
38.9	36.561	-0.593	-0.314	0	24.67	0	0.379	0.379	0
39	36.574	-0.595	-1.441	0	24.67	0	0.379	0.379	0
39.1	36.586	-0.595	-1.374	0	23.2	0	0.38	0.38	0
39.2	36.599	-0.62	-0.272	0	23.2	0	0.38	0.38	0
39.3	36.605	-0.615	-0.286	0	23.27	0	0.382	0.382	0
39.4	36.611	-0.615	-0.936	0	23.27	0	0.382	0.382	0
39.5	36.624	-0.608	-1.003	0	25.08	0	0.383	0.383	0
39.6	36.636	-0.593	-1.084	0	25.4	0	0.384	0.384	0
39.7	36.648	-0.593	-1.01	0	26.01	0	0.384	0.384	0
39.8	36.661	-0.59	-0.639	0	26.01	0	0.384	0.384	0
39.9	36.68	-0.595	-0.989	0	25.99	0	0.386	0.386	0
40	36.692	-0.595	-0.83	0	25.81	0	0.387	0.387	0
40.1	36.704	-0.608	-0.777	0	25.83	0	0.387	0.387	0
40.2	36.717	-0.6	-0.516	0	25.83	0	0.387	0.387	0
40.3	36.735	-0.6	-1.07	0	25.8	0	0.389	0.389	0
40.4	36.748	-0.595	-0.989	0	25.93	0	0.389	0.389	0
40.5	36.76	-0.595	-0.682	0	25.82	0	0.39	0.39	0
40.6	36.779	-0.6	-0.653	0	25.85	0	0.391	0.391	0
40.7	36.791	-0.615	-0.844	0	25.92	0	0.392	0.392	0
40.8	36.81	-0.618	-0.872	0	25.92	0	0.392	0.392	0
40.9	36.822	-0.618	-0.622	0	25.91	0	0.393	0.393	0
41	36.835	-0.615	-1.003	0	25.91	0	0.393	0.393	0
41.1	36.854	-0.623	-1.169	0	25.86	0	0.394	0.394	0
41.2	36.866	-0.623	-0.565	0	25.86	0	0.394	0.394	0
41.3	36.878	-0.593	-0.639	0	25.91	0	0.396	0.396	0
41.4	36.891	-0.59	-1.247	0	25.91	0	0.396	0.396	0
41.5	36.903	-0.595	-1.169	0	25.86	0	0.397	0.397	0
41.6	36.916	-0.595	-0.918	0	25.86	0	0.397	0.397	0

41.7	36.928	-0.598	-0.745	0	25.12	0	0.399	0.399	0
41.8	36.941	-0.593	-0.844	0	25.12	0	0.399	0.399	0
41.9	36.953	-0.583	-0.759	0	25.13	0	0.4	0.4	0
42	36.965	-0.578	-0.879	0	25.13	0	0.4	0.4	0
42.1	36.972	-0.578	-0.936	0	25.13	0	0.4	0.4	0
42.2	36.984	-0.588	-0.844	0	23.7	0	0.401	0.401	0
42.3	36.99	-0.585	-0.65	0	23.18	0	0.403	0.403	0
42.4	36.996	-0.585	-1.07	0	23.18	0	0.403	0.403	0
42.5	37.003	-0.6	-0.805	0	23.14	0	0.404	0.404	0
42.6	37.009	-0.605	-0.516	0	23.14	0	0.404	0.404	0
42.7	37.021	-0.605	-0.731	0	23.24	0	0.405	0.405	0
42.8	37.028	-0.603	-0.759	0	23.24	0	0.405	0.405	0
42.9	37.034	-0.603	-0.858	0	23.02	0	0.407	0.407	0
43	37.04	-0.603	-1.37	0	21.92	0	0.407	0.407	0
43.1	37.046	-0.613	-0.431	0	21.31	0	0.408	0.408	0
43.2	37.046	-0.595	-0.72	0	21.31	0	0.408	0.408	0
43.3	37.046	-0.598	-1.66	0	20.29	0	0.409	0.409	0
43.4	37.052	-0.593	-0.431	0	18.44	0	0.409	0.409	0
43.5	37.046	-0.593	-0.622	0	16.94	0	0.41	0.41	0
43.6	37.034	-0.598	-0.932	0	16.3	0	0.41	0.41	0
43.7	37.028	-0.598	-0.773	0	16.12	0	0.411	0.411	0
43.8	37.021	-0.585	-0.713	0	16.12	0	0.411	0.411	0
43.9	37.003	-0.585	-1.017	0	14.54	0	0.412	0.412	0
44	36.99	-0.598	-1.176	0	14.54	0	0.412	0.412	0
44.1	36.978	-0.6	-0.639	0	14.43	0	0.412	0.412	0
44.2	36.965	-0.6	-0.537	0	14.43	0	0.412	0.412	0
44.3	36.947	-0.59	-1.102	0	14.46	0	0.413	0.413	0
44.4	36.941	-0.6	-1.021	0	14.46	0	0.413	0.413	0
44.5	36.922	-0.6	-0.964	0	15.49	0	0.414	0.414	0
44.6	36.909	-0.613	-0.65	0	15.49	0	0.414	0.414	0
44.7	36.903	-0.6	-0.639	0	18.53	0	0.415	0.415	0
44.8	36.897	-0.598	-0.936	0	18.53	0	0.415	0.415	0
44.9	36.897	-0.603	-0.964	0	19.13	0	0.416	0.416	0
45	36.897	-0.595	-0.678	0	19.13	0	0.416	0.416	0
45.1	36.897	-0.595	-0.858	0	19.13	0	0.417	0.417	0
45.2	36.891	-0.598	-0.95	0	19.13	0	0.417	0.417	0
45.3	36.891	-0.605	-0.448	0	19.18	0	0.418	0.418	0
45.4	36.891	-0.605	-0.943	0	19.18	0	0.418	0.418	0
45.5	36.885	-0.618	-0.858	0	19.12	0	0.419	0.419	0
45.6	36.885	-0.6	-0.773	0	19.19	0	0.42	0.42	0
45.7	36.885	-0.6	-1.289	0	19.12	0	0.42	0.42	0
45.8	36.885	-0.61	-1.059	0	18.47	0	0.421	0.421	0
45.9	36.878	-0.623	-0.639	0	18.66	0	0.421	0.421	0
46	36.878	-0.623	-0.819	0	18.64	0	0.422	0.422	0
46.1	36.872	-0.59	-0.187	0	18.62	0	0.422	0.422	0
46.2	36.866	-0.588	-1.543	0	18.62	0	0.422	0.422	0
46.3	36.866	-0.588	-1.13	0	18.62	0	0.422	0.422	0

46.4	36.878	-0.61	-0.607	0	35.57	0	0.425	0.425	0
46.5	36.903	-0.61	-0.477	0	37.07	0	0.426	0.426	0
46.6	36.947	-0.605	-0.805	0	39.35	0	0.427	0.427	0
46.7	36.996	-0.6	-1.102	0	40.28	0	0.428	0.428	0
46.8	37.04	-0.605	-0.565	0	40.28	0	0.428	0.428	0
46.9	37.09	-0.605	-0.862	0	39.91	0	0.43	0.43	0
47	37.133	-0.615	-0.819	0	39.91	0	0.43	0.43	0
47.1	37.177	-0.615	-0.491	0	37.14	0	0.432	0.432	0
47.2	37.22	-0.615	-0.805	0	37.14	0	0.432	0.432	0
47.3	37.257	-0.575	-0.978	0	36.25	0	0.434	0.434	0
47.4	37.295	-0.585	-1.236	0	36.25	0	0.434	0.434	0
47.5	37.338	-0.585	-0.607	0	38.94	0	0.436	0.436	0
47.6	37.375	-0.61	-0.505	0	38.94	0	0.436	0.436	0
47.7	37.425	-0.605	-0.537	0	39.3	0	0.439	0.439	0
47.8	37.469	-0.605	-1.127	0	39.3	0	0.439	0.439	0
47.9	37.506	-0.585	-0.858	0	35.64	0	0.441	0.441	0
48	37.543	-0.603	-0.964	0	35.64	0	0.441	0.441	0
48.1	37.574	-0.603	-0.569	0	30.53	0	0.442	0.442	0
48.2	37.593	-0.605	0.293	0	30.53	0	0.442	0.442	0
48.3	37.618	-0.598	-0.978	0	30.72	0	0.444	0.444	0
48.4	37.643	-0.598	-1.307	0	32.48	0	0.445	0.445	0
48.5	37.668	-0.603	-0.346	0	35.18	0	0.446	0.446	0
48.6	37.699	-0.603	-1.144	0	35.18	0	0.446	0.446	0
48.7	37.742	-0.603	-0.477	0	38.93	0	0.448	0.448	0
48.8	37.792	-0.588	-1.021	0	38.93	0	0.448	0.448	0
48.9	37.835	-0.61	-0.936	0	38.97	0	0.45	0.45	0
49	37.873	-0.61	-0.576	0	39.73	0	0.451	0.451	0
49.1	37.922	-0.61	-0.332	0	40	0	0.453	0.453	0
49.2	37.96	-0.593	-0.819	0	40.02	0	0.454	0.454	0
49.3	38.009	-0.593	-0.858	0	41	0	0.455	0.455	0
49.4	38.053	-0.593	-1.017	0	44.07	0	0.456	0.456	0
49.5	38.109	-0.593	-0.576	0	44.93	0	0.457	0.457	0
49.6	38.158	-0.598	-0.936	0	44.93	0	0.457	0.457	0
49.7	38.221	-0.613	-0.692	0	46.21	0	0.46	0.46	0
49.8	38.27	-0.613	-0.448	0	46.21	0	0.46	0.46	0
49.9	38.332	-0.613	-0.932	0	46.35	0	0.462	0.462	0
50	38.382	-0.603	-0.879	0	46.35	0	0.462	0.462	0
50.1	38.45	-0.61	-0.936	0	54.1	0	0.465	0.465	0
50.2	38.519	-0.61	-0.533	0	54.1	0	0.465	0.465	0
50.3	38.606	-0.62	-0.272	0	65.09	0	0.469	0.469	0
50.4	38.693	-0.613	-0.448	0	65.09	0	0.469	0.469	0
50.5	38.798	-0.61	-1.063	0	65.09	0	0.469	0.469	0
50.6	38.916	-0.608	-1.275	0	72.19	0	0.473	0.473	0
50.7	39.022	-0.603	-0.918	0	73.46	0	0.477	0.477	0
50.8	39.146	-0.603	-0.95	0	73.46	0	0.477	0.477	0
50.9	39.258	-0.593	-0.823	0	73.38	0	0.481	0.481	0
51	39.37	-0.603	-1.038	0	73.38	0	0.481	0.481	0

51.1	39.476	-0.61	-0.833	0	70.6	0	0.485	0.485	0
51.2	39.581	-0.6	-0.417	0	70.6	0	0.485	0.485	0
51.3	39.668	-0.61	-0.932	0	56.5	0	0.488	0.488	0
51.4	39.743	-0.61	-0.95	0	56.5	0	0.488	0.488	0
51.5	39.817	-0.625	-0.092	0	51.53	0	0.491	0.491	0
51.6	39.88	-0.595	-0.897	0	49.77	0	0.492	0.492	0
51.7	39.942	-0.595	-1.427	0	49.33	0	0.494	0.494	0
51.8	39.998	-0.62	-0.752	0	49.21	0	0.495	0.495	0
51.9	40.054	-0.635	-0.448	0	49.22	0	0.496	0.496	0
52	40.11	-0.635	-0.547	0	49.11	0	0.498	0.498	0
52.1	40.172	-0.605	-0.706	0	48.92	0	0.499	0.499	0
52.2	40.228	-0.605	-1.275	0	48.04	0	0.501	0.501	0
52.3	40.283	-0.605	-0.788	0	48.46	0	0.502	0.502	0
52.4	40.339	-0.595	-0.692	0	50.13	0	0.503	0.503	0
52.5	40.395	-0.595	-0.992	0	51.19	0	0.505	0.505	0
52.6	40.451	-0.613	-0.59	0	51.19	0	0.505	0.505	0
52.7	40.513	-0.625	-0.491	0	53.27	0	0.508	0.508	0
52.8	40.582	-0.625	-0.773	0	53.27	0	0.508	0.508	0
52.9	40.65	-0.625	-0.3	0	51.75	0	0.511	0.511	0
53	40.706	-0.603	-1.201	0	51.75	0	0.511	0.511	0
53.1	40.762	-0.618	-1.406	0	48.73	0	0.513	0.513	0
53.2	40.818	-0.618	-0.547	0	48.73	0	0.513	0.513	0
53.3	40.874	-0.615	-0.371	0	48.14	0	0.516	0.516	0
53.4	40.924	-0.605	-0.95	0	48.14	0	0.516	0.516	0
53.5	40.973	-0.605	-1.116	0	48	0	0.519	0.519	0
53.6	41.029	-0.6	-0.95	0	48	0	0.519	0.519	0
53.7	41.079	-0.595	-0.706	0	48.07	0	0.521	0.521	0
53.8	41.135	-0.59	-1.035	0	48.07	0	0.521	0.521	0
53.9	41.184	-0.595	-0.992	0	48.08	0	0.524	0.524	0
54	41.234	-0.595	-0.876	0	48.08	0	0.524	0.524	0
54.1	41.284	-0.595	-0.848	0	47.93	0	0.527	0.527	0
54.2	41.34	-0.593	-0.886	0	47.93	0	0.527	0.527	0
54.3	41.39	-0.598	-0.848	0	47.9	0	0.529	0.529	0
54.4	41.439	-0.598	-0.622	0	47.9	0	0.529	0.529	0
54.5	41.489	-0.598	-0.622	0	47.95	0	0.532	0.532	0
54.6	41.539	-0.603	-1.077	0	48.39	0	0.533	0.533	0
54.7	41.595	-0.605	-0.667	0	48.39	0	0.533	0.533	0
54.8	41.644	-0.595	-0.505	0	50.72	0	0.536	0.536	0
54.9	41.706	-0.593	-0.936	0	50.73	0	0.538	0.538	0
55	41.762	-0.593	-0.992	0	50.75	0	0.539	0.539	0
55.1	41.818	-0.593	-0.706	0	50.68	0	0.54	0.54	0
55.2	41.874	-0.623	-0.752	0	50.73	0	0.542	0.542	0
55.3	41.93	-0.623	0.011	0	50.66	0	0.543	0.543	0
55.4	41.98	-0.615	-0.219	0	50.66	0	0.543	0.543	0
55.5	42.036	-0.615	-0.964	0	50.75	0	0.546	0.546	0
55.6	42.092	-0.61	-0.83	0	50.75	0	0.546	0.546	0
55.7	42.148	-0.6	-0.872	0	50.7	0	0.549	0.549	0

55.8	42.197	-0.618	-0.802	0	50.7	0	0.549	0.549	0
55.9	42.253	-0.618	-0.505	0	50.7	0	0.552	0.552	0
56	42.309	-0.6	-0.547	0	50.7	0	0.552	0.552	0
56.1	42.365	-0.605	-1.529	0	59.32	0	0.555	0.555	0
56.2	42.433	-0.605	-0.505	0	59.32	0	0.555	0.555	0
56.3	42.514	-0.588	-0.72	0	62.57	0	0.558	0.558	0
56.4	42.589	-0.598	-1.01	0	62.57	0	0.558	0.558	0
56.5	42.663	-0.598	-1.289	0	62.46	0	0.562	0.562	0
56.6	42.738	-0.625	0.18	0	62.48	0	0.563	0.563	0
56.7	42.819	-0.618	-0.636	0	61.26	0	0.565	0.565	0
56.8	42.893	-0.618	-0.717	0	58.5	0	0.567	0.567	0
56.9	42.955	-0.605	-0.788	0	55.82	0	0.568	0.568	0
57	43.018	-0.603	-0.932	0	55.82	0	0.568	0.568	0
57.1	43.073	-0.603	-0.964	0	55.43	0	0.571	0.571	0
57.2	43.136	-0.6	-0.816	0	55.43	0	0.571	0.571	0
57.3	43.198	-0.595	-0.636	0	55.52	0	0.574	0.574	0
57.4	43.254	-0.595	-0.802	0	55.52	0	0.574	0.574	0
57.5	43.316	-0.595	-0.886	0	55.43	0	0.578	0.578	0
57.6	43.378	-0.618	-0.417	0	55.53	0	0.579	0.579	0
57.7	43.434	-0.618	-0.314	0	55.46	0	0.581	0.581	0
57.8	43.496	-0.593	-1.172	0	55.46	0	0.582	0.582	0
57.9	43.552	-0.61	-1.155	0	55.58	0	0.584	0.584	0
58	43.614	-0.61	-0.314	0	55.4	0	0.585	0.585	0
58.1	43.664	-0.59	-0.109	0	54.42	0	0.587	0.587	0
58.2	43.72	-0.593	-1.289	0	51.71	0	0.588	0.588	0
58.3	43.769	-0.593	-1.006	0	51.45	0	0.59	0.59	0
58.4	43.825	-0.61	-0.314	0	51.45	0	0.59	0.59	0
58.5	43.875	-0.61	-0.36	0	49.73	0	0.592	0.592	0
58.6	43.919	-0.603	-1.077	0	49.73	0	0.592	0.592	0
58.7	43.962	-0.62	-0.848	0	45.94	0	0.595	0.595	0
58.8	43.999	-0.618	-0.491	0	45.94	0	0.595	0.595	0
58.9	44.03	-0.618	-0.636	0	45.94	0	0.595	0.595	0
59	44.068	-0.618	-1.084	0	43.29	0	0.597	0.597	0
59.1	44.099	-0.628	-0.901	0	43.41	0	0.6	0.6	0
59.2	44.136	-0.628	-0.279	0	43.41	0	0.6	0.6	0
59.3	44.167	-0.623	-0.551	0	43.31	0	0.602	0.602	0
59.4	44.198	-0.625	-1.049	0	43.31	0	0.602	0.602	0
59.5	44.235	-0.625	-0.399	0	43.35	0	0.605	0.605	0
59.6	44.266	-0.62	-0.65	0	43.35	0	0.605	0.605	0
59.7	44.291	-0.615	-0.72	0	43.37	0	0.607	0.607	0
59.8	44.322	-0.615	-0.816	0	43.37	0	0.607	0.607	0
59.9	44.36	-0.628	-0.65	0	43.17	0	0.609	0.609	0
60	44.391	-0.643	-1.063	0	43.17	0	0.609	0.609	0
60.1	44.422	-0.643	-0.42	0	43.28	0	0.612	0.612	0
60.2	44.453	-0.6	-1.045	0	43.28	0	0.613	0.613	0
60.3	44.484	-0.603	-1.349	0	43.26	0	0.614	0.614	0
60.4	44.515	-0.603	-1.006	0	43.25	0	0.615	0.615	0

60.5	44.552	-0.615	-0.682	0	42.72	0	0.617	0.617	0
60.6	44.583	-0.595	-0.448	0	42.24	0	0.618	0.618	0
60.7	44.608	-0.595	-1.021	0	41.66	0	0.619	0.619	0
60.8	44.639	-0.598	-1.021	0	41.55	0	0.62	0.62	0
60.9	44.664	-0.59	-0.519	0	41.01	0	0.621	0.621	0
61	44.695	-0.59	-1.021	0	39.77	0	0.622	0.622	0
61.1	44.72	-0.6	-0.682	0	39	0	0.623	0.623	0
61.2	44.745	-0.613	-0.547	0	39	0	0.623	0.623	0
61.3	44.764	-0.613	-0.533	0	38.87	0	0.626	0.626	0
61.4	44.788	-0.62	-0.682	0	38.87	0	0.626	0.626	0
61.5	44.813	-0.62	-0.378	0	35.91	0	0.628	0.628	0
61.6	44.832	-0.613	-1.063	0	35.91	0	0.628	0.628	0
61.7	44.844	-0.633	-0.717	0	32.17	0	0.629	0.629	0
61.8	44.851	-0.64	-0.233	0	32.17	0	0.629	0.629	0
61.9	44.857	-0.64	-0.406	0	30.69	0	0.631	0.631	0
62	44.869	-0.615	-0.678	0	30.69	0	0.631	0.631	0
62.1	44.869	-0.633	-1.501	0	30.52	0	0.633	0.633	0
62.2	44.875	-0.633	-0.187	0	30.52	0	0.633	0.633	0
62.3	44.882	-0.63	-0.692	0	31.31	0	0.635	0.635	0
62.4	44.894	-0.628	-0.978	0	31.31	0	0.635	0.635	0
62.5	44.9	-0.628	-0.696	0	31.68	0	0.636	0.636	0
62.6	44.906	-0.63	-0.901	0	32.61	0	0.637	0.637	0
62.7	44.919	-0.618	-0.816	0	34.19	0	0.638	0.638	0
62.8	44.931	-0.618	-0.992	0	36.37	0	0.639	0.639	0
62.9	44.95	-0.605	-0.738	0	36.37	0	0.64	0.64	0
63	44.969	-0.595	-0.696	0	36.4	0	0.641	0.641	0
63.1	44.987	-0.608	-0.83	0	36.4	0	0.641	0.641	0
63.2	45	-0.63	-0.946	0	36.41	0	0.643	0.643	0
63.3	45.018	-0.623	-0.046	0	36.48	0	0.644	0.644	0
63.4	45.037	-0.623	-0.162	0	36.43	0	0.645	0.645	0
63.5	45.056	-0.613	-1.021	0	38.4	0	0.646	0.646	0
63.6	45.074	-0.593	-0.667	0	41.37	0	0.648	0.648	0
63.7	45.099	-0.593	-0.735	0	42	0	0.649	0.649	0
63.8	45.124	-0.623	-0.328	0	42.33	0	0.65	0.65	0
63.9	45.155	-0.628	-0.162	0	42.28	0	0.651	0.651	0
64	45.186	-0.628	-0.477	0	42.28	0	0.651	0.651	0
64.1	45.211	-0.61	-0.816	0	42.37	0	0.653	0.653	0
64.2	45.242	-0.603	-0.901	0	42.37	0	0.653	0.653	0
64.3	45.273	-0.603	-1.187	0	43.18	0	0.656	0.656	0
64.4	45.304	-0.62	-0.505	0	43.18	0	0.656	0.656	0
64.5	45.335	-0.62	-0.491	0	44.27	0	0.658	0.658	0
64.6	45.366	-0.595	-1.144	0	44.27	0	0.658	0.658	0
64.7	45.404	-0.618	-1.067	0	44.86	0	0.661	0.661	0
64.8	45.435	-0.613	0.124	0	44.86	0	0.661	0.661	0
64.9	45.466	-0.613	-0.607	0	44.93	0	0.663	0.663	0
65	45.503	-0.598	-0.862	0	44.93	0	0.663	0.663	0
65.1	45.534	-0.59	-0.992	0	44.8	0	0.666	0.666	0

65.2	45.565	-0.59	-1.091	0	44.8	0	0.667	0.667	0
65.3	45.609	-0.595	-0.939	0	44.77	0	0.668	0.668	0
65.4	45.634	-0.6	-0.533	0	44.77	0	0.668	0.668	0
65.5	45.671	-0.6	-0.406	0	43.01	0	0.671	0.671	0
65.6	45.696	-0.598	-0.667	0	41.93	0	0.672	0.672	0
65.7	45.72	-0.598	-0.65	0	40.7	0	0.673	0.673	0
65.8	45.745	-0.598	-0.978	0	40.08	0	0.674	0.674	0
65.9	45.77	-0.6	-1.105	0	38.44	0	0.675	0.675	0
66	45.789	-0.598	-0.65	0	37.02	0	0.676	0.676	0
66.1	45.807	-0.598	-0.915	0	36.5	0	0.677	0.677	0
66.2	45.826	-0.603	-0.795	0	36.56	0	0.678	0.678	0
66.3	45.839	-0.615	-0.915	0	36.51	0	0.679	0.679	0
66.4	45.857	-0.615	-0.491	0	35.98	0	0.68	0.68	0
66.5	45.876	-0.61	-0.682	0	35.5	0	0.681	0.681	0
66.6	45.888	-0.628	-1.13	0	35.57	0	0.682	0.682	0
66.7	45.901	-0.628	-0.042	0	35.48	0	0.683	0.683	0
66.8	45.919	-0.64	-1.229	0	35.48	0	0.683	0.683	0
66.9	45.932	-0.635	-0.576	0	35.55	0	0.685	0.685	0
67	45.95	-0.635	-0.59	0	35.55	0	0.685	0.685	0
67.1	45.963	-0.61	-1.317	0	36.09	0	0.687	0.687	0
67.2	45.975	-0.615	-1.021	0	36.09	0	0.687	0.687	0
67.3	45.994	-0.615	-0.65	0	36.09	0	0.687	0.687	0
67.4	46.013	-0.658	-0.505	0	36.4	0	0.689	0.689	0
67.5	46.031	-0.658	-0.088	0	37.14	0	0.691	0.691	0
67.6	46.044	-0.635	-0.491	0	37.14	0	0.691	0.691	0
67.7	46.062	-0.593	-1.586	0	38.04	0	0.693	0.693	0
67.8	46.081	-0.605	-1.063	0	38.04	0	0.693	0.693	0
67.9	46.1	-0.605	-0.018	0	39.03	0	0.695	0.695	0
68	46.118	-0.62	-0.59	0	39.03	0	0.695	0.695	0
68.1	46.143	-0.615	-0.562	0	39.02	0	0.698	0.698	0
68.2	46.162	-0.615	-0.915	0	39.02	0	0.698	0.698	0
68.3	46.18	-0.61	-0.915	0	38.99	0	0.7	0.7	0
68.4	46.199	-0.61	-0.735	0	39.07	0	0.701	0.701	0
68.5	46.224	-0.61	-0.667	0	39.03	0	0.702	0.702	0
68.6	46.242	-0.605	-0.667	0	38.78	0	0.703	0.703	0
68.7	46.261	-0.61	-1.077	0	38.87	0	0.704	0.704	0
68.8	46.286	-0.61	-0.667	0	38.85	0	0.705	0.705	0
68.9	46.305	-0.615	-0.459	0	38.84	0	0.706	0.706	0
69	46.323	-0.605	-0.667	0	38.95	0	0.707	0.707	0
69.1	46.342	-0.605	-0.533	0	38.95	0	0.707	0.707	0
69.2	46.367	-0.603	-1.006	0	38.86	0	0.709	0.709	0
69.3	46.385	-0.608	-0.915	0	39.02	0	0.711	0.711	0
69.4	46.404	-0.608	-0.752	0	38.95	0	0.712	0.712	0
69.5	46.429	-0.605	-0.632	0	38.97	0	0.713	0.713	0
69.6	46.447	-0.603	-0.667	0	39.08	0	0.714	0.714	0
69.7	46.466	-0.603	-0.992	0	38.98	0	0.715	0.715	0
69.8	46.485	-0.608	-0.42	0	38.98	0	0.715	0.715	0

69.9	46.503	-0.6	-0.618	0	38.88	0	0.717	0.717	0
70	46.522	-0.6	-1.158	0	38.88	0	0.717	0.717	0
70.1	46.547	-0.603	-0.961	0	38.88	0	0.719	0.719	0
70.2	46.566	-0.605	-0.872	0	38.88	0	0.719	0.719	0
70.3	46.584	-0.605	-0.505	0	38.87	0	0.721	0.721	0
70.4	46.603	-0.588	-0.961	0	38.87	0	0.721	0.721	0
70.5	46.628	-0.588	-1.006	0	38.96	0	0.724	0.724	0
70.6	46.646	-0.593	-0.667	0	38.96	0	0.724	0.724	0
70.7	46.659	-0.603	-0.978	0	38.99	0	0.726	0.726	0
70.8	46.677	-0.603	-0.427	0	38.99	0	0.726	0.726	0
70.9	46.702	-0.603	-0.473	0	38.96	0	0.728	0.728	0
71	46.721	-0.603	-1.038	0	38.96	0	0.728	0.728	0
71.1	46.74	-0.598	-0.682	0	38.85	0	0.73	0.73	0
71.2	46.758	-0.598	-0.667	0	38.38	0	0.731	0.731	0
71.3	46.777	-0.593	-1.187	0	38	0	0.732	0.732	0
71.4	46.795	-0.61	-0.893	0	38.02	0	0.733	0.733	0
71.5	46.814	-0.61	-0.102	0	38.02	0	0.733	0.733	0
71.6	46.833	-0.618	-0.766	0	38.07	0	0.735	0.735	0
71.7	46.845	-0.623	-0.576	0	37.26	0	0.736	0.736	0
71.8	46.864	-0.623	-0.427	0	36.97	0	0.737	0.737	0
71.9	46.876	-0.638	-0.682	0	36.21	0	0.738	0.738	0
72	46.889	-0.62	-0.3	0	36.21	0	0.738	0.738	0
72.1	46.901	-0.62	-0.862	0	36.22	0	0.74	0.74	0
72.2	46.914	-0.615	-1.296	0	36.26	0	0.741	0.741	0
72.3	46.932	-0.603	-0.427	0	36.26	0	0.742	0.742	0
72.4	46.945	-0.603	-0.915	0	36.24	0	0.743	0.743	0
72.5	46.957	-0.605	-0.752	0	36.27	0	0.744	0.744	0
72.6	46.976	-0.615	-0.667	0	36.32	0	0.745	0.745	0
72.7	46.982	-0.615	-0.357	0	36.3	0	0.746	0.746	0
72.8	47.001	-0.603	-0.328	0	35.43	0	0.747	0.747	0
72.9	47.013	-0.598	-0.992	0	34.58	0	0.748	0.748	0
73	47.019	-0.598	-1.172	0	34.58	0	0.748	0.748	0
73.1	47.032	-0.638	-0.441	0	33.27	0	0.75	0.75	0
73.2	47.038	-0.633	-0.505	0	33.27	0	0.75	0.75	0
73.3	47.044	-0.633	-0.59	0	32.67	0	0.752	0.752	0
73.4	47.05	-0.61	-1.074	0	32.67	0	0.752	0.752	0
73.5	47.056	-0.61	-0.975	0	32.75	0	0.754	0.754	0
73.6	47.063	-0.613	-0.795	0	32.72	0	0.755	0.755	0
73.7	47.069	-0.63	-0.59	0	32.67	0	0.756	0.756	0
73.8	47.075	-0.61	-0.505	0	32.67	0	0.756	0.756	0
73.9	47.081	-0.61	-1.345	0	32.73	0	0.758	0.758	0
74	47.088	-0.595	-1.243	0	32.73	0	0.758	0.758	0
74.1	47.094	-0.615	-0.915	0	32.71	0	0.759	0.759	0
74.2	47.1	-0.615	-0.343	0	32.71	0	0.759	0.759	0
74.3	47.106	-0.613	-0.441	0	33.3	0	0.761	0.761	0
74.4	47.119	-0.615	-1.123	0	33.28	0	0.762	0.762	0
74.5	47.125	-0.615	-0.667	0	33.38	0	0.763	0.763	0

74.6	47.131	-0.583	-0.667	0	33.38	0	0.763	0.763	0
74.7	47.143	-0.593	-1.448	0	33.29	0	0.765	0.765	0
74.8	47.143	-0.593	-0.915	0	33.37	0	0.766	0.766	0
74.9	47.156	-0.608	-0.074	0	33.31	0	0.767	0.767	0
75	47.162	-0.618	-0.915	0	33.32	0	0.768	0.768	0
75.1	47.168	-0.618	-0.992	0	33.39	0	0.769	0.769	0
75.2	47.175	-0.625	-0.191	0	33.31	0	0.769	0.769	0
75.3	47.187	-0.605	-1.123	0	33.35	0	0.77	0.77	0
75.4	47.193	-0.605	-1.402	0	33.41	0	0.771	0.771	0
75.5	47.199	-0.605	-0.932	0	33.3	0	0.772	0.772	0
75.6	47.206	-0.603	-1.081	0	33.12	0	0.773	0.773	0
75.7	47.212	-0.603	-0.78	0	33.12	0	0.773	0.773	0
75.8	47.218	-0.635	-1.165	0	31.18	0	0.775	0.775	0
75.9	47.224	-0.635	-0.233	0	31.26	0	0.776	0.776	0
76	47.224	-0.635	-0.403	0	31.17	0	0.777	0.777	0
76.1	47.23	-0.588	-1.172	0	31.23	0	0.778	0.778	0
76.2	47.237	-0.61	-1.692	0	31.23	0	0.778	0.778	0
76.3	47.237	-0.61	-0.343	0	31.18	0	0.779	0.779	0
76.4	47.237	-0.633	-0.004	0	31.18	0	0.779	0.779	0
76.5	47.243	-0.633	-0.766	0	31.25	0	0.781	0.781	0
76.6	47.249	-0.625	-0.59	0	31.25	0	0.781	0.781	0
76.7	47.249	-0.62	-1.572	0	31.3	0	0.783	0.783	0
76.8	47.255	-0.62	-0.766	0	31.3	0	0.783	0.783	0
76.9	47.255	-0.62	-0.403	0	28.69	0	0.784	0.784	0
77	47.255	-0.588	-1.282	0	28.69	0	0.784	0.784	0
77.1	47.255	-0.588	-0.992	0	27.71	0	0.786	0.786	0
77.2	47.255	-0.588	-0.83	0	27.71	0	0.786	0.786	0
77.3	47.249	-0.608	-0.251	0	27.81	0	0.787	0.787	0
77.4	47.243	-0.615	-0.505	0	27.74	0	0.788	0.788	0
77.5	47.243	-0.615	-0.357	0	27.81	0	0.789	0.789	0
77.6	47.243	-0.608	-0.505	0	27.8	0	0.79	0.79	0
77.7	47.237	-0.6	-0.763	0	27.73	0	0.791	0.791	0
77.8	47.237	-0.6	-0.667	0	27.82	0	0.791	0.791	0
77.9	47.23	-0.61	-0.932	0	27.77	0	0.792	0.792	0
78	47.23	-0.615	-0.487	0	27.61	0	0.793	0.793	0
78.1	47.224	-0.615	-0.343	0	27.66	0	0.794	0.794	0
78.2	47.224	-0.605	-0.78	0	27.66	0	0.794	0.794	0
78.3	47.218	-0.613	-0.946	0	27.63	0	0.795	0.795	0
78.4	47.212	-0.613	-0.89	0	27.64	0	0.796	0.796	0
78.5	47.212	-0.605	-0.636	0	27.55	0	0.797	0.797	0
78.6	47.212	-0.625	-0.682	0	27.63	0	0.797	0.797	0
78.7	47.206	-0.625	-0.604	0	27.57	0	0.798	0.798	0
78.8	47.206	-0.608	-0.565	0	27.56	0	0.799	0.799	0
78.9	47.199	-0.61	-1.331	0	27.63	0	0.8	0.8	0
79	47.193	-0.61	-0.89	0	27.55	0	0.801	0.801	0
79.1	47.193	-0.605	-0.505	0	27.6	0	0.801	0.801	0
79.2	47.187	-0.603	-0.745	0	27.6	0	0.801	0.801	0

79.3	47.181	-0.603	-0.519	0	28.2	0	0.803	0.803	0
79.4	47.181	-0.625	-0.505	0	28.2	0	0.803	0.803	0
79.5	47.181	-0.625	-0.032	0	29	0	0.804	0.804	0
79.6	47.181	-0.608	-0.932	0	29.04	0	0.805	0.805	0
79.7	47.181	-0.623	-0.992	0	29.82	0	0.806	0.806	0
79.8	47.181	-0.62	-0.519	0	29.82	0	0.806	0.806	0
79.9	47.181	-0.62	-0.191	0	29.82	0	0.806	0.806	0
80	47.181	-0.598	-1.257	0	29.78	0	0.808	0.808	0
80.1	47.181	-0.608	-0.915	0	29.75	0	0.809	0.809	0
80.2	47.187	-0.608	-0.48	0	29.75	0	0.809	0.809	0
80.3	47.187	-0.625	-0.275	0	29.69	0	0.811	0.811	0
80.4	47.187	-0.625	-0.519	0	29.69	0	0.811	0.811	0
80.5	47.187	-0.625	-0.72	0	29.72	0	0.813	0.813	0
80.6	47.193	-0.638	-0.696	0	29.73	0	0.814	0.814	0
80.7	47.193	-0.603	-0.018	0	29.79	0	0.814	0.814	0
80.8	47.193	-0.603	-0.682	0	29.68	0	0.815	0.815	0
80.9	47.193	-0.603	-1.752	0	29.77	0	0.816	0.816	0
81	47.193	-0.62	-0.59	0	29.74	0	0.817	0.817	0
81.1	47.199	-0.62	-0.357	0	29.73	0	0.818	0.818	0
81.2	47.199	-0.603	-0.682	0	29.78	0	0.818	0.818	0
81.3	47.199	-0.605	-1.331	0	29.69	0	0.819	0.819	0
81.4	47.199	-0.605	-0.932	0	29.76	0	0.82	0.82	0
81.5	47.199	-0.618	-0.533	0	29.73	0	0.821	0.821	0
81.6	47.206	-0.615	-0.403	0	29.71	0	0.822	0.822	0
81.7	47.206	-0.615	-0.682	0	29.8	0	0.823	0.823	0
81.8	47.206	-0.613	-0.848	0	29.71	0	0.823	0.823	0
81.9	47.206	-0.625	-0.862	0	29.74	0	0.824	0.824	0
82	47.206	-0.625	-0.388	0	29.76	0	0.825	0.825	0
82.1	47.206	-0.613	-0.766	0	29.69	0	0.826	0.826	0
82.2	47.206	-0.623	-1.218	0	29.69	0	0.826	0.826	0
82.3	47.212	-0.623	-0.487	0	29.72	0	0.828	0.828	0
82.4	47.212	-0.608	-0.682	0	29.72	0	0.828	0.828	0
82.5	47.212	-0.608	-0.682	0	29.77	0	0.829	0.829	0
82.6	47.212	-0.605	-1.038	0	29.77	0	0.829	0.829	0
82.7	47.212	-0.615	-0.604	0	29.78	0	0.831	0.831	0
82.8	47.212	-0.605	-0.293	0	29.78	0	0.831	0.831	0
82.9	47.212	-0.605	-0.682	0	29.72	0	0.833	0.833	0
83	47.218	-0.595	-1.455	0	29.72	0	0.833	0.833	0
83.1	47.218	-0.605	-0.682	0	29.69	0	0.834	0.834	0
83.2	47.218	-0.605	-0.357	0	29.69	0	0.834	0.834	0
83.3	47.218	-0.62	-0.59	0	29.69	0	0.836	0.836	0
83.4	47.224	-0.635	-0.809	0	29.76	0	0.837	0.837	0
83.5	47.224	-0.635	-0.477	0	29.75	0	0.837	0.837	0
83.6	47.224	-0.623	-0.275	0	29.57	0	0.838	0.838	0
83.7	47.23	-0.608	-0.667	0	29.66	0	0.839	0.839	0
83.8	47.23	-0.608	-1.197	0	29.53	0	0.84	0.84	0
83.9	47.23	-0.628	-0.357	0	29.53	0	0.841	0.841	0

84	47.23	-0.635	-0.505	0	29.61	0	0.842	0.842	0
84.1	47.237	-0.635	-0.117	0	29.61	0	0.842	0.842	0
84.2	47.23	-0.608	-1.434	0	29.6	0	0.843	0.843	0
84.3	47.237	-0.625	-1.257	0	29.51	0	0.844	0.844	0
84.4	47.237	-0.625	-0.275	0	29.59	0	0.845	0.845	0
84.5	47.237	-0.623	-0.604	0	29.56	0	0.846	0.846	0
84.6	47.243	-0.62	-0.975	0	29.51	0	0.847	0.847	0
84.7	47.243	-0.62	-0.682	0	29.62	0	0.847	0.847	0
84.8	47.243	-0.615	-0.862	0	29.62	0	0.847	0.847	0
84.9	47.243	-0.628	-1.006	0	28.81	0	0.849	0.849	0
85	47.243	-0.628	-0.046	0	28.81	0	0.849	0.849	0
85.1	47.237	-0.608	-0.78	0	28.12	0	0.851	0.851	0
85.2	47.237	-0.618	-1.363	0	28.12	0	0.851	0.851	0
85.3	47.23	-0.618	-0.802	0	27.08	0	0.852	0.852	0
85.4	47.23	-0.608	-0.752	0	27.08	0	0.852	0.852	0
85.5	47.224	-0.608	-1.158	0	25.22	0	0.853	0.853	0
85.6	47.212	-0.615	-0.724	0	25.22	0	0.853	0.853	0
85.7	47.206	-0.613	-1.006	0	25	0	0.855	0.855	0
85.8	47.193	-0.618	-1.052	0	25	0	0.855	0.855	0
85.9	47.187	-0.618	-0.448	0	24.35	0	0.856	0.856	0
86	47.181	-0.605	-0.848	0	24.35	0	0.856	0.856	0
86.1	47.168	-0.605	-0.89	0	23.44	0	0.858	0.858	0
86.2	47.156	-0.605	-0.738	0	22.85	0	0.858	0.858	0
86.3	47.143	-0.598	-0.42	0	22.57	0	0.859	0.859	0
86.4	47.131	-0.595	-0.682	0	21.95	0	0.859	0.859	0
86.5	47.119	-0.595	-1.137	0	21.19	0	0.86	0.86	0
86.6	47.1	-0.613	-0.876	0	21.19	0	0.86	0.86	0
86.7	47.081	-0.598	-0.487	0	16.75	0	0.861	0.861	0
86.8	47.063	-0.598	-0.992	0	15.86	0	0.861	0.861	0
86.9	47.032	-0.608	-0.763	0	14.75	0	0.862	0.862	0
87	47.007	-0.615	-0.904	0	14.31	0	0.862	0.862	0
87.1	46.982	-0.615	-0.692	0	14.3	0	0.863	0.863	0
87.2	46.951	-0.62	-0.915	0	14.33	0	0.863	0.863	0
87.3	46.92	-0.653	-1.285	0	14.29	0	0.863	0.863	0
87.4	46.895	-0.653	0.625	0	14.26	0	0.864	0.864	0
87.5	46.864	-0.618	-0.982	0	14.29	0	0.864	0.864	0
87.6	46.833	-0.58	-2.281	0	14.29	0	0.864	0.864	0
87.7	46.802	-0.58	-1.218	0	14.25	0	0.865	0.865	0
87.8	46.777	-0.605	-0.159	0	14.25	0	0.865	0.865	0
87.9	46.752	-0.613	-0.71	0	15.08	0	0.866	0.866	0
88	46.721	-0.613	-0.795	0	15.08	0	0.866	0.866	0
88.1	46.696	-0.663	-0.766	0	15.21	0	0.867	0.867	0
88.2	46.671	-0.673	-0.562	0	15.21	0	0.867	0.867	0
88.3	46.646	-0.673	0.335	0	15.21	0	0.867	0.867	0
88.4	46.621	-0.675	-1.455	0	15.42	0	0.868	0.868	0
88.5	46.597	-0.675	-0.562	0	17.58	0	0.869	0.869	0
88.6	46.572	-0.655	-0.83	0	18.83	0	0.869	0.869	0

88.7	46.553	-0.588	-1.515	0	19.93	0	0.87	0.87	0
88.8	46.541	-0.608	-1.377	0	19.93	0	0.87	0.87	0
88.9	46.522	-0.608	-0.417	0	21.01	0	0.871	0.871	0
89	46.51	-0.613	-0.117	0	21.9	0	0.871	0.871	0
89.1	46.491	-0.608	-0.766	0	22.54	0	0.872	0.872	0
89.2	46.479	-0.608	-0.932	0	22.78	0	0.873	0.873	0
89.3	46.472	-0.608	-0.809	0	23.36	0	0.873	0.873	0
89.4	46.46	-0.605	-0.682	0	24.23	0	0.874	0.874	0
89.5	46.454	-0.605	-0.519	0	24.35	0	0.875	0.875	0
89.6	46.447	-0.59	-0.819	0	24.96	0	0.875	0.875	0
89.7	46.435	-0.598	-1.285	0	25.33	0	0.876	0.876	0
89.8	46.429	-0.598	-0.932	0	25.86	0	0.877	0.877	0
89.9	46.423	-0.615	-0.357	0	26.16	0	0.877	0.877	0
90	46.423	-0.613	-0.618	0	26.08	0	0.878	0.878	0
90.1	46.416	-0.613	-0.724	0	26.18	0	0.879	0.879	0
90.2	46.41	-0.61	-0.724	0	26.18	0	0.879	0.879	0
90.3	46.41	-0.62	-0.766	0	26.15	0	0.88	0.88	0
90.4	46.404	-0.62	-0.915	0	26.1	0	0.881	0.881	0
90.5	46.404	-0.628	-0.117	0	26.08	0	0.882	0.882	0
90.6	46.398	-0.61	-0.848	0	26.08	0	0.882	0.882	0
90.7	46.392	-0.61	-0.992	0	26.05	0	0.883	0.883	0
90.8	46.385	-0.623	-0.766	0	26.05	0	0.883	0.883	0
90.9	46.385	-0.623	-0.604	0	26.06	0	0.885	0.885	0
91	46.379	-0.623	-0.275	0	26.06	0	0.885	0.885	0
91.1	46.373	-0.585	-1.088	0	26.15	0	0.886	0.886	0
91.2	46.367	-0.598	-1.303	0	26.15	0	0.886	0.886	0
91.3	46.367	-0.598	-0.932	0	26.14	0	0.888	0.888	0
91.4	46.361	-0.625	0.138	0	26.14	0	0.888	0.888	0
91.5	46.354	-0.625	-0.261	0	26.5	0	0.889	0.889	0
91.6	46.354	-0.618	-1.331	0	27.2	0	0.89	0.89	0
91.7	46.348	-0.605	-0.519	0	28.02	0	0.891	0.891	0
91.8	46.348	-0.598	-0.802	0	28.93	0	0.891	0.891	0
91.9	46.348	-0.598	-1.275	0	30.71	0	0.892	0.892	0
92	46.354	-0.625	-0.65	0	34.22	0	0.893	0.893	0
92.1	46.361	-0.63	-0.177	0	35.3	0	0.894	0.894	0
92.2	46.373	-0.63	-0.547	0	36.33	0	0.895	0.895	0
92.3	46.392	-0.613	-0.763	0	38.2	0	0.896	0.896	0
92.4	46.404	-0.605	-0.862	0	39.01	0	0.897	0.897	0
92.5	46.429	-0.605	-0.915	0	39.01	0	0.897	0.897	0
92.6	46.447	-0.623	-0.992	0	39.81	0	0.9	0.9	0
92.7	46.472	-0.618	-0.343	0	40	0	0.901	0.901	0
92.8	46.491	-0.618	-0.766	0	40.05	0	0.902	0.902	0
92.9	46.516	-0.608	-1.006	0	40.02	0	0.903	0.903	0
93	46.534	-0.608	-0.862	0	40.02	0	0.904	0.904	0
93.1	46.553	-0.608	-0.71	0	40.12	0	0.905	0.905	0
93.2	46.584	-0.603	-0.667	0	40.12	0	0.905	0.905	0
93.3	46.597	-0.6	-0.547	0	39.88	0	0.907	0.907	0

93.4	46.621	-0.6	-0.83	0	39.88	0	0.907	0.907	0
93.5	46.64	-0.603	-1.021	0	41.75	0	0.91	0.91	0
93.6	46.671	-0.618	-0.71	0	41.75	0	0.91	0.91	0
93.7	46.696	-0.618	-0.505	0	41.49	0	0.912	0.912	0
93.8	46.715	-0.603	-1.158	0	41.49	0	0.912	0.912	0
93.9	46.74	-0.615	-0.83	0	41.46	0	0.914	0.914	0
94	46.764	-0.615	-0.604	0	41.46	0	0.914	0.914	0
94.1	46.795	-0.61	-0.018	0	41.5	0	0.917	0.917	0
94.2	46.814	-0.613	-0.992	0	42.38	0	0.918	0.918	0
94.3	46.839	-0.613	-0.89	0	42.41	0	0.919	0.919	0
94.4	46.864	-0.618	-0.505	0	42.41	0	0.919	0.919	0
94.5	46.895	-0.618	-0.519	0	42.51	0	0.921	0.921	0
94.6	46.92	-0.613	-0.848	0	42.35	0	0.922	0.922	0
94.7	46.945	-0.608	-0.71	0	42.35	0	0.924	0.924	0
94.8	46.969	-0.6	-0.632	0	42.35	0	0.925	0.925	0
94.9	46.994	-0.6	-1.158	0	42.33	0	0.926	0.926	0
95	47.019	-0.62	-0.724	0	42.33	0	0.926	0.926	0
95.1	47.044	-0.613	-0.505	0	42.39	0	0.928	0.928	0
95.2	47.069	-0.613	-1.038	0	42.42	0	0.929	0.929	0
95.3	47.094	-0.608	-1.158	0	42.48	0	0.931	0.931	0
95.4	47.119	-0.625	-0.848	0	42.42	0	0.932	0.932	0
95.5	47.143	-0.625	-0.261	0	42.45	0	0.933	0.933	0
95.6	47.168	-0.62	-0.604	0	42.36	0	0.934	0.934	0
95.7	47.193	-0.63	-0.992	0	42.34	0	0.935	0.935	0
95.8	47.218	-0.63	-0.667	0	42.43	0	0.937	0.937	0
95.9	47.243	-0.61	-0.752	0	42.42	0	0.938	0.938	0
96	47.268	-0.608	-1.158	0	42.95	0	0.939	0.939	0
96.1	47.293	-0.608	-0.667	0	43.73	0	0.94	0.94	0
96.2	47.317	-0.6	-0.71	0	43.73	0	0.94	0.94	0
96.3	47.348	-0.605	-0.848	0	44.77	0	0.943	0.943	0
96.4	47.38	-0.605	-0.992	0	44.77	0	0.943	0.943	0
96.5	47.404	-0.62	-0.441	0	44.74	0	0.945	0.945	0
96.6	47.435	-0.623	-0.328	0	44.76	0	0.946	0.946	0
96.7	47.467	-0.623	-0.915	0	44.76	0	0.946	0.946	0
96.8	47.491	-0.618	-0.667	0	44.99	0	0.948	0.948	0
96.9	47.522	-0.62	-0.667	0	46.49	0	0.95	0.95	0
97	47.554	-0.62	-0.992	0	46.49	0	0.95	0.95	0
97.1	47.585	-0.628	-0.177	0	46.54	0	0.953	0.953	0
97.2	47.616	-0.613	-0.547	0	46.54	0	0.953	0.953	0
97.3	47.647	-0.613	-1.317	0	46.43	0	0.955	0.955	0
97.4	47.678	-0.63	-1.377	0	46.55	0	0.957	0.957	0
97.5	47.703	-0.63	-0.59	0	47.31	0	0.958	0.958	0
97.6	47.734	-0.638	-0.343	0	47.29	0	0.959	0.959	0
97.7	47.771	-0.613	-0.791	0	47.34	0	0.961	0.961	0
97.8	47.808	-0.603	-1.158	0	47.3	0	0.962	0.962	0
97.9	47.833	-0.603	-0.862	0	47.17	0	0.963	0.963	0
98	47.864	-0.65	-1.123	0	47.27	0	0.964	0.964	0

98.1	47.895	-0.623	0.067	0	47.23	0	0.966	0.966	0
98.2	47.926	-0.623	-0.961	0	47.32	0	0.967	0.967	0
98.3	47.964	-0.613	-1.624	0	47.34	0	0.968	0.968	0
98.4	47.995	-0.633	-0.961	0	47.36	0	0.97	0.97	0
98.5	48.026	-0.633	-0.413	0	47.28	0	0.971	0.971	0
98.6	48.057	-0.623	-0.3	0	47.22	0	0.972	0.972	0
98.7	48.088	-0.603	-0.583	0	47.23	0	0.974	0.974	0
98.8	48.119	-0.603	-1.158	0	47.31	0	0.975	0.975	0
98.9	48.15	-0.608	-0.816	0	47.27	0	0.976	0.976	0
99	48.187	-0.618	-0.547	0	47.3	0	0.978	0.978	0
99.1	48.212	-0.618	-0.53	0	47.27	0	0.979	0.979	0
99.2	48.243	-0.63	-0.71	0	47.27	0	0.979	0.979	0
99.3	48.281	-0.635	-0.961	0	47.21	0	0.982	0.982	0
99.4	48.305	-0.635	-0.59	0	47.21	0	0.982	0.982	0
99.5	48.336	-0.623	-0.745	0	47.23	0	0.984	0.984	0
99.6	48.368	-0.605	-0.953	0	47.23	0	0.984	0.984	0
99.7	48.399	-0.605	-0.519	0	47.32	0	0.987	0.987	0
99.8	48.43	-0.613	-0.314	0	47.32	0	0.987	0.987	0
99.9	48.461	-0.625	-0.752	0	47.22	0	0.989	0.989	0
100	48.486	-0.625	-0.696	0	47.22	0	0.989	0.989	0
100.1	48.517	-0.603	-0.244	0	47.24	0	0.992	0.992	0
100.2	48.554	-0.58	-0.745	0	47.33	0	0.993	0.993	0
100.3	48.579	-0.58	-1.529	0	47.31	0	0.995	0.995	0
100.4	48.604	-0.6	-1.006	0	47.22	0	0.996	0.996	0
100.5	48.635	-0.6	-0.328	0	46.7	0	0.997	0.997	0
100.6	48.666	-0.618	-0.004	0	46.25	0	0.999	0.999	0
100.7	48.691	-0.61	-0.261	0	46.31	0	1	1	0
100.8	48.722	-0.608	-0.904	0	46.36	0	1.001	1.001	0
100.9	48.747	-0.608	-1.021	0	46.36	0	1.001	1.001	0
101	48.778	-0.595	-0.388	0	46.4	0	1.004	1.004	0
101.1	48.802	-0.605	-0.939	0	46.27	0	1.005	1.005	0
101.2	48.834	-0.605	-0.667	0	46.25	0	1.006	1.006	0
101.3	48.865	-0.61	-0.413	0	46.3	0	1.008	1.008	0
101.4	48.889	-0.6	-0.802	0	46.37	0	1.009	1.009	0
101.5	48.914	-0.6	-1.112	0	46.36	0	1.01	1.01	0
101.6	48.945	-0.605	-0.844	0	46.41	0	1.011	1.011	0
101.7	48.97	-0.61	-0.667	0	46.44	0	1.013	1.011	0
101.8	49.001	-0.61	-0.696	0	46.28	0	1.014	1.014	0
101.9	49.032	-0.61	-0.71	0	45.03	0	1.015	1.015	0
102	49.051	-0.605	-0.696	0	43.64	0	1.016	1.016	0
102.1	49.076	-0.605	-1.021	0	40.19	0	1.018	1.018	0
102.2	49.095	-0.618	-0.802	0	40.19	0	1.018	1.018	0
102.3	49.113	-0.618	-0.533	0	37.07	0	1.02	1.02	0
102.4	49.119	-0.618	-0.459	0	37.07	0	1.02	1.02	0
102.5	49.132	-0.618	-0.65	0	37.04	0	1.022	1.022	0
102.6	49.144	-0.618	-0.208	0	37.1	0	1.023	1.023	0
102.7	49.15	-0.618	-0.735	0	37.09	0	1.024	1.024	0

102.8	49.163	-0.603	-0.547	0	36.25	0	1.025	1.025	0
102.9	49.175	-0.605	-1.049	0	31.44	0	1.026	1.026	0
103	49.175	-0.605	-0.516	0	28.37	0	1.026	1.026	0
103.1	49.169	-0.628	-0.66	0	27.71	0	1.027	1.027	0
103.2	49.169	-0.625	-0.328	0	27.71	0	1.027	1.027	0
103.3	49.157	-0.625	-0.491	0	27.63	0	1.029	1.029	0
103.4	49.15	-0.608	-1.021	0	27.63	0	1.029	1.029	0
103.5	49.15	-0.608	-0.816	0	28.26	0	1.03	1.03	0
103.6	49.144	-0.61	-0.978	0	28.19	0	1.031	1.031	0
103.7	49.138	-0.635	-0.074	0	28.28	0	1.032	1.032	0
103.8	49.132	-0.643	-0.399	0	28.17	0	1.033	1.033	0
103.9	49.126	-0.643	-0.491	0	28.22	0	1.033	1.033	0
104	49.119	-0.605	-0.925	0	28.21	0	1.034	1.034	0
104.1	49.119	-0.608	-1.377	0	28.17	0	1.035	1.035	0
104.2	49.113	-0.608	-0.533	0	27.76	0	1.036	1.036	0
104.3	49.107	-0.61	-0.696	0	27.57	0	1.037	1.037	0
104.4	49.101	-0.62	-0.773	0	27.59	0	1.037	1.037	0
104.5	49.095	-0.62	-0.162	0	27.64	0	1.038	1.038	0
104.6	49.088	-0.605	-0.816	0	27.96	0	1.039	1.039	0
104.7	49.082	-0.618	-0.706	0	28.36	0	1.04	1.04	0
104.8	49.076	-0.618	-0.886	0	28.91	0	1.04	1.04	0
104.9	49.07	-0.608	-0.032	0	29.18	0	1.041	1.041	0
105	49.07	-0.598	-0.901	0	29.18	0	1.041	1.041	0
105.1	49.063	-0.598	-1.501	0	29.18	0	1.041	1.041	0
105.2	49.07	-0.608	-0.131	0	31.48	0	1.043	1.043	0
105.3	49.07	-0.595	-0.431	0	31.77	0	1.045	1.045	0
105.4	49.07	-0.595	-1.172	0	31.77	0	1.045	1.045	0
105.5	49.07	-0.598	-0.886	0	31.78	0	1.047	1.047	0
105.6	49.076	-0.62	-0.72	0	31.78	0	1.047	1.047	0
105.7	49.076	-0.62	-0.72	0	31.25	0	1.048	1.048	0
105.8	49.076	-0.648	-0.6	0	31.03	0	1.049	1.049	0
105.9	49.076	-0.64	-0.65	0	30.2	0	1.05	1.05	0
106	49.076	-0.64	-0.177	0	30.31	0	1.051	1.051	0
106.1	49.076	-0.6	-1.487	0	30.25	0	1.052	1.052	0
106.2	49.076	-0.588	-1.116	0	30.26	0	1.053	1.053	0
106.3	49.07	-0.588	-1.201	0	30.32	0	1.053	1.053	0
106.4	49.07	-0.593	-0.678	0	30.21	0	1.054	1.054	0
106.5	49.07	-0.593	-0.682	0	30.32	0	1.055	1.055	0
106.6	49.07	-0.615	-0.735	0	30.22	0	1.056	1.056	0
106.7	49.063	-0.61	-0.099	0	30.98	0	1.057	1.057	0
106.8	49.063	-0.608	-0.586	0	31.14	0	1.058	1.058	0
106.9	49.07	-0.608	-1.13	0	31.12	0	1.058	1.058	0
107	49.063	-0.628	-0.562	0	31.16	0	1.059	1.059	0
107.1	49.07	-0.63	-0.689	0	31.1	0	1.06	1.06	0
107.2	49.063	-0.63	-0.505	0	31.19	0	1.061	1.061	0
107.3	49.07	-0.633	-0.925	0	31.09	0	1.062	1.062	0
107.4	49.07	-0.633	-0.83	0	31.61	0	1.063	1.063	0

107.5	49.07	-0.633	-0.957	0	31.73	0	1.064	1.064	0
107.6	49.07	-0.61	-0.735	0	32.06	0	1.065	1.065	0
107.7	49.076	-0.628	-1.088	0	32.62	0	1.065	1.065	0
107.8	49.076	-0.628	-0.636	0	32.6	0	1.066	1.066	0
107.9	49.082	-0.595	-0.194	0	33.01	0	1.067	1.067	0
108	49.082	-0.595	-1.303	0	33.01	0	1.067	1.067	0
108.1	49.088	-0.595	-1.215	0	34.1	0	1.069	1.069	0
108.2	49.095	-0.623	-0.247	0	34.1	0	1.069	1.069	0
108.3	49.101	-0.613	-0.297	0	34.44	0	1.071	1.071	0
108.4	49.107	-0.613	-1.081	0	34.44	0	1.071	1.071	0
108.5	49.113	-0.62	-0.777	0	34.84	0	1.073	1.073	0
108.6	49.119	-0.605	-0.424	0	34.81	0	1.074	1.074	0
108.7	49.126	-0.605	-1.119	0	35.33	0	1.075	1.075	0
108.8	49.132	-0.64	-0.83	0	36.88	0	1.076	1.076	0
108.9	49.144	-0.638	-0.074	0	37.76	0	1.077	1.077	0
109	49.157	-0.638	-1.088	0	38.04	0	1.078	1.078	0
109.1	49.169	-0.625	-0.343	0	38.12	0	1.079	1.079	0
109.2	49.182	-0.608	-0.844	0	39.46	0	1.08	1.08	0
109.3	49.194	-0.608	-1.473	0	39.46	0	1.08	1.08	0
109.4	49.213	-0.613	-0.403	0	39.52	0	1.082	1.082	0
109.5	49.225	-0.613	-0.562	0	39.44	0	1.084	1.084	0
109.6	49.244	-0.613	-1.049	0	39.52	0	1.085	1.085	0
109.7	49.256	-0.61	-0.6	0	39.5	0	1.086	1.086	0
109.8	49.269	-0.613	-0.826	0	39.51	0	1.087	1.087	0
109.9	49.287	-0.613	-0.83	0	39.4	0	1.088	1.088	0
110	49.306	-0.62	-0.675	0	38.5	0	1.089	1.089	0
110.1	49.318	-0.625	-0.791	0	37.53	0	1.09	1.09	0
110.2	49.331	-0.625	-0.505	0	36.52	0	1.091	1.091	0
110.3	49.343	-0.615	-0.6	0	36.09	0	1.092	1.092	0
110.4	49.349	-0.61	-1.035	0	36.17	0	1.092	1.092	0
110.5	49.356	-0.61	-0.816	0	36.11	0	1.094	1.094	0
110.6	49.368	-0.615	-1.091	0	36.16	0	1.095	1.095	0
110.7	49.374	-0.623	-0.855	0	35.86	0	1.096	1.096	0
110.8	49.387	-0.623	-0.512	0	34.99	0	1.097	1.097	0
110.9	49.393	-0.633	-0.731	0	34.66	0	1.098	1.098	0
111	49.393	-0.613	-0.491	0	34.66	0	1.098	1.098	0
111.1	49.399	-0.613	-0.908	0	34.6	0	1.1	1.1	0
111.2	49.405	-0.598	-0.876	0	34.6	0	1.1	1.1	0
111.3	49.411	-0.6	-0.678	0	34.63	0	1.102	1.102	0
111.4	49.418	-0.6	-0.897	0	34.65	0	1.103	1.103	0
111.5	49.424	-0.618	-0.258	0	34.7	0	1.104	1.104	0
111.6	49.436	-0.603	-0.826	0	34.7	0	1.104	1.104	0
111.7	49.443	-0.603	-0.908	0	34.3	0	1.106	1.106	0
111.8	49.449	-0.6	-0.505	0	33.34	0	1.107	1.107	0
111.9	49.449	-0.593	-0.83	0	33.21	0	1.108	1.108	0
112	49.455	-0.593	-0.992	0	33.29	0	1.108	1.108	0
112.1	49.455	-0.608	-0.547	0	33.22	0	1.109	1.109	0

112.2	49.461	-0.6	-0.42	0	33.42	0	1.11	1.11	0
112.3	49.461	-0.6	-0.992	0	34.16	0	1.111	1.111	0
112.4	49.467	-0.605	-1.017	0	34.18	0	1.112	1.112	0
112.5	49.467	-0.605	-0.664	0	34.76	0	1.113	1.113	0
112.6	49.48	-0.61	-0.516	0	34.65	0	1.114	1.114	0
112.7	49.486	-0.603	-0.664	0	34.73	0	1.115	1.115	0
112.8	49.486	-0.613	-0.901	0	34.65	0	1.116	1.116	0
112.9	49.498	-0.613	-0.802	0	34.72	0	1.117	1.117	0
113	49.498	-0.618	-0.491	0	34.35	0	1.118	1.118	0
113.1	49.511	-0.605	-0.731	0	34.1	0	1.119	1.119	0
113.2	49.517	-0.605	-0.83	0	34.19	0	1.12	1.12	0
113.3	49.523	-0.61	-0.791	0	34.11	0	1.121	1.121	0
113.4	49.523	-0.605	-0.325	0	33.9	0	1.122	1.122	0
113.5	49.529	-0.605	-1.059	0	33.9	0	1.122	1.122	0
113.6	49.536	-0.62	-0.833	0	33.04	0	1.124	1.124	0
113.7	49.536	-0.603	-0.328	0	32.25	0	1.124	1.124	0
113.8	49.542	-0.603	-1.398	0	32.25	0	1.124	1.124	0
113.9	49.542	-0.603	-0.978	0	29.61	0	1.126	1.126	0
114	49.536	-0.625	-0.777	0	28.66	0	1.127	1.127	0
114.1	49.529	-0.625	-0.431	0	28.05	0	1.128	1.128	0
114.2	49.523	-0.6	-0.41	0	28.05	0	1.128	1.128	0
114.3	49.517	-0.603	-1.384	0	25.31	0	1.129	1.129	0
114.4	49.511	-0.603	-1.187	0	24.19	0	1.13	1.13	0
114.5	49.498	-0.608	-0.177	0	23.15	0	1.131	1.131	0
114.6	49.48	-0.595	-0.83	0	22.06	0	1.131	1.131	0
114.7	49.461	-0.595	-0.911	0	21.29	0	1.132	1.132	0
114.8	49.443	-0.618	-0.745	0	20.4	0	1.132	1.132	0
114.9	49.424	-0.613	-0.162	0	18.75	0	1.133	1.133	0
115	49.399	-0.613	-0.978	0	17.91	0	1.133	1.133	0
115.1	49.38	-0.608	-0.862	0	18	0	1.134	1.134	0
115.2	49.356	-0.605	-0.491	0	17.94	0	1.134	1.134	0
115.3	49.331	-0.605	-1.144	0	18.4	0	1.135	1.135	0
115.4	49.306	-0.618	-0.505	0	19.33	0	1.135	1.135	0
115.5	49.287	-0.618	-0.448	0	19.39	0	1.136	1.136	0
115.6	49.262	-0.618	-0.533	0	19.46	0	1.136	1.136	0
115.7	49.244	-0.613	-0.731	0	19.4	0	1.137	1.137	0
115.8	49.219	-0.615	-0.763	0	19.41	0	1.138	1.138	0
115.9	49.2	-0.615	-0.897	0	18.85	0	1.138	1.138	0
116	49.175	-0.633	-0.41	0	18.73	0	1.139	1.139	0
116.1	49.157	-0.61	-0.328	0	18.91	0	1.139	1.139	0
116.2	49.132	-0.61	-1.473	0	19.16	0	1.14	1.14	0
116.3	49.107	-0.625	-0.862	0	20.12	0	1.14	1.14	0
116.4	49.088	-0.62	-0.491	0	20.25	0	1.141	1.141	0
116.5	49.07	-0.62	-0.696	0	20.14	0	1.141	1.141	0
116.6	49.051	-0.595	-1.095	0	20.14	0	1.141	1.141	0
116.7	49.032	-0.608	-1.144	0	20.13	0	1.142	1.142	0
116.8	49.014	-0.608	-0.731	0	20.13	0	1.142	1.142	0

116.9	48.989	-0.618	-0.406	0	19.2	0	1.143	1.143	0
117	48.97	-0.595	-0.491	0	19.2	0	1.143	1.143	0
117.1	48.945	-0.595	-1.515	0	16.61	0	1.144	1.144	0
117.2	48.921	-0.65	-0.897	0	16.61	0	1.144	1.144	0
117.3	48.889	-0.635	0.328	0	15.23	0	1.145	1.145	0
117.4	48.858	-0.635	-0.505	0	15.29	0	1.146	1.146	0
117.5	48.834	-0.618	-1.879	0	15.24	0	1.146	1.146	0
117.6	48.809	-0.63	-1.021	0	15.18	0	1.147	1.147	0
117.7	48.778	-0.63	-0.445	0	15.18	0	1.147	1.147	0
117.8	48.753	-0.618	-0.84	0	15.2	0	1.147	1.147	0
117.9	48.728	-0.625	-1.225	0	15.14	0	1.148	1.148	0
118	48.697	-0.625	-0.445	0	15.19	0	1.148	1.148	0
118.1	48.666	-0.598	-0.65	0	15.18	0	1.149	1.149	0
118.2	48.641	-0.598	-0.773	0	15.11	0	1.149	1.149	0
118.3	48.61	-0.598	-0.904	0	15.16	0	1.15	1.15	0
118.4	48.585	-0.618	-0.505	0	14.9	0	1.15	1.15	0
118.5	48.554	-0.618	-0.431	0	14.72	0	1.15	1.15	0
118.6	48.529	-0.613	-0.876	0	14.69	0	1.151	1.151	0
118.7	48.498	-0.63	-0.844	0	13.35	0	1.151	1.151	0
118.8	48.467	-0.643	-0.618	0	12.95	0	1.151	1.151	0
118.9	48.436	-0.643	-0.441	0	13	0	1.152	1.152	0
119	48.405	-0.613	-0.636	0	13.02	0	1.152	1.152	0
119.1	48.368	-0.598	-1.285	0	12.95	0	1.153	1.153	0
119.2	48.336	-0.598	-0.879	0	13.71	0	1.153	1.153	0
119.3	48.305	-0.615	-0.946	0	13.86	0	1.153	1.153	0
119.4	48.274	-0.605	-0.558	0	13.81	0	1.154	1.154	0
119.5	48.243	-0.605	-0.65	0	13.79	0	1.154	1.154	0
119.6	48.212	-0.608	-1.225	0	12.94	0	1.154	1.154	0
119.7	48.181	-0.623	-0.65	0	12.9	0	1.155	1.155	0
119.8	48.15	-0.623	-0.357	0	12.85	0	1.155	1.155	0
119.9	48.119	-0.62	-0.646	0	12.49	0	1.156	1.156	0
120	48.088	-0.615	-0.802	0	12.49	0	1.156	1.156	0
120.1	48.051	-0.615	-0.65	0	11.86	0	1.156	1.156	0
120.2	48.02	-0.625	-1.13	0	11.86	0	1.156	1.156	0
120.3	47.988	-0.618	-0.614	0	11.86	0	1.157	1.157	0
120.4	47.945	-0.618	-0.477	0	11.86	0	1.157	1.157	0
120.5	47.92	-0.593	-1.289	0	12.44	0	1.158	1.158	0
120.6	47.883	-0.61	-0.964	0	12.48	0	1.158	1.158	0
120.7	47.852	-0.61	-0.353	0	12.47	0	1.158	1.158	0
120.8	47.821	-0.62	-0.802	0	12.42	0	1.159	1.159	0
120.9	47.79	-0.628	-0.636	0	12.96	0	1.159	1.159	0
121	47.759	-0.628	-0.614	0	13.09	0	1.159	1.159	0
121.1	47.734	-0.623	-0.802	0	13.04	0	1.16	1.16	0
121.2	47.696	-0.608	-0.636	0	13.9	0	1.16	1.16	0
121.3	47.672	-0.608	-0.802	0	13.89	0	1.16	1.16	0
121.4	47.641	-0.615	-1.059	0	14.08	0	1.161	1.161	0
121.5	47.609	-0.615	-0.491	0	14.35	0	1.161	1.161	0

121.6	47.572	-0.633	-0.328	0	15.23	0	1.162	1.162	0
121.7	47.554	-0.6	-0.473	0	17.62	0	1.162	1.162	0
121.8	47.529	-0.608	-1.473	0	19.29	0	1.163	1.163	0
121.9	47.51	-0.608	-0.883	0	19.29	0	1.163	1.163	0
122	47.491	-0.613	-0.533	0	23.63	0	1.164	1.164	0
122.1	47.485	-0.595	-0.65	0	23.75	0	1.165	1.165	0
122.2	47.473	-0.595	-1.257	0	24.62	0	1.165	1.165	0
122.3	47.46	-0.6	-1.13	0	25.27	0	1.166	1.166	0
122.4	47.454	-0.615	-0.519	0	27.62	0	1.167	1.167	0
122.5	47.448	-0.615	-0.516	0	28.32	0	1.168	1.168	0
122.6	47.448	-0.625	-0.328	0	28.32	0	1.168	1.168	0
122.7	47.448	-0.613	-0.477	0	28.31	0	1.169	1.169	0
122.8	47.448	-0.613	-0.964	0	28.34	0	1.17	1.17	0
122.9	47.442	-0.623	-0.802	0	28.36	0	1.171	1.171	0
123	47.442	-0.615	-0.314	0	28.49	0	1.171	1.171	0
123.1	47.442	-0.615	-0.717	0	29.05	0	1.172	1.172	0
123.2	47.442	-0.628	-0.992	0	29.7	0	1.173	1.173	0
123.3	47.442	-0.62	-0.117	0	33.16	0	1.174	1.174	0
123.4	47.448	-0.62	-0.381	0	36.22	0	1.175	1.175	0
123.5	47.46	-0.61	-1.211	0	38.87	0	1.176	1.176	0
123.6	47.479	-0.615	-0.636	0	39.05	0	1.177	1.177	0
123.7	47.498	-0.615	-0.636	0	38.96	0	1.178	1.178	0
123.8	47.516	-0.603	-1.225	0	39.05	0	1.179	1.179	0
123.9	47.535	-0.613	-1.102	0	39	0	1.18	1.18	0
124	47.554	-0.613	-0.396	0	39.07	0	1.182	1.182	0
124.1	47.572	-0.62	-0.572	0	39.08	0	1.183	1.183	0
124.2	47.591	-0.615	-0.632	0	38.8	0	1.184	1.184	0
124.3	47.603	-0.615	-1.278	0	36.73	0	1.185	1.185	0
124.4	47.622	-0.658	-0.72	0	35.68	0	1.186	1.186	0
124.5	47.628	-0.658	-0.576	0	35.61	0	1.187	1.187	0
124.6	47.641	-0.648	-0.148	0	35.55	0	1.188	1.188	0
124.7	47.653	-0.615	-1.621	0	35.52	0	1.189	1.189	0
124.8	47.665	-0.615	-0.964	0	35.45	0	1.19	1.19	0
124.9	47.678	-0.615	-1.088	0	35.45	0	1.191	1.191	0
125	47.69	-0.623	-1.014	0	35.42	0	1.192	1.192	0
125.1	47.703	-0.63	-0.459	0	35.46	0	1.193	1.193	0
125.2	47.715	-0.63	-0.456	0	35.46	0	1.193	1.193	0
125.3	47.721	-0.613	-1.088	0	30.54	0	1.194	1.194	0
125.4	47.728	-0.62	-1.215	0	29.23	0	1.195	1.195	0
125.5	47.728	-0.62	-0.763	0	28.91	0	1.196	1.196	0
125.6	47.728	-0.595	-0.763	0	28.93	0	1.197	1.197	0
125.7	47.728	-0.61	-1.211	0	28.92	0	1.198	1.198	0
125.8	47.728	-0.61	-1.458	0	29.55	0	1.198	1.198	0
125.9	47.721	-0.62	0.667	0	29.73	0	1.199	1.199	0
126	47.721	-0.59	-0.689	0	29.74	0	1.2	1.2	0
126.1	47.721	-0.59	-1.978	0	29.74	0	1.2	1.2	0
126.2	47.721	-0.623	-0.72	0	29.78	0	1.202	1.202	0

126.3	47.728	-0.628	-0.215	0	30.35	0	1.203	1.203	0
126.4	47.728	-0.628	-0.396	0	30.6	0	1.203	1.203	0
126.5	47.734	-0.63	-1.074	0	31.25	0	1.204	1.204	0
126.6	47.74	-0.603	-0.759	0	31.11	0	1.205	1.205	0
126.7	47.74	-0.603	-1.25	0	31.18	0	1.206	1.206	0
126.8	47.746	-0.595	-0.978	0	31.15	0	1.207	1.207	0
126.9	47.752	-0.593	-0.622	0	31.14	0	1.208	1.208	0
127	47.752	-0.593	-0.682	0	31.21	0	1.209	1.209	0
127.1	47.759	-0.615	-0.929	0	31.13	0	1.209	1.209	0
127.2	47.759	-0.625	-0.929	0	31.19	0	1.21	1.21	0
127.3	47.765	-0.625	0.004	0	31.17	0	1.211	1.211	0
127.4	47.771	-0.59	-0.812	0	31.14	0	1.212	1.212	0
127.5	47.771	-0.59	-1.285	0	31.23	0	1.213	1.213	0
127.6	47.777	-0.6	-0.459	0	31.13	0	1.214	1.214	0
127.7	47.783	-0.61	-0.706	0	31.19	0	1.215	1.215	0
127.8	47.783	-0.62	-0.65	0	31.2	0	1.216	1.216	0
127.9	47.79	-0.62	-0.512	0	31.14	0	1.216	1.216	0
128	47.79	-0.623	-0.802	0	31.14	0	1.216	1.216	0
128.1	47.796	-0.623	-0.833	0	31.16	0	1.218	1.218	0
128.2	47.802	-0.623	-0.717	0	31.21	0	1.219	1.219	0
128.3	47.802	-0.62	-0.731	0	31.19	0	1.22	1.22	0
128.4	47.808	-0.61	-0.802	0	31.19	0	1.221	1.221	0
128.5	47.815	-0.61	-1.172	0	31.24	0	1.222	1.222	0
128.6	47.815	-0.6	-0.872	0	31.15	0	1.222	1.222	0
128.7	47.821	-0.603	-0.759	0	31.26	0	1.223	1.223	0
128.8	47.821	-0.603	-0.353	0	31.17	0	1.224	1.224	0
128.9	47.827	-0.615	-0.883	0	31.22	0	1.225	1.225	0
129	47.833	-0.64	-0.869	0	31.22	0	1.226	1.226	0
129.1	47.833	-0.64	-0.314	0	31.19	0	1.227	1.227	0
129.2	47.839	-0.595	-0.703	0	31.29	0	1.228	1.228	0
129.3	47.846	-0.593	-1.879	0	31.18	0	1.229	1.229	0
129.4	47.846	-0.593	-1.049	0	31.27	0	1.229	1.229	0
129.5	47.846	-0.6	-0.6	0	31.22	0	1.23	1.23	0
129.6	47.852	-0.603	-0.848	0	31.22	0	1.231	1.231	0
129.7	47.858	-0.603	-0.717	0	31.25	0	1.232	1.232	0
129.8	47.864	-0.608	-0.844	0	31.21	0	1.233	1.233	0
129.9	47.864	-0.608	-1.13	0	31.3	0	1.234	1.234	0
130	47.87	-0.608	-0.477	0	31.21	0	1.235	1.235	0
130.1	47.877	-0.61	-1.084	0	31.25	0	1.236	1.236	0
130.2	47.877	-0.61	-0.65	0	31.27	0	1.236	1.236	0
130.3	47.883	-0.61	-0.636	0	31.27	0	1.236	1.236	0
130.4	47.883	-0.593	-0.83	0	31.31	0	1.238	1.238	0
130.5	47.889	-0.593	-1.444	0	31.22	0	1.239	1.239	0
130.6	47.895	-0.6	-1.155	0	31.28	0	1.24	1.24	0
130.7	47.902	-0.625	-0.053	0	31.28	0	1.241	1.241	0
130.8	47.902	-0.613	-0.431	0	31.24	0	1.242	1.242	0
130.9	47.908	-0.613	-0.961	0	31.31	0	1.242	1.242	0

131	47.908	-0.6	-1.211	0	31.24	0	1.243	1.243	0
131.1	47.914	-0.605	-0.84	0	31.29	0	1.244	1.244	0
131.2	47.92	-0.605	-1.028	0	31.29	0	1.244	1.244	0
131.3	47.92	-0.605	-0.636	0	30.45	0	1.246	1.246	0
131.4	47.92	-0.608	-0.883	0	30.55	0	1.247	1.247	0
131.5	47.926	-0.608	-0.788	0	30.46	0	1.248	1.248	0
131.6	47.933	-0.59	-0.802	0	30.55	0	1.248	1.248	0
131.7	47.933	-0.593	-1.13	0	30.49	0	1.249	1.249	0
131.8	47.933	-0.593	-0.622	0	30.48	0	1.25	1.25	0
131.9	47.933	-0.613	-0.396	0	30.54	0	1.251	1.251	0
132	47.939	-0.608	-0.717	0	30.48	0	1.252	1.252	0
132.1	47.939	-0.608	-0.519	0	30.55	0	1.253	1.253	0
132.2	47.939	-0.598	-1.275	0	30.51	0	1.254	1.254	0
132.3	47.945	-0.6	-1.003	0	30.51	0	1.254	1.254	0
132.4	47.951	-0.6	-0.367	0	30.55	0	1.255	1.255	0
132.5	47.951	-0.598	-0.802	0	30.49	0	1.256	1.256	0
132.6	47.951	-0.6	-0.763	0	30.56	0	1.257	1.257	0
132.7	47.957	-0.6	-0.501	0	30.5	0	1.258	1.258	0
132.8	47.957	-0.608	-0.72	0	30.45	0	1.259	1.259	0
132.9	47.964	-0.615	-0.572	0	29.68	0	1.259	1.259	0
133	47.964	-0.615	-0.593	0	29.22	0	1.26	1.26	0
133.1	47.964	-0.61	-0.477	0	27.64	0	1.261	1.261	0
133.2	47.964	-0.6	-0.883	0	23.8	0	1.262	1.262	0
133.3	47.951	-0.6	-0.946	0	18.17	0	1.262	1.262	0
133.4	47.939	-0.603	-0.802	0	14.43	0	1.263	1.263	0
133.5	47.914	-0.603	-0.682	0	11.65	0	1.263	1.263	0
133.6	47.877	-0.615	-0.477	0	8.73	0	1.263	1.263	0
133.7	47.839	-0.61	-0.957	0	6.48	0	1.263	1.263	0
133.8	47.796	-0.605	-0.964	0	5.87	0	1.263	1.263	0
133.9	47.752	-0.605	-0.632	0	5.84	0	1.264	1.264	0
134	47.709	-0.603	-1.155	0	5.84	0	1.264	1.264	0
134.1	47.665	-0.608	-0.961	0	4.85	0	1.264	1.264	0
134.2	47.622	-0.608	-0.477	0	2.72	0	1.264	1.264	0
134.3	47.572	-0.595	-0.812	0	1.32	0	1.264	1.264	0
134.4	47.51	-0.613	-1.187	0	0	0	1.264	1.264	0
134.5	47.46	-0.613	-0.788	0	0	0	1.264	1.264	0
134.6	47.411	-0.595	-0.148	0	0	0	1.264	1.264	0
134.7	47.348	-0.595	-0.946	0	0	0	1.264	1.264	0
134.8	47.293	-0.595	-0.985	0	0	0	1.264	1.264	0
134.9	47.237	-0.605	-0.385	0	0	0	1.264	1.264	0
135	47.181	-0.588	-0.622	0	-2.54	0	1.264	1.264	0
135.1	47.081	-0.588	-1.144	0	-16.34	0	1.264	1.264	-0.001
135.2	46.926	-0.605	-1.006	0	-28.47	0	1.263	1.264	-0.001
135.3	46.771	-0.6	-0.102	0	-30.84	0	1.262	1.264	-0.002
135.4	46.621	-0.6	-0.477	0	-30.76	0	1.261	1.264	-0.003
135.5	46.497	-0.6	-1.031	0	-31.52	0	1.26	1.264	-0.004
135.6	46.354	-0.61	-0.374	0	-30.22	0	1.259	1.264	-0.005

135.7	46.218	-0.61	-0.614	0	-31.79	0	1.258	1.264	-0.006
135.8	46.081	-0.608	-0.964	0	-36.59	0	1.257	1.264	-0.007
135.9	45.913	-0.598	-0.784	0	-39.93	0	1.256	1.264	-0.008
136	45.745	-0.598	-0.826	0	-40.97	0	1.255	1.264	-0.009
136.1	45.559	-0.608	-1.349	0	-40.52	0	1.254	1.264	-0.01
136.2	45.36	-0.61	-0.576	0	-40.98	0	1.253	1.264	-0.011
136.3	45.155	-0.61	-0.477	0	-40.64	0	1.252	1.264	-0.012
136.4	44.95	-0.598	-1.003	0	-41.05	0	1.251	1.264	-0.013
136.5	44.733	-0.598	-0.826	0	-41.14	0	1.25	1.264	-0.015
136.6	44.49	-0.595	-0.939	0	-40.94	0	1.248	1.264	-0.016
136.7	44.223	-0.605	-0.957	0	-41.11	0	1.247	1.264	-0.017
136.8	43.931	-0.593	-0.148	0	-40.93	0	1.246	1.264	-0.018
136.9	43.608	-0.593	-0.862	0	-40.89	0	1.245	1.264	-0.019
137	43.254	-0.613	-1.36	0	-40.89	0	1.245	1.264	-0.019
137.1	42.887	-0.625	0.028	0	-40.67	0	1.243	1.264	-0.021
137.2	42.533	-0.625	-0.477	0	-40.38	0	1.242	1.264	-0.023
137.3	42.21	-0.623	-0.897	0	-40.4	0	1.24	1.264	-0.024
137.4	41.955	-0.61	-0.971	0	-40.69	0	1.239	1.264	-0.025
137.5	41.775	-0.61	-0.41	0	-40.69	0	1.238	1.264	-0.026
137.6	41.588	-0.6	-1.049	0	-36.98	0	1.237	1.264	-0.027
137.7	41.402	-0.6	-0.84	0	-34.66	0	1.236	1.264	-0.028
137.8	41.203	-0.6	-0.459	0	-30.03	0	1.235	1.264	-0.029
137.9	41.042	-0.585	-1.006	0	-31.15	0	1.235	1.264	-0.03
138	40.886	-0.593	-0.964	0	-30.21	0	1.234	1.264	-0.03
138.1	40.743	-0.593	-0.682	0	-18.29	0	1.233	1.264	-0.031
138.2	40.644	-0.625	-0.717	0	-11.71	0	1.233	1.264	-0.031
138.3	40.557	-0.618	-0.011	0	-14.47	0	1.232	1.264	-0.032
138.4	40.451	-0.618	-0.872	0	-10.87	0	1.232	1.264	-0.032
138.5	40.364	-0.608	-1.074	0	-1.37	0	1.232	1.264	-0.032
138.6	40.29	-0.585	-0.636	0	0	0	1.232	1.264	-0.032
138.7	40.234	-0.585	-1.13	0	0	0	1.232	1.264	-0.032
138.8	40.19	-0.62	-0.314	0	0	0	1.232	1.264	-0.032
138.9	40.134	-0.61	-0.159	0	0	0	1.232	1.264	-0.032
139	40.085	-0.61	-1.384	0	0	0	1.232	1.264	-0.032
139.1	40.035	-0.623	-0.915	0	0	0	1.232	1.264	-0.032
139.2	39.991	-0.618	-0.353	0	0	0	1.232	1.264	-0.032
139.3	39.942	-0.618	-0.586	0	0	0	1.232	1.264	-0.032
139.4	39.886	-0.615	-0.618	0	0	0	1.232	1.264	-0.032
139.5	39.842	-0.615	-0.424	0	0	0	1.232	1.264	-0.032
139.6	39.793	-0.613	-0.749	0	0	0	1.232	1.264	-0.032
139.7	39.743	-0.6	-0.911	0	0	0	1.232	1.264	-0.032
139.8	39.699	-0.598	-0.975	0	0	0	1.232	1.264	-0.032
139.9	39.65	-0.598	-0.636	0	0	0	1.232	1.264	-0.032
140	39.6	-0.58	-0.798	0	0	0	1.232	1.264	-0.032
140.1	39.55	-0.598	-1.257	0	0	0	1.232	1.264	-0.032
140.2	39.501	-0.598	-0.505	0	0.54	0	1.232	1.264	-0.032
140.3	39.457	-0.643	-0.569	0	1.28	0	1.232	1.264	-0.032

140.4	39.407	-0.615	0.014	0	1.79	0	1.232	1.264	-0.032
140.5	39.37	-0.615	-1.042	0	2.33	0	1.232	1.264	-0.032
140.6	39.327	-0.603	-1.73	0	2.93	0	1.232	1.264	-0.032
140.7	39.283	-0.603	-1.003	0	3.02	0	1.233	1.265	-0.032
140.8	39.246	-0.603	-0.745	0	3.27	0	1.233	1.265	-0.032
140.9	39.202	-0.6	-0.675	0	4.12	0	1.233	1.265	-0.032
141	39.171	-0.585	-0.749	0	5.68	0	1.233	1.265	-0.032
141.1	39.134	-0.585	-1.006	0	5.98	0	1.233	1.265	-0.032
141.2	39.097	-0.6	-0.925	0	6.13	0	1.233	1.265	-0.032
141.3	39.066	-0.595	-0.558	0	6.57	0	1.233	1.265	-0.032
141.4	39.035	-0.595	-0.632	0	8	0	1.234	1.266	-0.032
141.5	39.01	-0.598	-0.636	0	9.41	0	1.234	1.266	-0.032
141.6	38.979	-0.603	-0.424	0	9.54	0	1.234	1.266	-0.032
141.7	38.96	-0.603	-0.692	0	10.43	0	1.234	1.266	-0.032
141.8	38.935	-0.603	-1.501	0	10.6	0	1.235	1.267	-0.032
141.9	38.91	-0.6	-0.477	0	11.01	0	1.235	1.267	-0.032
142	38.892	-0.6	-0.706	0	11.9	0	1.235	1.267	-0.032
142.1	38.873	-0.62	-0.872	0	15.31	0	1.236	1.268	-0.032
142.2	38.854	-0.605	-0.622	0	19.19	0	1.236	1.268	-0.032
142.3	38.854	-0.605	-0.353	0	21.63	0	1.237	1.269	-0.032
142.4	38.861	-0.6	-1.497	0	16.97	0	1.237	1.269	-0.032
142.5	38.873	-0.6	-0.706	0	21.63	0	1.238	1.27	-0.032
142.6	38.879	-0.605	-0.173	0	22.84	0	1.239	1.271	-0.032
142.7	38.885	-0.588	-0.826	0	22.82	0	1.239	1.271	-0.032
142.8	38.892	-0.59	-0.872	0	22.85	0	1.24	1.272	-0.032
142.9	38.898	-0.59	-0.562	0	22.85	0	1.24	1.272	-0.032
143	38.91	-0.613	-0.696	0	25.62	0	1.241	1.273	-0.032
143.1	38.923	-0.618	-0.533	0	26.62	0	1.242	1.274	-0.032
143.2	38.935	-0.618	-0.576	0	28.89	0	1.243	1.275	-0.032
143.3	38.954	-0.59	-0.636	0	29.6	0	1.244	1.276	-0.032
143.4	38.979	-0.6	-1.289	0	32.1	0	1.245	1.277	-0.032
143.5	38.997	-0.6	-0.872	0	34.84	0	1.246	1.278	-0.032
143.6	39.035	-0.605	-0.339	0	36.47	0	1.247	1.279	-0.032
143.7	39.066	-0.625	-1.003	0	36.83	0	1.248	1.28	-0.032
143.8	39.103	-0.625	0.004	0	38.48	0	1.249	1.281	-0.032
143.9	39.146	-0.618	-0.925	0	39	0	1.25	1.282	-0.032
144	39.184	-0.608	-1.003	0	41.33	0	1.251	1.283	-0.032
144.1	39.227	-0.608	-0.456	0	46.73	0	1.252	1.284	-0.032
144.2	39.283	-0.605	-1.377	0	48.65	0	1.254	1.286	-0.032
144.3	39.345	-0.625	-1.031	0	49.63	0	1.255	1.287	-0.032
144.4	39.407	-0.625	0.17	0	51.39	0	1.256	1.288	-0.032
144.5	39.476	-0.618	-1.088	0	54.66	0	1.258	1.29	-0.032
144.6	39.55	-0.643	-0.802	0	55.77	0	1.259	1.291	-0.032
144.7	39.625	-0.643	-0.053	0	61.24	0	1.261	1.293	-0.032
144.8	39.712	-0.615	-0.353	0	61.24	0	1.261	1.293	-0.032
144.9	39.811	-0.598	-1.197	0	72.55	0	1.265	1.297	-0.032
145	39.923	-0.598	-1.685	0	73.76	0	1.267	1.299	-0.032

145.1	40.029	-0.62	-0.745	0	73.83	0	1.269	1.301	-0.032
145.2	40.147	-0.605	-0.325	0	73.76	0	1.271	1.303	-0.032
145.3	40.259	-0.605	-0.706	0	73.76	0	1.273	1.305	-0.032
145.4	40.37	-0.595	-1.37	0	73.76	0	1.273	1.305	-0.032
145.5	40.476	-0.595	-0.957	0	73.8	0	1.277	1.309	-0.032
145.6	40.588	-0.608	-0.438	0	73.81	0	1.279	1.311	-0.032
145.7	40.694	-0.618	-0.339	0	73.85	0	1.281	1.313	-0.032
145.8	40.805	-0.605	-0.438	0	72.81	0	1.283	1.315	-0.032
145.9	40.911	-0.605	-1.526	0	70.3	0	1.285	1.317	-0.032
146	41.01	-0.618	-0.749	0	67.25	0	1.287	1.319	-0.032
146.1	41.104	-0.62	-0.717	0	64.58	0	1.289	1.321	-0.032
146.2	41.197	-0.62	-0.477	0	64.65	0	1.291	1.323	-0.032
146.3	41.278	-0.59	-0.869	0	64.69	0	1.293	1.325	-0.032
146.4	41.365	-0.6	-0.904	0	64.67	0	1.294	1.326	-0.032
146.5	41.452	-0.6	-0.636	0	64.59	0	1.296	1.328	-0.032
146.6	41.539	-0.61	-0.516	0	65.43	0	1.298	1.33	-0.032
146.7	41.626	-0.59	-0.675	0	65.83	0	1.3	1.332	-0.032
146.8	41.713	-0.59	-1.116	0	65.88	0	1.302	1.334	-0.032
146.9	41.8	-0.603	-1.169	0	65.98	0	1.304	1.336	-0.032
147	41.887	-0.61	-0.484	0	67.63	0	1.305	1.337	-0.032
147.1	41.98	-0.61	-0.173	0	67.63	0	1.305	1.337	-0.032
147.2	42.067	-0.608	-1.13	0	67.94	0	1.309	1.341	-0.032
147.3	42.16	-0.608	-0.925	0	67.92	0	1.311	1.343	-0.032
147.4	42.259	-0.608	-0.339	0	67.88	0	1.313	1.345	-0.032
147.5	42.34	-0.603	-1.07	0	67.82	0	1.315	1.347	-0.032
147.6	42.427	-0.6	-0.501	0	68.87	0	1.317	1.349	-0.032
147.7	42.52	-0.6	-0.607	0	68.98	0	1.319	1.351	-0.032
147.8	42.614	-0.605	-0.84	0	68.98	0	1.319	1.351	-0.032
147.9	42.701	-0.595	-0.544	0	68.97	0	1.323	1.355	-0.032
148	42.794	-0.595	-0.943	0	68.93	0	1.324	1.356	-0.032
148.1	42.881	-0.603	-0.862	0	68.92	0	1.326	1.358	-0.032
148.2	42.974	-0.605	-0.544	0	68.81	0	1.328	1.36	-0.032
148.3	43.061	-0.605	-0.516	0	68.77	0	1.33	1.362	-0.032
148.4	43.154	-0.593	-1.045	0	67.8	0	1.332	1.364	-0.032
148.5	43.241	-0.593	-0.84	0	65.05	0	1.334	1.366	-0.032
148.6	43.322	-0.593	-0.805	0	60.93	0	1.336	1.368	-0.032
148.7	43.397	-0.6	-0.886	0	56.69	0	1.337	1.369	-0.032
148.8	43.465	-0.613	-0.558	0	52.99	0	1.339	1.371	-0.032
148.9	43.521	-0.613	-0.749	0	50.69	0	1.34	1.372	-0.032
149	43.571	-0.61	-0.763	0	49.94	0	1.341	1.373	-0.032
149.1	43.62	-0.61	-0.826	0	48.4	0	1.343	1.375	-0.032
149.2	43.67	-0.61	-0.788	0	47.42	0	1.344	1.376	-0.032
149.3	43.713	-0.608	-0.84	0	47.23	0	1.345	1.377	-0.032
149.4	43.763	-0.6	-0.501	0	47.17	0	1.347	1.379	-0.032
149.5	43.807	-0.6	-0.925	0	47.31	0	1.348	1.38	-0.032
149.6	43.85	-0.618	-0.689	0	46.37	0	1.349	1.381	-0.032
149.7	43.894	-0.6	-0.173	0	46.32	0	1.351	1.383	-0.032

149.8	43.937	-0.6	-1.13	0	46.16	0	1.352	1.384	-0.032
149.9	43.981	-0.595	-1.003	0	47.24	0	1.353	1.385	-0.032
150	44.03	-0.598	-0.353	0	47.56	0	1.355	1.387	-0.032
150.1	44.074	-0.598	-0.731	0	48.08	0	1.356	1.388	-0.032
150.2	44.117	-0.598	-0.597	0	47.94	0	1.357	1.389	-0.032
150.3	44.161	-0.608	-0.978	0	47.98	0	1.359	1.391	-0.032
150.4	44.211	-0.608	-0.84	0	47.58	0	1.36	1.392	-0.032
150.5	44.254	-0.62	-0.053	0	47.11	0	1.361	1.393	-0.032
150.6	44.298	-0.63	-0.632	0	45.56	0	1.362	1.394	-0.032
150.7	44.341	-0.63	-0.816	0	42.87	0	1.364	1.396	-0.032
150.8	44.378	-0.635	-0.632	0	40.77	0	1.365	1.397	-0.032
150.9	44.409	-0.628	-0.759	0	38.74	0	1.366	1.398	-0.032
151	44.434	-0.628	-0.759	0	38.58	0	1.367	1.399	-0.032
151.1	44.465	-0.62	-1.074	0	38.66	0	1.368	1.4	-0.032
151.2	44.49	-0.618	-0.897	0	38.62	0	1.369	1.401	-0.032
151.3	44.515	-0.618	-0.65	0	38.62	0	1.369	1.401	-0.032
151.4	44.54	-0.595	-0.826	0	38.66	0	1.371	1.403	-0.032
151.5	44.571	-0.595	-1.211	0	38.4	0	1.372	1.404	-0.032
151.6	44.596	-0.608	-0.812	0	38.49	0	1.373	1.405	-0.032
151.7	44.614	-0.62	-0.247	0	38.51	0	1.374	1.406	-0.032
151.8	44.646	-0.618	-0.579	0	38.01	0	1.375	1.407	-0.032
151.9	44.67	-0.618	-0.773	0	37.58	0	1.376	1.408	-0.032
152	44.695	-0.598	-0.554	0	37.46	0	1.378	1.41	-0.032
152.1	44.72	-0.583	-0.886	0	36.36	0	1.379	1.411	-0.032
152.2	44.739	-0.583	-1.374	0	36.01	0	1.38	1.412	-0.032
152.3	44.757	-0.605	-0.675	0	35.98	0	1.381	1.413	-0.032
152.4	44.776	-0.608	-0.385	0	35.82	0	1.382	1.414	-0.032
152.5	44.801	-0.608	-0.636	0	33.57	0	1.382	1.414	-0.032
152.6	44.82	-0.603	-0.675	0	32.36	0	1.383	1.415	-0.032
152.7	44.832	-0.613	-0.65	0	31.55	0	1.384	1.416	-0.032
152.8	44.844	-0.613	-0.855	0	31.54	0	1.385	1.417	-0.032
152.9	44.857	-0.64	0.283	0	31.47	0	1.386	1.418	-0.032
153	44.869	-0.61	0.187	0	31.57	0	1.387	1.419	-0.032
153.1	44.882	-0.61	-1.314	0	31.54	0	1.388	1.42	-0.032
153.2	44.894	-0.618	-0.978	0	31.48	0	1.389	1.421	-0.032
153.3	44.9	-0.598	-0.187	0	31.57	0	1.39	1.422	-0.032
153.4	44.913	-0.598	-0.939	0	31.45	0	1.39	1.422	-0.032
153.5	44.919	-0.593	-1.017	0	31.36	0	1.391	1.423	-0.032
153.6	44.931	-0.598	-0.173	0	31.42	0	1.392	1.424	-0.032
153.7	44.944	-0.598	-0.798	0	31.44	0	1.393	1.425	-0.032
153.8	44.95	-0.61	-0.53	0	31.34	0	1.394	1.426	-0.032
153.9	44.962	-0.59	-0.339	0	31.47	0	1.395	1.427	-0.032
154	44.975	-0.59	-1.254	0	31.38	0	1.396	1.428	-0.032
154.1	44.987	-0.618	-0.872	0	31.43	0	1.396	1.428	-0.032
154.2	44.993	-0.61	-0.113	0	31.44	0	1.397	1.429	-0.032
154.3	45.006	-0.61	-0.784	0	31.39	0	1.398	1.43	-0.032
154.4	45.018	-0.61	-0.886	0	32.25	0	1.399	1.431	-0.032

154.5	45.031	-0.61	-0.544	0	32.13	0	1.4	1.432	-0.032
154.6	45.043	-0.61	-0.59	0	32.28	0	1.401	1.433	-0.032
154.7	45.056	-0.6	-0.53	0	32.14	0	1.402	1.434	-0.032
154.8	45.068	-0.588	-0.989	0	32.3	0	1.403	1.435	-0.032
154.9	45.08	-0.588	-0.886	0	32.47	0	1.404	1.436	-0.032
155	45.099	-0.613	-1.088	0	32.93	0	1.405	1.437	-0.032
155.1	45.112	-0.613	-0.501	0	32.79	0	1.405	1.437	-0.032
155.2	45.124	-0.613	-0.353	0	32.93	0	1.406	1.438	-0.032
155.3	45.136	-0.613	-1.088	0	32.82	0	1.407	1.439	-0.032
155.4	45.149	-0.6	-0.516	0	33.48	0	1.408	1.44	-0.032
155.5	45.161	-0.6	-0.759	0	33.48	0	1.408	1.44	-0.032
155.6	45.174	-0.615	-1.384	0	34.05	0	1.41	1.442	-0.032
155.7	45.192	-0.608	-0.057	0	35	0	1.411	1.443	-0.032
155.8	45.211	-0.608	-0.812	0	35.7	0	1.412	1.444	-0.032
155.9	45.23	-0.6	-1.088	0	36.7	0	1.413	1.445	-0.032
156	45.254	-0.598	-0.826	0	36.7	0	1.413	1.445	-0.032
156.1	45.273	-0.598	-0.396	0	36.7	0	1.415	1.447	-0.032
156.2	45.292	-0.603	-1.374	0	36.86	0	1.416	1.448	-0.032
156.3	45.317	-0.608	-0.533	0	37.64	0	1.417	1.449	-0.032
156.4	45.335	-0.608	-0.353	0	37.86	0	1.418	1.45	-0.032
156.5	45.36	-0.605	-1.014	0	38.49	0	1.419	1.451	-0.032
156.6	45.385	-0.625	-0.886	0	38.46	0	1.42	1.452	-0.032
156.7	45.41	-0.625	-0.367	0	38.91	0	1.421	1.453	-0.032
156.8	45.435	-0.61	-0.632	0	39.31	0	1.423	1.455	-0.032
156.9	45.466	-0.608	-0.84	0	39.63	0	1.424	1.456	-0.032
157	45.491	-0.608	-0.929	0	40.12	0	1.425	1.457	-0.032
157.1	45.515	-0.593	-0.452	0	40.21	0	1.426	1.458	-0.032
157.2	45.547	-0.605	-0.84	0	40.18	0	1.427	1.459	-0.032
157.3	45.571	-0.605	-0.53	0	40.17	0	1.428	1.46	-0.032
157.4	45.596	-0.605	-0.558	0	40.05	0	1.429	1.461	-0.032
157.5	45.621	-0.605	-0.855	0	40.07	0	1.43	1.462	-0.032
157.6	45.646	-0.613	-0.731	0	40.83	0	1.431	1.463	-0.032
157.7	45.671	-0.625	-0.187	0	40.86	0	1.433	1.465	-0.032
157.8	45.702	-0.623	-0.314	0	40.95	0	1.434	1.466	-0.032
157.9	45.727	-0.623	-1.017	0	40.89	0	1.435	1.467	-0.032
158	45.758	-0.62	-0.396	0	40.99	0	1.436	1.468	-0.032
158.1	45.789	-0.615	-0.516	0	40.95	0	1.437	1.469	-0.032
158.2	45.814	-0.615	-1.074	0	40.91	0	1.438	1.47	-0.032
158.3	45.845	-0.618	-0.516	0	40.86	0	1.439	1.471	-0.032
158.4	45.87	-0.625	-1.017	0	40.84	0	1.441	1.473	-0.032
158.5	45.894	-0.625	-0.558	0	40.95	0	1.442	1.474	-0.032
158.6	45.926	-0.625	-0.6	0	40.86	0	1.443	1.475	-0.032
158.7	45.95	-0.62	-0.798	0	41	0	1.444	1.476	-0.032
158.8	45.981	-0.62	-0.802	0	40.92	0	1.445	1.477	-0.032
158.9	46.006	-0.618	-1.088	0	41.05	0	1.446	1.478	-0.032
159	46.037	-0.608	-0.675	0	40.92	0	1.447	1.479	-0.032
159.1	46.068	-0.608	-1.003	0	40.85	0	1.449	1.48	-0.032

159.2	46.087	-0.585	-1.137	0	40.85	0	1.45	1.482	-0.032
159.3	46.118	-0.59	-0.961	0	40.86	0	1.451	1.483	-0.032
159.4	46.143	-0.59	-0.893	0	40.91	0	1.452	1.484	-0.032
159.5	46.174	-0.605	-0.399	0	40.89	0	1.453	1.485	-0.032
159.6	46.199	-0.61	-0.353	0	40.98	0	1.454	1.486	-0.032
159.7	46.224	-0.61	-0.939	0	40.98	0	1.454	1.486	-0.032
159.8	46.255	-0.603	-0.632	0	40.97	0	1.456	1.488	-0.032
159.9	46.28	-0.61	-0.745	0	40.78	0	1.458	1.49	-0.032
160	46.311	-0.61	-1.427	0	40.9	0	1.459	1.491	-0.032
160.1	46.336	-0.635	0.325	0	40.87	0	1.46	1.492	-0.032
160.2	46.361	-0.618	-0.353	0	40.94	0	1.461	1.493	-0.032
160.3	46.392	-0.618	-1.66	0	40.95	0	1.462	1.494	-0.032
160.4	46.416	-0.618	-0.675	0	40.95	0	1.463	1.495	-0.032
160.5	46.441	-0.618	-0.516	0	40.98	0	1.464	1.496	-0.032
160.6	46.466	-0.628	-0.53	0	40.97	0	1.466	1.498	-0.032
160.7	46.497	-0.6	-0.53	0	40.95	0	1.467	1.499	-0.032
160.8	46.522	-0.613	-1.307	0	40.82	0	1.468	1.5	-0.032
160.9	46.547	-0.613	-0.84	0	40.92	0	1.469	1.501	-0.032
161	46.578	-0.615	-0.187	0	40.86	0	1.47	1.502	-0.032
161.1	46.603	-0.605	-0.706	0	40.98	0	1.471	1.503	-0.032
161.2	46.628	-0.605	-0.925	0	40.94	0	1.472	1.504	-0.032
161.3	46.653	-0.638	-0.883	0	40.98	0	1.474	1.506	-0.032
161.4	46.677	-0.635	-0.187	0	41.02	0	1.475	1.507	-0.032
161.5	46.702	-0.635	-0.353	0	40.97	0	1.476	1.508	-0.032
161.6	46.727	-0.62	-1.183	0	40.84	0	1.477	1.509	-0.032
161.7	46.752	-0.608	-0.84	0	40.77	0	1.478	1.51	-0.032
161.8	46.777	-0.608	-0.516	0	40.91	0	1.479	1.511	-0.032
161.9	46.802	-0.61	-1.169	0	40.83	0	1.48	1.512	-0.032
162	46.833	-0.615	-0.66	0	40.91	0	1.481	1.513	-0.032
162.1	46.858	-0.615	-0.385	0	40.86	0	1.483	1.515	-0.032
162.2	46.882	-0.59	-1.003	0	40.86	0	1.483	1.515	-0.032
162.3	46.907	-0.61	-1.155	0	40.94	0	1.485	1.517	-0.032
162.4	46.932	-0.61	-0.925	0	40.9	0	1.486	1.518	-0.032
162.5	46.957	-0.628	-0.155	0	40.8	0	1.487	1.519	-0.032
162.6	46.982	-0.63	-0.675	0	40.79	0	1.488	1.52	-0.032
162.7	47.007	-0.63	-0.84	0	40.88	0	1.489	1.521	-0.032
162.8	47.032	-0.618	-0.777	0	40.81	0	1.491	1.523	-0.032
162.9	47.056	-0.605	-0.675	0	40.98	0	1.492	1.524	-0.032
163	47.081	-0.605	-0.939	0	41.73	0	1.493	1.525	-0.032
163.1	47.106	-0.605	-1.183	0	41.81	0	1.494	1.526	-0.032
163.2	47.131	-0.615	-0.53	0	41.76	0	1.495	1.527	-0.032
163.3	47.156	-0.615	-0.614	0	41.81	0	1.496	1.528	-0.032
163.4	47.187	-0.633	-0.452	0	42.41	0	1.497	1.529	-0.032
163.5	47.212	-0.633	-0.484	0	42.68	0	1.499	1.531	-0.032
163.6	47.237	-0.63	-0.745	0	43.44	0	1.5	1.532	-0.032
163.7	47.261	-0.608	-1.169	0	43.63	0	1.501	1.533	-0.032
163.8	47.293	-0.61	-1.268	0	44.42	0	1.502	1.534	-0.032

163.9	47.324	-0.61	-0.618	0	44.42	0	1.502	1.534	-0.032
164	47.355	-0.615	-0.689	0	44.23	0	1.505	1.537	-0.032
164.1	47.386	-0.62	-0.689	0	44.21	0	1.506	1.538	-0.032
164.2	47.417	-0.62	-0.759	0	44.06	0	1.507	1.539	-0.032
164.3	47.448	-0.633	-0.53	0	43.27	0	1.508	1.54	-0.032
164.4	47.473	-0.603	-0.53	0	42.52	0	1.51	1.542	-0.032
164.5	47.498	-0.603	-1.572	0	42.45	0	1.511	1.543	-0.032
164.6	47.529	-0.6	-1.225	0	42.48	0	1.512	1.544	-0.032
164.7	47.547	-0.61	-0.501	0	42.55	0	1.513	1.545	-0.032
164.8	47.578	-0.61	-0.706	0	42.51	0	1.514	1.546	-0.032
164.9	47.603	-0.618	-0.399	0	42.61	0	1.516	1.548	-0.032
165	47.634	-0.62	-0.66	0	42.59	0	1.517	1.549	-0.032
165.1	47.659	-0.62	-1.088	0	41.92	0	1.518	1.55	-0.032
165.2	47.684	-0.618	-0.247	0	41.7	0	1.519	1.551	-0.032
165.3	47.709	-0.6	-0.53	0	41.1	0	1.52	1.552	-0.032
165.4	47.734	-0.6	-0.961	0	40.87	0	1.521	1.553	-0.032
165.5	47.752	-0.588	-1.102	0	40.81	0	1.522	1.554	-0.032
165.6	47.777	-0.6	-0.53	0	40.89	0	1.524	1.556	-0.032
165.7	47.796	-0.6	-0.286	0	40.92	0	1.525	1.557	-0.032
165.8	47.821	-0.615	-1.596	0	40.91	0	1.526	1.558	-0.032
165.9	47.846	-0.623	-0.452	0	40.91	0	1.527	1.559	-0.032
166	47.864	-0.623	-0.328	0	40.7	0	1.528	1.56	-0.032
166.1	47.889	-0.625	-1.059	0	40.78	0	1.529	1.561	-0.032
166.2	47.908	-0.62	-0.699	0	40.47	0	1.53	1.562	-0.032
166.3	47.933	-0.62	-0.201	0	39.64	0	1.531	1.563	-0.032
166.4	47.951	-0.61	-1.254	0	38.63	0	1.533	1.565	-0.032
166.5	47.97	-0.61	-0.978	0	37.52	0	1.534	1.566	-0.032
166.6	47.988	-0.615	-0.6	0	37.19	0	1.535	1.567	-0.032
166.7	48.001	-0.625	-0.438	0	36.35	0	1.536	1.568	-0.032
166.8	48.02	-0.62	-0.629	0	35.54	0	1.537	1.569	-0.032
166.9	48.032	-0.62	-0.759	0	34.38	0	1.538	1.57	-0.032
167	48.044	-0.605	-1.088	0	34.18	0	1.539	1.571	-0.032
167.1	48.051	-0.598	-0.886	0	34.31	0	1.539	1.571	-0.032
167.2	48.063	-0.598	-1.088	0	34.18	0	1.54	1.572	-0.032
167.3	48.075	-0.618	-0.788	0	33.98	0	1.541	1.573	-0.032
167.4	48.082	-0.625	-0.311	0	32.26	0	1.542	1.574	-0.032
167.5	48.088	-0.625	-0.311	0	29.62	0	1.543	1.575	-0.032
167.6	48.094	-0.6	-0.572	0	26.5	0	1.544	1.576	-0.032
167.7	48.088	-0.598	-1.169	0	22.37	0	1.544	1.576	-0.032
167.8	48.075	-0.598	-1.088	0	19.29	0	1.545	1.577	-0.032
167.9	48.063	-0.615	-0.675	0	16.73	0	1.545	1.577	-0.032
168	48.038	-0.595	-0.187	0	14.4	0	1.546	1.578	-0.032
168.1	48.013	-0.595	-1.169	0	14.4	0	1.546	1.578	-0.032
168.2	47.982	-0.618	-0.675	0	7.97	0	1.546	1.578	-0.032
168.3	47.939	-0.618	-0.127	0	7.44	0	1.547	1.579	-0.032
168.4	47.902	-0.618	-0.311	0	7.3	0	1.547	1.579	-0.032
168.5	47.864	-0.618	-0.675	0	6.81	0	1.547	1.579	-0.032

168.6	47.821	-0.62	-0.689	0	6.64	0	1.547	1.579	-0.032
168.7	47.777	-0.62	-0.6	0	6.02	0	1.547	1.579	-0.032
168.8	47.734	-0.635	-0.438	0	5.31	0	1.547	1.579	-0.032
168.9	47.69	-0.625	-0.431	0	5.14	0	1.548	1.58	-0.032
169	47.647	-0.625	-0.703	0	4.68	0	1.548	1.58	-0.032
169.1	47.597	-0.615	-1.169	0	4.89	0	1.548	1.58	-0.032
169.2	47.554	-0.61	-0.72	0	4.95	0	1.548	1.58	-0.032
169.3	47.51	-0.61	-0.501	0	5.43	0	1.548	1.58	-0.032
169.4	47.467	-0.613	-1.017	0	5.46	0	1.548	1.58	-0.032
169.5	47.423	-0.613	-0.84	0	5.47	0	1.548	1.58	-0.032
169.6	47.38	-0.615	-0.353	0	5.46	0	1.549	1.581	-0.032
169.7	47.336	-0.605	-0.675	0	5.44	0	1.549	1.581	-0.032
169.8	47.293	-0.6	-0.978	0	5.44	0	1.549	1.581	-0.032
169.9	47.249	-0.6	-1.144	0	5.42	0	1.549	1.581	-0.032
170	47.206	-0.62	-0.689	0	5.43	0	1.549	1.581	-0.032
170.1	47.162	-0.62	-0.399	0	5.42	0	1.549	1.581	-0.032
170.2	47.119	-0.62	-0.6	0	5.42	0	1.55	1.582	-0.032
170.3	47.075	-0.605	-1.003	0	5.43	0	1.55	1.582	-0.032
170.4	47.032	-0.61	-0.855	0	5.4	0	1.55	1.582	-0.032
170.5	46.988	-0.61	-0.66	0	5.41	0	1.55	1.582	-0.032
170.6	46.951	-0.628	-0.84	0	5.41	0	1.55	1.582	-0.032
170.7	46.907	-0.623	-0.516	0	5.5	0	1.55	1.582	-0.032
170.8	46.864	-0.623	-0.491	0	5.53	0	1.55	1.582	-0.032
170.9	46.82	-0.623	-1.169	0	5.55	0	1.551	1.583	-0.032
171	46.777	-0.623	-0.516	0	5.53	0	1.551	1.583	-0.032
171.1	46.733	-0.623	-0.632	0	5.52	0	1.551	1.583	-0.032
171.2	46.69	-0.595	-0.84	0	5.51	0	1.551	1.583	-0.032
171.3	46.646	-0.585	-0.971	0	5.51	0	1.551	1.583	-0.032
171.4	46.603	-0.585	-0.848	0	5.48	0	1.551	1.583	-0.032
171.5	46.553	-0.613	-0.424	0	5.46	0	1.552	1.584	-0.032
171.6	46.516	-0.625	0.057	0	5.64	0	1.552	1.584	-0.032
171.7	46.479	-0.625	-0.84	0	6.08	0	1.552	1.584	-0.032
171.8	46.435	-0.625	-1.416	0	6.27	0	1.552	1.584	-0.032
171.9	46.392	-0.623	-0.593	0	6.34	0	1.552	1.584	-0.032
172	46.354	-0.623	-0.367	0	7.24	0	1.552	1.584	-0.032
172.1	46.317	-0.635	-0.925	0	7.76	0	1.553	1.585	-0.032
172.2	46.274	-0.663	-0.897	0	8.44	0	1.553	1.585	-0.032
172.3	46.236	-0.663	0.212	0	8.44	0	1.553	1.585	-0.032
172.4	46.205	-0.608	-0.614	0	10.23	0	1.553	1.585	-0.032
172.5	46.174	-0.608	-1.451	0	10.21	0	1.554	1.586	-0.032
172.6	46.143	-0.605	-0.939	0	10.21	0	1.554	1.586	-0.032
172.7	46.106	-0.615	-0.424	0	10.28	0	1.554	1.586	-0.032
172.8	46.075	-0.618	-0.731	0	10.23	0	1.555	1.587	-0.032
172.9	46.044	-0.618	-0.558	0	10.19	0	1.555	1.587	-0.032
173	46.013	-0.625	-0.925	0	10.52	0	1.555	1.587	-0.032
173.1	45.981	-0.608	-0.558	0	10.87	0	1.555	1.587	-0.032
173.2	45.95	-0.608	-0.816	0	11.62	0	1.556	1.588	-0.032

173.3	45.919	-0.615	-1.342	0	12.73	0	1.556	1.588	-0.032
173.4	45.894	-0.62	-0.187	0	13.73	0	1.556	1.588	-0.032
173.5	45.87	-0.62	-0.187	0	15.04	0	1.557	1.589	-0.032
173.6	45.845	-0.618	-0.84	0	15.67	0	1.557	1.589	-0.032
173.7	45.826	-0.618	-0.367	0	15.85	0	1.558	1.59	-0.032
173.8	45.807	-0.618	-0.84	0	15.94	0	1.558	1.59	-0.032
173.9	45.789	-0.603	-0.47	0	15.87	0	1.559	1.591	-0.032
174	45.764	-0.6	-1.003	0	15.95	0	1.559	1.591	-0.032
174.1	45.745	-0.6	-0.925	0	15.95	0	1.56	1.592	-0.032
174.2	45.727	-0.635	-0.84	0	15.78	0	1.56	1.592	-0.032
174.3	45.708	-0.618	-0.145	0	15.38	0	1.56	1.592	-0.032
174.4	45.683	-0.618	-0.367	0	15.33	0	1.561	1.593	-0.032
174.5	45.665	-0.593	-1.699	0	15.29	0	1.561	1.593	-0.032
174.6	45.64	-0.633	-0.759	0	15.37	0	1.562	1.594	-0.032
174.7	45.621	-0.633	-0.109	0	15.28	0	1.562	1.594	-0.032
174.8	45.602	-0.635	-0.145	0	15.32	0	1.563	1.595	-0.032
174.9	45.584	-0.61	-0.759	0	15.34	0	1.563	1.595	-0.032
175	45.559	-0.61	-1.617	0	15.26	0	1.563	1.595	-0.032
175.1	45.534	-0.598	-0.964	0	15.32	0	1.564	1.596	-0.032
175.2	45.515	-0.605	-0.897	0	15.25	0	1.564	1.596	-0.032
175.3	45.497	-0.605	-1.045	0	15.43	0	1.565	1.597	-0.032
175.4	45.478	-0.618	-0.272	0	15.43	0	1.565	1.597	-0.032
175.5	45.46	-0.618	-0.438	0	15.42	0	1.566	1.598	-0.032
175.6	45.435	-0.615	-0.855	0	15.49	0	1.566	1.598	-0.032
175.7	45.416	-0.608	-0.925	0	15.79	0	1.566	1.598	-0.032
175.8	45.397	-0.615	-1.017	0	17.3	0	1.567	1.599	-0.032
175.9	45.379	-0.615	-0.025	0	17.87	0	1.567	1.599	-0.032
176	45.366	-0.613	-0.84	0	18.96	0	1.568	1.6	-0.032
176.1	45.354	-0.61	-0.72	0	19.77	0	1.568	1.6	-0.032
176.2	45.341	-0.61	-0.675	0	19.75	0	1.569	1.601	-0.032
176.3	45.329	-0.603	-0.925	0	19.78	0	1.57	1.602	-0.032
176.4	45.317	-0.603	-0.353	0	19.66	0	1.57	1.602	-0.032
176.5	45.304	-0.603	-0.84	0	19.66	0	1.57	1.602	-0.032
176.6	45.292	-0.615	-0.65	0	13.33	0	1.571	1.603	-0.032
176.7	45.273	-0.618	-0.554	0	6.13	0	1.571	1.603	-0.032
176.8	45.236	-0.618	-0.84	0	3.53	0	1.571	1.603	-0.032
176.9	45.192	-0.615	-0.805	0	1.94	0	1.571	1.603	-0.032
177	45.143	-0.625	-0.911	0	0.89	0	1.571	1.603	-0.032
177.1	45.093	-0.625	-0.466	0	0	0	1.571	1.603	-0.032
177.2	45.043	-0.615	-0.353	0	0	0	1.571	1.603	-0.032
177.3	44.993	-0.593	-0.84	0	0	0	1.571	1.603	-0.032
177.4	44.938	-0.593	-1.48	0	0	0	1.571	1.603	-0.032
177.5	44.888	-0.59	-1.003	0	0	0	1.571	1.603	-0.032
177.6	44.838	-0.615	-0.452	0	0	0	1.571	1.603	-0.032
177.7	44.782	-0.615	-0.554	0	0	0	1.571	1.603	-0.032
177.8	44.733	-0.63	-0.759	0	0	0	1.571	1.603	-0.032
177.9	44.683	-0.62	-0.516	0	0	0	1.571	1.603	-0.032

178	44.627	-0.62	-0.759	0	0	0	1.571	1.603	-0.032
178.1	44.577	-0.605	-1.328	0	0	0	1.571	1.603	-0.032
178.2	44.527	-0.6	-0.501	0	0	0	1.571	1.603	-0.032
178.3	44.465	-0.6	-0.84	0	-2.88	0	1.571	1.603	-0.032
178.4	44.378	-0.615	-0.6	0	-13.66	0	1.571	1.603	-0.032
178.5	44.266	-0.615	-0.516	0	-15.99	0	1.571	1.603	-0.033
178.6	44.155	-0.608	-0.812	0	-16.15	0	1.57	1.603	-0.033
178.7	44.055	-0.62	-1.088	0	-15.93	0	1.57	1.603	-0.034
178.8	43.956	-0.625	-0.501	0	-15.29	0	1.569	1.603	-0.034
178.9	43.856	-0.625	-0.586	0	-14.77	0	1.569	1.603	-0.035
179	43.763	-0.628	-0.826	0	-14.94	0	1.568	1.603	-0.035
179.1	43.664	-0.618	-0.802	0	-14.27	0	1.568	1.603	-0.035
179.2	43.571	-0.618	-1.074	0	-8.79	0	1.568	1.603	-0.036
179.3	43.49	-0.623	-0.618	0	-0.63	0	1.568	1.603	-0.036
179.4	43.434	-0.613	-0.604	0	0	0	1.568	1.603	-0.036
179.5	43.378	-0.613	-0.911	0	0	0	1.568	1.603	-0.036
179.6	43.322	-0.64	-1.13	0	0	0	1.568	1.603	-0.036
179.7	43.26	-0.64	-0.025	0	0	0	1.568	1.603	-0.036
179.8	43.192	-0.64	-0.353	0	-2.72	0	1.568	1.603	-0.036
179.9	43.123	-0.603	-0.989	0	-3.39	0	1.568	1.603	-0.036
180	43.055	-0.603	-1.031	0	-4.06	0	1.567	1.603	-0.036
180.1	42.98	-0.603	-1.197	0	-4.39	0	1.567	1.603	-0.036
180.2	42.912	-0.618	-0.187	0	-4.54	0	1.567	1.603	-0.036
180.3	42.844	-0.598	-0.925	0	-4.72	0	1.567	1.603	-0.036
180.4	42.844	-0.598	-1.088	0	-5.53	0	1.567	1.603	-0.037
180.5	42.694	-0.59	-0.66	0	-7.61	0	1.567	1.603	-0.037
180.6	42.607	-0.615	-0.759	0	-8.93	0	1.566	1.603	-0.037
180.7	42.52	-0.615	-0.424	0	-8.93	0	1.566	1.603	-0.037
180.8	42.44	-0.625	-0.84	0	-8.96	0	1.566	1.603	-0.037
180.9	42.359	-0.625	-0.501	0	-8.94	0	1.566	1.603	-0.038
181	42.278	-0.625	-0.759	0	-8.96	0	1.565	1.603	-0.038
181.1	42.191	-0.64	-0.925	0	-8.84	0	1.565	1.603	-0.038
181.2	42.11	-0.62	-0.424	0	-8.88	0	1.565	1.603	-0.038
181.3	42.023	-0.62	-0.706	0	-6.24	0	1.565	1.603	-0.039
181.4	41.955	-0.618	-1.398	0	0	0	1.565	1.603	-0.039
181.5	41.899	-0.618	-0.911	0	0	0	1.565	1.603	-0.039
181.6	41.849	-0.64	0.071	0	0	0	1.565	1.603	-0.039
181.7	41.8	-0.61	-1.049	0	0	0	1.565	1.603	-0.039
181.8	41.75	-0.618	-0.911	0	0	0	1.565	1.603	-0.039
181.9	41.75	-0.618	-1.24	0	0	0	1.565	1.604	-0.039
182	41.657	-0.623	-0.424	0	0	0	1.565	1.604	-0.039
182.1	41.607	-0.605	-0.675	0	0	0	1.565	1.604	-0.039
182.2	41.557	-0.605	-1.73	0	0.84	0	1.565	1.604	-0.039
182.3	41.514	-0.62	-0.629	0	2.63	0	1.565	1.604	-0.039
182.4	41.464	-0.618	-0.173	0	6.33	0	1.565	1.604	-0.039
182.5	41.433	-0.618	-0.911	0	11.49	0	1.565	1.604	-0.039
182.6	41.408	-0.63	-0.501	0	14.69	0	1.566	1.605	-0.039

182.7	41.39	-0.613	-0.258	0	21.23	0	1.566	1.605	-0.039
182.8	41.39	-0.613	-0.989	0	25.1	0	1.567	1.606	-0.039
182.9	41.396	-0.615	-1.268	0	34	0	1.568	1.607	-0.039
183	41.421	-0.603	-0.484	0	42.65	0	1.569	1.608	-0.039
183.1	41.458	-0.603	-0.826	0	52.2	0	1.571	1.609	-0.039
183.2	41.526	-0.63	-0.812	0	64.33	0	1.573	1.611	-0.039
183.3	41.607	-0.648	-0.812	0	64.74	0	1.574	1.613	-0.039
183.4	41.607	-0.648	0.155	0	63.6	0	1.576	1.615	-0.039
183.5	41.781	-0.63	-1.324	0	63.53	0	1.578	1.617	-0.039
183.6	41.868	-0.638	-0.911	0	63.61	0	1.58	1.618	-0.039
183.7	41.955	-0.638	-0.159	0	63.65	0	1.581	1.62	-0.039
183.8	42.036	-0.63	-0.812	0	63.04	0	1.583	1.622	-0.039
183.9	42.117	-0.635	-0.911	0	62	0	1.585	1.624	-0.039
184	42.197	-0.635	-0.745	0	60.43	0	1.587	1.625	-0.039
184.1	42.278	-0.633	-0.456	0	60.5	0	1.588	1.627	-0.039
184.2	42.353	-0.63	-0.731	0	60.5	0	1.59	1.629	-0.039
184.3	42.427	-0.63	-0.703	0	59.4	0	1.592	1.63	-0.039
184.4	42.502	-0.633	-0.826	0	53.9	0	1.593	1.632	-0.039
184.5	42.57	-0.633	-0.501	0	52.47	0	1.595	1.633	-0.039
184.6	42.626	-0.61	-1.3	0	52.44	0	1.596	1.635	-0.039
184.7	42.688	-0.598	-1.314	0	52.5	0	1.597	1.636	-0.039
184.8	42.744	-0.605	-0.989	0	52.46	0	1.599	1.638	-0.039
184.9	42.806	-0.605	-0.858	0	52.46	0	1.599	1.638	-0.039
185	42.862	-0.628	-0.6	0	52.42	0	1.602	1.64	-0.039
185.1	42.924	-0.623	-0.297	0	52.45	0	1.603	1.642	-0.039
185.2	42.98	-0.623	-0.724	0	52.44	0	1.605	1.643	-0.039
185.3	43.036	-0.603	-0.971	0	52.36	0	1.606	1.645	-0.039
185.4	43.098	-0.615	-1.222	0	52.38	0	1.608	1.646	-0.039
185.5	43.154	-0.615	-0.66	0	52.36	0	1.609	1.648	-0.039
185.6	43.21	-0.613	-0.484	0	52.34	0	1.611	1.649	-0.039
185.7	43.266	-0.618	-0.812	0	52.39	0	1.612	1.651	-0.039
185.8	43.328	-0.618	-1.314	0	52.35	0	1.613	1.652	-0.039
185.9	43.384	-0.635	0.314	0	52.33	0	1.615	1.654	-0.039
186	43.44	-0.618	-0.526	0	52.45	0	1.616	1.655	-0.039
186.1	43.496	-0.618	-1.3	0	52.29	0	1.618	1.656	-0.039
186.2	43.552	-0.623	-0.745	0	52.43	0	1.619	1.658	-0.039
186.3	43.608	-0.608	-0.501	0	52.52	0	1.621	1.659	-0.039
186.4	43.67	-0.608	-1.24	0	52.59	0	1.622	1.661	-0.039
186.5	43.72	-0.618	-0.766	0	52.39	0	1.624	1.662	-0.039
186.6	43.776	-0.61	-0.441	0	49.88	0	1.625	1.664	-0.039
186.7	43.832	-0.61	-1.3	0	41.2	0	1.626	1.665	-0.039
186.8	43.863	-0.613	-0.66	0	32.52	0	1.627	1.666	-0.039
186.9	43.881	-0.603	-0.745	0	27.09	0	1.628	1.666	-0.039
187	43.887	-0.603	-1.37	0	23.6	0	1.628	1.667	-0.039
187.1	43.887	-0.628	-0.569	0	22.72	0	1.629	1.668	-0.039
187.2	43.881	-0.615	-0.159	0	22.17	0	1.63	1.668	-0.039
187.3	43.881	-0.615	-1.222	0	18.79	0	1.63	1.669	-0.039

187.4	43.875	-0.613	-0.989	0	14.88	0	1.631	1.669	-0.039
187.5	43.856	-0.613	-0.484	0	11.38	0	1.631	1.67	-0.039
187.6	43.832	-0.615	-0.798	0	7.35	0	1.631	1.67	-0.039
187.7	43.794	-0.62	-0.897	0	5.36	0	1.631	1.67	-0.039
187.8	43.757	-0.623	-0.731	0	4.06	0	1.631	1.67	-0.039
187.9	43.713	-0.623	-0.484	0	3.13	0	1.632	1.67	-0.039
188	43.676	-0.615	-0.569	0	2.82	0	1.632	1.67	-0.039
188.1	43.626	-0.61	-0.812	0	3.59	0	1.632	1.67	-0.039
188.2	43.583	-0.61	-0.798	0	4.18	0	1.632	1.67	-0.039
188.3	43.539	-0.625	-0.971	0	4.2	0	1.632	1.671	-0.039
188.4	43.502	-0.633	-0.325	0	4.19	0	1.632	1.671	-0.039
188.5	43.459	-0.633	0.004	0	4.19	0	1.632	1.671	-0.039
188.6	43.421	-0.61	-0.897	0	4.19	0	1.632	1.671	-0.039
188.7	43.378	-0.615	-1.056	0	4.18	0	1.632	1.671	-0.039
188.8	43.341	-0.615	-0.858	0	4.26	0	1.633	1.671	-0.039
188.9	43.297	-0.62	-0.325	0	5.58	0	1.633	1.671	-0.039
189	43.26	-0.62	-0.883	0	8.12	0	1.633	1.672	-0.039
189.1	43.229	-0.62	-1.084	0	8.12	0	1.633	1.672	-0.039
189.2	43.198	-0.61	-0.512	0	10.45	0	1.633	1.672	-0.039
189.3	43.167	-0.605	-0.731	0	12.65	0	1.634	1.672	-0.039
189.4	43.148	-0.605	-0.999	0	15.11	0	1.634	1.673	-0.039
189.5	43.129	-0.615	-0.484	0	18.9	0	1.635	1.673	-0.039
189.6	43.117	-0.638	-0.692	0	20.78	0	1.635	1.674	-0.039
189.7	43.111	-0.638	-0.526	0	20.86	0	1.636	1.675	-0.039
189.8	43.105	-0.628	-0.145	0	20.94	0	1.636	1.675	-0.039
189.9	43.098	-0.615	-0.936	0	21.24	0	1.637	1.676	-0.039
190	43.098	-0.615	-0.731	0	21.76	0	1.638	1.676	-0.039
190.1	43.092	-0.62	-0.812	0	21.87	0	1.638	1.677	-0.039
190.2	43.092	-0.61	-0.145	0	21.97	0	1.639	1.678	-0.039
190.3	43.086	-0.61	-1.07	0	24.32	0	1.64	1.678	-0.039
190.4	43.086	-0.62	-0.985	0	27.07	0	1.64	1.679	-0.039
190.5	43.092	-0.62	-0.311	0	28.8	0	1.641	1.68	-0.039
190.6	43.105	-0.618	-0.717	0	29.15	0	1.642	1.681	-0.039
190.7	43.117	-0.615	-0.798	0	29.19	0	1.643	1.681	-0.039
190.8	43.129	-0.63	-0.925	0	29.17	0	1.644	1.682	-0.039
190.9	43.142	-0.63	-0.47	0	29.41	0	1.644	1.683	-0.039
191	43.154	-0.608	-0.311	0	30.85	0	1.645	1.684	-0.039
191.1	43.167	-0.6	-1.095	0	33.82	0	1.646	1.685	-0.039
191.2	43.185	-0.6	-1.398	0	35.25	0	1.647	1.686	-0.039
191.3	43.216	-0.625	-0.456	0	35.1	0	1.648	1.687	-0.039
191.4	43.235	-0.658	-0.424	0	35.2	0	1.649	1.688	-0.039
191.5	43.26	-0.658	-0.396	0	36.8	0	1.65	1.689	-0.039
191.6	43.291	-0.62	-0.145	0	37.75	0	1.651	1.69	-0.039
191.7	43.316	-0.62	-1.466	0	37.76	0	1.652	1.691	-0.039
191.8	43.347	-0.605	-1.398	0	38.61	0	1.653	1.692	-0.039
191.9	43.378	-0.628	-0.632	0	41.29	0	1.654	1.693	-0.039
192	43.415	-0.643	-0.72	0	41.95	0	1.656	1.694	-0.039

192.1	43.452	-0.643	-0.583	0	41.89	0	1.657	1.695	-0.039
192.2	43.49	-0.633	-0.84	0	42.51	0	1.658	1.697	-0.039
192.3	43.527	-0.625	-1.07	0	43.36	0	1.659	1.698	-0.039
192.4	43.564	-0.625	-0.78	0	43.54	0	1.66	1.699	-0.039
192.5	43.608	-0.605	-0.989	0	44.21	0	1.662	1.7	-0.039
192.6	43.651	-0.628	-0.911	0	44.64	0	1.663	1.701	-0.039
192.7	43.689	-0.628	-0.145	0	44.66	0	1.664	1.703	-0.039
192.8	43.732	-0.625	-0.498	0	44.67	0	1.665	1.704	-0.039
192.9	43.769	-0.615	-0.717	0	44.56	0	1.667	1.705	-0.039
193	43.813	-0.615	-1.275	0	44.58	0	1.668	1.706	-0.039
193.1	43.85	-0.615	-0.869	0	44.63	0	1.669	1.708	-0.039
193.2	43.894	-0.63	-0.812	0	44.74	0	1.67	1.709	-0.039
193.3	43.937	-0.63	-0.47	0	44.74	0	1.67	1.709	-0.039
193.4	43.974	-0.615	-0.498	0	44.57	0	1.673	1.711	-0.039
193.5	44.024	-0.615	-1.137	0	44.5	0	1.674	1.713	-0.039
193.6	44.055	-0.618	-1.102	0	43.22	0	1.675	1.714	-0.039
193.7	44.093	-0.625	-0.544	0	40.82	0	1.676	1.715	-0.039
193.8	44.13	-0.608	-0.512	0	38.17	0	1.677	1.716	-0.039
193.9	44.161	-0.608	-1.314	0	37.8	0	1.678	1.717	-0.039
194	44.186	-0.615	-0.784	0	37.83	0	1.679	1.718	-0.039
194.1	44.211	-0.628	-0.6	0	37.86	0	1.681	1.719	-0.039
194.2	44.242	-0.628	-0.339	0	37.89	0	1.682	1.72	-0.039
194.3	44.266	-0.638	-0.53	0	38.04	0	1.683	1.721	-0.039
194.4	44.291	-0.643	-0.703	0	38.9	0	1.684	1.722	-0.039
194.5	44.322	-0.643	-0.498	0	39.47	0	1.685	1.723	-0.039
194.6	44.353	-0.61	-0.646	0	39.45	0	1.686	1.725	-0.039
194.7	44.378	-0.608	-1.282	0	39.55	0	1.687	1.726	-0.039
194.8	44.409	-0.608	-1.324	0	39.52	0	1.688	1.727	-0.039
194.9	44.44	-0.705	-0.41	0	39.93	0	1.689	1.728	-0.039
195	44.472	-0.723	0.586	0	40.42	0	1.69	1.729	-0.039
195.1	44.503	-0.723	-0.279	0	40.84	0	1.691	1.73	-0.039
195.2	44.534	-0.603	-0.727	0	41.19	0	1.693	1.731	-0.039
195.3	44.565	-0.598	-2.514	0	41.16	0	1.694	1.732	-0.039
195.4	44.596	-0.598	-1.716	0	41.23	0	1.695	1.734	-0.039
195.5	44.633	-0.628	0.127	0	41.23	0	1.696	1.735	-0.039
195.6	44.664	-0.618	-0.498	0	41.3	0	1.697	1.736	-0.039
195.7	44.695	-0.618	-0.943	0	40.37	0	1.698	1.737	-0.039
195.8	44.726	-0.61	-1.056	0	39.93	0	1.699	1.738	-0.039
195.9	44.757	-0.63	-1.017	0	37.09	0	1.7	1.739	-0.039
196	44.782	-0.63	-0.325	0	31.16	0	1.701	1.74	-0.039
196.1	44.801	-0.61	-0.484	0	26.96	0	1.702	1.741	-0.039
196.2	44.801	-0.608	-1.123	0	23.68	0	1.703	1.741	-0.039
196.3	44.801	-0.608	-1.222	0	21.98	0	1.703	1.742	-0.039
196.4	44.795	-0.638	-0.526	0	19.26	0	1.704	1.743	-0.039
196.5	44.788	-0.638	-0.424	0	17.34	0	1.704	1.743	-0.039
196.6	44.77	-0.628	-0.614	0	15.03	0	1.705	1.743	-0.039
196.7	44.751	-0.625	-1.095	0	11.59	0	1.705	1.744	-0.039

196.8	44.726	-0.64	-1.042	0	8.03	0	1.705	1.744	-0.039
196.9	44.695	-0.64	0.004	0	6.11	0	1.706	1.744	-0.039
197	44.658	-0.618	-0.441	0	5.78	0	1.706	1.744	-0.039
197.1	44.614	-0.625	-1.028	0	5.78	0	1.706	1.744	-0.039
197.2	44.577	-0.625	-0.812	0	5.82	0	1.706	1.745	-0.039
197.3	44.54	-0.635	-0.364	0	6.26	0	1.706	1.745	-0.039
197.4	44.503	-0.623	-0.812	0	6.29	0	1.706	1.745	-0.039
197.5	44.459	-0.623	-0.897	0	6.29	0	1.706	1.745	-0.039
197.6	44.428	-0.628	-1.3	0	6.28	0	1.707	1.745	-0.039
197.7	44.385	-0.625	-0.646	0	6.27	0	1.707	1.746	-0.039
197.8	44.353	-0.625	-0.646	0	6.27	0	1.707	1.746	-0.039
197.9	44.316	-0.618	-1.088	0	6.05	0	1.707	1.746	-0.039
198	44.279	-0.638	-1.017	0	5.51	0	1.707	1.746	-0.039
198.1	44.242	-0.638	-0.244	0	4.76	0	1.707	1.746	-0.039
198.2	44.198	-0.64	-0.646	0	3.62	0	1.708	1.746	-0.039
198.3	44.161	-0.64	-0.971	0	2.28	0	1.708	1.746	-0.039
198.4	44.117	-0.64	-0.689	0	1.12	0	1.708	1.746	-0.039
198.5	44.068	-0.63	-0.798	0	0	0	1.708	1.746	-0.039
198.6	44.018	-0.61	-0.989	0	0	0	1.708	1.746	-0.039
198.7	43.968	-0.61	-0.403	0	0	0	1.708	1.746	-0.039
198.8	43.919	-0.593	-1.017	0	0	0	1.708	1.746	-0.039
198.9	43.869	-0.593	-1.003	0	0	0	1.708	1.746	-0.039
199	43.813	-0.593	-0.798	0	0	0	1.708	1.746	-0.039
199.1	43.763	-0.61	-0.516	0	0	0	1.708	1.746	-0.039
199.2	43.713	-0.618	-0.516	0	0	0	1.708	1.746	-0.039
199.3	43.67	-0.618	-0.632	0	1.05	0	1.708	1.746	-0.039
199.4	43.62	-0.63	-0.717	0	2.26	0	1.708	1.747	-0.039
199.5	43.571	-0.63	-0.586	0	4.51	0	1.708	1.747	-0.039
199.6	43.533	-0.63	-0.812	0	9.3	0	1.708	1.747	-0.039
199.7	43.502	-0.608	-0.812	0	12.42	0	1.709	1.747	-0.039
199.8	43.484	-0.61	-0.957	0	12.9	0	1.709	1.748	-0.039
199.9	43.459	-0.61	-0.727	0	12.91	0	1.709	1.748	-0.039
200	43.44	-0.605	-0.632	0	12.92	0	1.71	1.748	-0.039
200.1	43.415	-0.603	-1.268	0	12.93	0	1.71	1.749	-0.039
200.2	43.39	-0.603	-0.487	0	13.19	0	1.71	1.749	-0.039
200.3	43.372	-0.618	-1.088	0	14.65	0	1.711	1.749	-0.039
200.4	43.353	-0.638	-0.759	0	14.76	0	1.711	1.75	-0.039
200.5	43.334	-0.638	0.187	0	15.37	0	1.712	1.75	-0.039
200.6	43.316	-0.598	-1.123	0	17.05	0	1.712	1.751	-0.039
200.7	43.303	-0.598	-1.437	0	17.77	0	1.713	1.751	-0.039
200.8	43.291	-0.608	-0.925	0	18.23	0	1.713	1.752	-0.039
200.9	43.279	-0.618	-0.339	0	18.15	0	1.714	1.752	-0.039
201	43.272	-0.623	-1.003	0	18.18	0	1.714	1.753	-0.039
201.1	43.26	-0.623	-0.632	0	18.18	0	1.715	1.753	-0.039
201.2	43.247	-0.615	-0.703	0	18.17	0	1.715	1.754	-0.039
201.3	43.241	-0.615	-0.901	0	18.23	0	1.716	1.754	-0.039
201.4	43.229	-0.615	-0.869	0	18.14	0	1.716	1.755	-0.039

201.5	43.223	-0.623	-0.47	0	18.18	0	1.717	1.755	-0.039
201.6	43.21	-0.61	-0.756	0	18.18	0	1.717	1.756	-0.039
201.7	43.204	-0.61	-1.042	0	18.18	0	1.717	1.756	-0.039
201.8	43.192	-0.63	-0.826	0	18.35	0	1.718	1.757	-0.039
201.9	43.179	-0.63	-0.47	0	18.28	0	1.719	1.757	-0.039
202	43.173	-0.63	-0.657	0	18.33	0	1.719	1.758	-0.039
202.1	43.16	-0.608	-0.77	0	18.36	0	1.72	1.758	-0.039
202.2	43.148	-0.61	-1.003	0	18.28	0	1.72	1.759	-0.039
202.3	43.136	-0.61	-0.84	0	18.38	0	1.721	1.759	-0.039
202.4	43.129	-0.625	-0.456	0	18.83	0	1.721	1.76	-0.039
202.5	43.123	-0.625	-0.427	0	19.09	0	1.722	1.76	-0.039
202.6	43.111	-0.61	-1.123	0	19.15	0	1.722	1.761	-0.039
202.7	43.105	-0.64	-0.911	0	19.06	0	1.723	1.761	-0.039
202.8	43.092	-0.635	-0.396	0	19.09	0	1.723	1.762	-0.039
202.9	43.086	-0.635	-0.784	0	19	0	1.724	1.763	-0.039
203	43.08	-0.625	-0.784	0	18.88	0	1.724	1.763	-0.039
203.1	43.067	-0.608	-0.699	0	18.97	0	1.725	1.764	-0.039
203.2	43.061	-0.608	-1.285	0	18.94	0	1.725	1.764	-0.039
203.3	43.049	-0.623	-0.957	0	18.56	0	1.726	1.765	-0.039
203.4	43.042	-0.623	-0.297	0	17.97	0	1.726	1.765	-0.039
203.5	43.036	-0.623	-0.297	0	17.75	0	1.727	1.766	-0.039
203.6	43.018	-0.615	-0.989	0	17.81	0	1.727	1.766	-0.039
203.7	43.011	-0.618	-0.989	0	17.71	0	1.728	1.767	-0.039
203.8	43.005	-0.618	-0.943	0	17.77	0	1.728	1.767	-0.039
203.9	42.993	-0.615	-0.618	0	17.77	0	1.729	1.768	-0.039
204	42.98	-0.618	-0.883	0	17.73	0	1.729	1.768	-0.039
204.1	42.974	-0.618	-0.784	0	18.03	0	1.73	1.769	-0.039
204.2	42.962	-0.628	-0.657	0	18.96	0	1.73	1.769	-0.039
204.3	42.955	-0.648	-0.784	0	19.03	0	1.731	1.77	-0.039
204.4	42.943	-0.648	-0.6	0	19	0	1.732	1.77	-0.039
204.5	42.937	-0.643	-0.456	0	18.97	0	1.732	1.771	-0.039
204.6	42.924	-0.633	-1.017	0	19.05	0	1.733	1.771	-0.039
204.7	42.918	-0.633	-0.872	0	18.94	0	1.733	1.772	-0.039
204.8	42.912	-0.615	-0.883	0	19.12	0	1.734	1.772	-0.039
204.9	42.906	-0.608	-1.282	0	19.53	0	1.734	1.773	-0.039
205	42.893	-0.608	-0.784	0	20.5	0	1.735	1.773	-0.039
205.1	42.893	-0.623	-1.074	0	23.6	0	1.735	1.774	-0.039
205.2	42.887	-0.64	-0.554	0	23.95	0	1.736	1.775	-0.039
205.3	42.893	-0.64	-0.487	0	26.06	0	1.737	1.775	-0.039
205.4	42.899	-0.605	-0.643	0	27.76	0	1.738	1.776	-0.039
205.5	42.912	-0.605	-1.391	0	27.84	0	1.738	1.777	-0.039
205.6	42.918	-0.603	-0.953	0	27.74	0	1.739	1.778	-0.039
205.7	42.924	-0.6	-0.851	0	27.9	0	1.74	1.779	-0.039
205.8	42.937	-0.613	-0.989	0	28.75	0	1.741	1.779	-0.039
205.9	42.949	-0.613	-0.703	0	28.75	0	1.741	1.779	-0.039
206	42.962	-0.625	-0.487	0	30.46	0	1.742	1.781	-0.039
206.1	42.98	-0.618	-0.865	0	33.34	0	1.743	1.782	-0.039

206.2	42.999	-0.618	-0.487	0	34.17	0	1.744	1.783	-0.039
206.3	43.024	-0.598	-1.162	0	34.63	0	1.745	1.784	-0.039
206.4	43.042	-0.61	-1.137	0	35.8	0	1.746	1.785	-0.039
206.5	43.073	-0.61	-0.113	0	36.62	0	1.747	1.786	-0.039
206.6	43.098	-0.615	-0.809	0	38.43	0	1.748	1.787	-0.039
206.7	43.129	-0.62	-0.851	0	40.76	0	1.749	1.788	-0.039
206.8	43.167	-0.62	-0.371	0	42.4	0	1.751	1.789	-0.039
206.9	43.204	-0.613	-1.052	0	45.86	0	1.752	1.79	-0.039
207	43.247	-0.623	-1.162	0	49.28	0	1.753	1.792	-0.039
207.1	43.303	-0.623	-0.604	0	50.73	0	1.755	1.793	-0.039
207.2	43.359	-0.625	-0.441	0	50.65	0	1.756	1.795	-0.039
207.3	43.415	-0.628	-0.989	0	50.69	0	1.757	1.796	-0.039
207.4	43.471	-0.628	-0.837	0	50.68	0	1.759	1.797	-0.039
207.5	43.533	-0.608	-1.095	0	50.63	0	1.76	1.799	-0.039
207.6	43.577	-0.593	-0.932	0	50.7	0	1.762	1.8	-0.039
207.7	43.633	-0.593	-0.953	0	50.77	0	1.763	1.802	-0.039
207.8	43.689	-0.618	-0.544	0	50.78	0	1.764	1.803	-0.039
207.9	43.738	-0.625	-0.261	0	50	0	1.766	1.805	-0.039
208	43.788	-0.625	-0.795	0	48.99	0	1.767	1.806	-0.039
208.1	43.844	-0.6	-0.929	0	48.74	0	1.769	1.807	-0.039
208.2	43.887	-0.61	-1.137	0	47.85	0	1.77	1.809	-0.039
208.3	43.937	-0.61	-0.795	0	46.03	0	1.771	1.81	-0.039
208.4	43.981	-0.618	-0.466	0	40.53	0	1.772	1.811	-0.039
208.5	44.018	-0.618	-0.77	0	35.92	0	1.773	1.812	-0.039
208.6	44.043	-0.62	-0.727	0	30.03	0	1.774	1.813	-0.039
208.7	44.055	-0.603	-0.918	0	16.48	0	1.775	1.813	-0.039
208.8	44.043	-0.605	-0.89	0	5.86	0	1.775	1.813	-0.039
208.9	44.006	-0.605	-0.837	0	3.44	0	1.775	1.814	-0.039
209	43.962	-0.608	-0.629	0	1.93	0	1.775	1.814	-0.039
209.1	43.919	-0.608	-0.586	0	0.88	0	1.775	1.814	-0.039
209.2	43.869	-0.608	-0.879	0	0	0	1.775	1.814	-0.039
209.3	43.819	-0.618	-0.837	0	0	0	1.775	1.814	-0.039
209.4	43.769	-0.63	-0.717	0	0	0	1.775	1.814	-0.039
209.5	43.72	-0.63	-0.138	0	0	0	1.775	1.814	-0.039
209.6	43.67	-0.605	-0.756	0	0	0	1.775	1.814	-0.039
209.7	43.62	-0.6	-1.296	0	0	0	1.775	1.814	-0.039
209.8	43.571	-0.6	-0.671	0	0	0	1.775	1.814	-0.039
209.9	43.521	-0.6	-0.795	0	0	0	1.775	1.814	-0.039
210	43.471	-0.61	-0.71	0	0	0	1.775	1.814	-0.039
210.1	43.421	-0.61	-0.798	0	0	0	1.775	1.814	-0.039
210.2	43.372	-0.608	-0.629	0	0	0	1.775	1.814	-0.039
210.3	43.316	-0.625	-0.953	0	-2.16	0	1.775	1.814	-0.039
210.4	43.247	-0.625	-0.643	0	-7.92	0	1.775	1.814	-0.039
210.5	43.154	-0.628	-0.611	0	-12.03	0	1.774	1.814	-0.039
210.6	43.061	-0.618	-1.194	0	-14.81	0	1.774	1.814	-0.04
210.7	42.962	-0.618	-0.918	0	-15.2	0	1.774	1.814	-0.04
210.8	42.862	-0.605	-0.689	0	-16.09	0	1.773	1.814	-0.041

210.9	42.763	-0.593	-0.586	0	-18.02	0	1.773	1.814	-0.041
211	42.651	-0.593	-1.247	0	-19.6	0	1.772	1.814	-0.042
211.1	42.539	-0.605	-0.629	0	-19.8	0	1.772	1.814	-0.042
211.2	42.433	-0.61	-0.438	0	-19.77	0	1.771	1.814	-0.043
211.3	42.328	-0.61	-0.985	0	-19.72	0	1.77	1.814	-0.043
211.4	42.216	-0.6	-0.646	0	-19.77	0	1.77	1.814	-0.044
211.5	42.104	-0.6	-1.232	0	-19.62	0	1.769	1.814	-0.044
211.6	41.998	-0.598	-1.395	0	-18.95	0	1.769	1.814	-0.045
211.7	41.893	-0.618	-0.466	0	-17.96	0	1.768	1.814	-0.045
211.8	41.8	-0.6	-0.138	0	-16.39	0	1.768	1.814	-0.046
211.9	41.694	-0.6	-1.932	0	-14.17	0	1.767	1.814	-0.046
212	41.607	-0.64	-1.028	0	-13.82	0	1.767	1.814	-0.047
212.1	41.514	-0.635	-0.053	0	-13.81	0	1.767	1.814	-0.047
212.2	41.421	-0.635	-0.526	0	-13.63	0	1.766	1.814	-0.047
212.3	41.327	-0.603	-1.268	0	-13.7	0	1.766	1.814	-0.048
212.4	41.24	-0.61	-1.105	0	-13.64	0	1.766	1.814	-0.048
212.5	41.147	-0.61	-0.717	0	-13.71	0	1.765	1.814	-0.048
212.6	41.054	-0.643	-0.777	0	-13.72	0	1.765	1.814	-0.049
212.7	40.967	-0.643	-0.47	0	-13.57	0	1.764	1.814	-0.049
212.8	40.874	-0.643	-0.696	0	-13.67	0	1.764	1.814	-0.05
212.9	40.787	-0.605	-1.434	0	-13.56	0	1.764	1.814	-0.05
213	40.694	-0.625	-1.621	0	-13.59	0	1.763	1.814	-0.05
213.1	40.607	-0.625	-0.413	0	-13.5	0	1.763	1.814	-0.051
213.2	40.507	-0.623	-0.067	0	-13.49	0	1.763	1.814	-0.051
213.3	40.426	-0.628	-1.42	0	-13.42	0	1.762	1.814	-0.052
213.4	40.333	-0.628	-0.777	0	-12.12	0	1.762	1.814	-0.052
213.5	40.252	-0.623	-0.671	0	-2.75	0	1.762	1.814	-0.052
213.6	40.184	-0.623	-1.409	0	0	0	1.762	1.814	-0.052
213.7	40.141	-0.623	-0.939	0	0	0	1.762	1.814	-0.052
213.8	40.097	-0.625	-0.862	0	0	0	1.762	1.814	-0.052
213.9	40.047	-0.633	-0.862	0	0	0	1.762	1.814	-0.052
214	39.998	-0.633	-0.855	0	0	0	1.762	1.814	-0.052
214.1	39.954	-0.635	-0.862	0	0	0	1.762	1.814	-0.052
214.2	39.911	-0.63	-0.597	0	1.84	0	1.762	1.814	-0.052
214.3	39.867	-0.63	-1.105	0	1.84	0	1.762	1.814	-0.052
214.4	39.836	-0.625	-1.25	0	9.27	0	1.762	1.814	-0.052
214.5	39.811	-0.625	-1.148	0	11.88	0	1.763	1.815	-0.052
214.6	39.793	-0.64	-0.364	0	16.6	0	1.763	1.815	-0.052
214.7	39.786	-0.643	-0.438	0	19.71	0	1.764	1.816	-0.052
214.8	39.78	-0.63	-0.837	0	22.92	0	1.764	1.816	-0.052
214.9	39.786	-0.63	-0.925	0	27.74	0	1.765	1.817	-0.052
215	39.805	-0.6	-1.01	0	32.97	0	1.766	1.818	-0.052
215.1	39.83	-0.615	-1.25	0	33.14	0	1.767	1.819	-0.052
215.2	39.861	-0.615	-0.597	0	35.3	0	1.768	1.82	-0.052
215.3	39.892	-0.625	-0.406	0	39.9	0	1.769	1.821	-0.052
215.4	39.929	-0.62	-0.812	0	40.66	0	1.77	1.822	-0.052
215.5	39.979	-0.62	-0.763	0	41.53	0	1.771	1.823	-0.052

215.6	40.023	-0.613	-0.823	0	41.68	0	1.772	1.824	-0.052
215.7	40.072	-0.608	-0.925	0	42.72	0	1.774	1.825	-0.052
215.8	40.116	-0.608	-1.303	0	45.39	0	1.775	1.827	-0.052
215.9	40.172	-0.648	-0.438	0	46.93	0	1.776	1.828	-0.052
216	40.228	-0.628	-0.275	0	47.17	0	1.777	1.829	-0.052
216.1	40.283	-0.628	-0.766	0	50.31	0	1.779	1.831	-0.052
216.2	40.352	-0.61	-1.522	0	52.21	0	1.78	1.832	-0.052
216.3	40.42	-0.643	-1.314	0	52.56	0	1.782	1.834	-0.052
216.4	40.482	-0.643	-0.039	0	54.2	0	1.783	1.835	-0.052
216.5	40.551	-0.633	-0.452	0	56.25	0	1.785	1.837	-0.052
216.6	40.625	-0.598	-1.282	0	59.8	0	1.786	1.838	-0.052
216.7	40.712	-0.598	-1.232	0	64.11	0	1.788	1.84	-0.052
216.8	40.799	-0.598	-0.523	0	70.62	0	1.79	1.842	-0.052
216.9	40.899	-0.613	-0.925	0	74.49	0	1.792	1.844	-0.052
217	41.01	-0.613	-0.646	0	74.51	0	1.794	1.846	-0.052
217.1	41.122	-0.618	-0.325	0	74.43	0	1.796	1.848	-0.052
217.2	41.234	-0.618	-0.925	0	74.44	0	1.799	1.85	-0.052
217.3	41.34	-0.618	-0.844	0	74.82	0	1.801	1.853	-0.052
217.4	41.445	-0.618	-0.371	0	75.79	0	1.803	1.855	-0.052
217.5	41.557	-0.618	-0.925	0	75.77	0	1.805	1.857	-0.052
217.6	41.669	-0.615	-0.611	0	75.74	0	1.807	1.859	-0.052
217.7	41.781	-0.61	-0.925	0	74.84	0	1.809	1.861	-0.052
217.8	41.887	-0.608	-0.72	0	72.85	0	1.811	1.863	-0.052
217.9	41.992	-0.608	-0.766	0	68.01	0	1.813	1.865	-0.052
218	42.085	-0.603	-1.137	0	61.71	0	1.815	1.867	-0.052
218.1	42.166	-0.608	-1.014	0	58.18	0	1.816	1.868	-0.052
218.2	42.241	-0.608	-1.134	0	57.24	0	1.818	1.87	-0.052
218.3	42.309	-0.628	-0.48	0	56.88	0	1.819	1.871	-0.052
218.4	42.384	-0.623	-0.438	0	55.08	0	1.821	1.873	-0.052
218.5	42.452	-0.623	-1.031	0	55.08	0	1.821	1.873	-0.052
218.6	42.514	-0.623	-0.275	0	51.87	0	1.824	1.876	-0.052
218.7	42.57	-0.62	-0.6	0	49.48	0	1.825	1.877	-0.052
218.8	42.626	-0.62	-0.512	0	46.22	0	1.827	1.878	-0.052
218.9	42.67	-0.623	-0.886	0	44.04	0	1.828	1.88	-0.052
219	42.719	-0.62	-1.01	0	41.56	0	1.829	1.881	-0.052
219.1	42.757	-0.62	-0.48	0	37.07	0	1.83	1.882	-0.052
219.2	42.781	-0.61	-1.388	0	33.97	0	1.831	1.883	-0.052
219.3	42.806	-0.603	-0.597	0	33.74	0	1.832	1.884	-0.052
219.4	42.831	-0.603	-1.25	0	33.54	0	1.833	1.885	-0.052
219.5	42.85	-0.61	-0.749	0	33.68	0	1.834	1.886	-0.052
219.6	42.868	-0.603	-0.78	0	33.49	0	1.835	1.887	-0.052
219.7	42.893	-0.603	-0.968	0	33.46	0	1.836	1.887	-0.052
219.8	42.912	-0.625	-0.611	0	33.4	0	1.836	1.888	-0.052
219.9	42.937	-0.62	-0.346	0	33.46	0	1.837	1.889	-0.052
220	42.962	-0.62	-0.833	0	33.45	0	1.838	1.89	-0.052
220.1	42.98	-0.608	-1.077	0	33.47	0	1.839	1.891	-0.052
220.2	43.005	-0.59	-0.438	0	33.55	0	1.84	1.892	-0.052

220.3	43.024	-0.59	-0.957	0	33.44	0	1.841	1.893	-0.052
220.4	43.049	-0.613	-0.996	0	33.79	0	1.842	1.894	-0.052
220.5	43.067	-0.613	-0.611	0	34.59	0	1.843	1.895	-0.052
220.6	43.092	-0.62	-0.374	0	35.27	0	1.844	1.896	-0.052
220.7	43.111	-0.63	-0.848	0	36.55	0	1.845	1.897	-0.052
220.8	43.136	-0.628	-0.47	0	36.44	0	1.846	1.898	-0.052
220.9	43.167	-0.628	-0.795	0	36.47	0	1.847	1.899	-0.052
221	43.192	-0.6	-1.134	0	36.89	0	1.848	1.9	-0.052
221.1	43.223	-0.62	-0.971	0	38.03	0	1.849	1.901	-0.052
221.2	43.247	-0.62	-0.646	0	39.56	0	1.85	1.902	-0.052
221.3	43.285	-0.615	-0.279	0	41.51	0	1.851	1.903	-0.052
221.4	43.316	-0.595	-1.081	0	41.44	0	1.852	1.904	-0.052
221.5	43.353	-0.595	-1.215	0	41.38	0	1.854	1.906	-0.052
221.6	43.39	-0.615	-1.176	0	41.37	0	1.855	1.907	-0.052
221.7	43.428	-0.615	-0.597	0	41.58	0	1.856	1.908	-0.052
221.8	43.465	-0.633	-0.155	0	43.12	0	1.857	1.909	-0.052
221.9	43.502	-0.625	-0.438	0	45.25	0	1.858	1.91	-0.052
222	43.546	-0.625	-0.943	0	48.06	0	1.86	1.912	-0.052
222.1	43.595	-0.625	-1.01	0	49.77	0	1.861	1.913	-0.052
222.2	43.645	-0.623	-0.78	0	49.7	0	1.863	1.914	-0.052
222.3	43.695	-0.605	-0.597	0	49.61	0	1.864	1.916	-0.052
222.4	43.751	-0.605	-0.879	0	49.95	0	1.865	1.917	-0.052
222.5	43.8	-0.603	-1.119	0	50.69	0	1.867	1.919	-0.052
222.6	43.856	-0.6	-0.275	0	50.72	0	1.868	1.92	-0.052
222.7	43.912	-0.6	-0.929	0	50.72	0	1.868	1.92	-0.052
222.8	43.962	-0.623	-1.01	0	48.55	0	1.871	1.923	-0.052
222.9	44.012	-0.623	-0.159	0	46.24	0	1.872	1.924	-0.052
223	44.055	-0.623	-0.583	0	45.06	0	1.873	1.925	-0.052
223.1	44.099	-0.593	-0.84	0	44.11	0	1.875	1.927	-0.052
223.2	44.136	-0.603	-1.134	0	41.71	0	1.876	1.928	-0.052
223.3	44.173	-0.603	-0.643	0	39.09	0	1.877	1.929	-0.052
223.4	44.204	-0.63	-0.191	0	38.31	0	1.878	1.93	-0.052
223.5	44.229	-0.63	-0.109	0	38.38	0	1.879	1.931	-0.052
223.6	44.254	-0.605	-1.547	0	38.35	0	1.88	1.932	-0.052
223.7	44.285	-0.623	-1.24	0	38.37	0	1.881	1.933	-0.052
223.8	44.316	-0.603	-0.194	0	38.47	0	1.882	1.934	-0.052
223.9	44.341	-0.603	-0.466	0	38.82	0	1.883	1.935	-0.052
224	44.372	-0.603	-1.406	0	39.04	0	1.884	1.936	-0.052
224.1	44.403	-0.598	-0.562	0	39.11	0	1.885	1.937	-0.052
224.2	44.434	-0.598	-0.378	0	38.98	0	1.887	1.938	-0.052
224.3	44.459	-0.605	-1.395	0	39.07	0	1.888	1.94	-0.052
224.4	44.49	-0.608	-0.629	0	39.15	0	1.889	1.941	-0.052
224.5	44.521	-0.608	-0.6	0	40.04	0	1.89	1.942	-0.052
224.6	44.552	-0.613	-0.968	0	41.57	0	1.891	1.943	-0.052
224.7	44.583	-0.608	-0.848	0	45.94	0	1.892	1.944	-0.052
224.8	44.627	-0.608	-0.501	0	48.94	0	1.894	1.946	-0.052
224.9	44.67	-0.6	-0.911	0	48.72	0	1.895	1.947	-0.052

225	44.714	-0.6	-0.795	0	48.75	0	1.896	1.948	-0.052
225.1	44.764	-0.6	-0.929	0	49.73	0	1.898	1.95	-0.052
225.2	44.813	-0.618	-0.261	0	49.74	0	1.899	1.951	-0.052
225.3	44.863	-0.613	-0.438	0	49.57	0	1.9	1.952	-0.052
225.4	44.913	-0.613	-0.968	0	49.68	0	1.902	1.954	-0.052
225.5	44.956	-0.61	-0.833	0	50.76	0	1.902	1.954	-0.052
225.6	45.006	-0.605	-0.763	0	52.22	0	1.905	1.957	-0.052
225.7	45.056	-0.605	-1.01	0	52.72	0	1.906	1.958	-0.052
225.8	45.112	-0.63	-0.643	0	52.77	0	1.908	1.96	-0.052
225.9	45.161	-0.628	-0.523	0	52.76	0	1.909	1.961	-0.052
226	45.217	-0.628	-0.749	0	52.63	0	1.911	1.962	-0.052
226.1	45.267	-0.628	-0.837	0	52.66	0	1.912	1.964	-0.052
226.2	45.329	-0.603	-0.611	0	52.75	0	1.913	1.965	-0.052
226.3	45.373	-0.603	-1.155	0	51.85	0	1.915	1.967	-0.052
226.4	45.422	-0.58	-1.31	0	49.19	0	1.916	1.968	-0.052
226.5	45.472	-0.58	-1.137	0	46.93	0	1.918	1.969	-0.052
226.6	45.515	-0.593	-0.307	0	44.56	0	1.919	1.971	-0.052
226.7	45.547	-0.595	-0.516	0	42.55	0	1.92	1.972	-0.052
226.8	45.584	-0.59	-0.766	0	42.71	0	1.921	1.973	-0.052
226.9	45.615	-0.59	-0.929	0	42.71	0	1.921	1.973	-0.052
227	45.646	-0.63	-0.512	0	43.13	0	1.924	1.975	-0.052
227.1	45.683	-0.638	-0.275	0	45.27	0	1.925	1.977	-0.052
227.2	45.714	-0.638	-0.095	0	45.98	0	1.926	1.978	-0.052
227.3	45.758	-0.59	-1.335	0	46.51	0	1.927	1.979	-0.052
227.4	45.795	-0.603	-1.815	0	48.09	0	1.929	1.981	-0.052
227.5	45.839	-0.603	-0.36	0	50.02	0	1.93	1.982	-0.052
227.6	45.882	-0.605	-0.392	0	51.56	0	1.932	1.983	-0.052
227.7	45.932	-0.618	-0.812	0	52.2	0	1.933	1.985	-0.052
227.8	45.981	-0.618	-0.343	0	52.72	0	1.934	1.986	-0.052
227.9	46.031	-0.6	-0.583	0	54.14	0	1.936	1.988	-0.052
228	46.087	-0.605	-1.091	0	55.61	0	1.938	1.989	-0.052
228.1	46.143	-0.605	-0.879	0	55.67	0	1.939	1.991	-0.052
228.2	46.193	-0.615	-0.639	0	56.67	0	1.941	1.993	-0.052
228.3	46.255	-0.598	-0.509	0	56.62	0	1.942	1.994	-0.052
228.4	46.311	-0.598	-1.335	0	56.56	0	1.944	1.996	-0.052
228.5	46.367	-0.603	-0.953	0	56.2	0	1.945	1.997	-0.052
228.6	46.423	-0.6	-0.095	0	55.58	0	1.947	1.999	-0.052
228.7	46.472	-0.6	-0.996	0	55.49	0	1.948	2	-0.052
228.8	46.528	-0.615	-0.982	0	55.57	0	1.95	2.002	-0.052
228.9	46.584	-0.613	-0.643	0	55.26	0	1.951	2.003	-0.052
229	46.634	-0.613	-0.378	0	54.36	0	1.953	2.005	-0.052
229.1	46.684	-0.59	-1.063	0	53.77	0	1.954	2.006	-0.052
229.2	46.74	-0.598	-0.996	0	53.22	0	1.956	2.008	-0.052
229.3	46.789	-0.598	-0.763	0	52.75	0	1.957	2.009	-0.052
229.4	46.833	-0.628	-0.265	0	52.06	0	1.959	2.011	-0.052
229.5	46.882	-0.628	-0.632	0	47.25	0	1.96	2.012	-0.052
229.6	46.92	-0.623	-0.452	0	43.79	0	1.961	2.013	-0.052

229.7	46.951	-0.598	-1.236	0	42.67	0	1.963	2.015	-0.052
229.8	46.982	-0.603	-1.105	0	42.49	0	1.964	2.016	-0.052
229.9	47.007	-0.603	-0.583	0	42.44	0	1.965	2.017	-0.052
230	47.038	-0.615	-0.452	0	42.46	0	1.966	2.018	-0.052
230.1	47.063	-0.603	-0.597	0	42.45	0	1.967	2.019	-0.052
230.2	47.094	-0.603	-0.812	0	42.53	0	1.968	2.02	-0.052
230.3	47.125	-0.6	-1.095	0	42.53	0	1.97	2.022	-0.052
230.4	47.15	-0.605	-0.833	0	42.52	0	1.971	2.023	-0.052
230.5	47.181	-0.605	-0.766	0	42.5	0	1.972	2.024	-0.052
230.6	47.212	-0.623	-0.424	0	42.39	0	1.973	2.025	-0.052
230.7	47.237	-0.61	-0.625	0	42.38	0	1.974	2.026	-0.052
230.8	47.268	-0.61	-1.176	0	42.45	0	1.976	2.027	-0.052
230.9	47.293	-0.61	-1.335	0	42.3	0	1.977	2.029	-0.052
231	47.324	-0.608	-0.809	0	41.41	0	1.978	2.03	-0.052
231.1	47.348	-0.608	-0.848	0	41.41	0	1.978	2.03	-0.052
231.2	47.373	-0.628	-0.848	0	38.92	0	1.98	2.032	-0.052
231.3	47.392	-0.613	-0.283	0	39	0	1.981	2.033	-0.052
231.4	47.417	-0.613	-1.105	0	38.46	0	1.982	2.034	-0.052
231.5	47.435	-0.613	-1.176	0	36.81	0	1.983	2.035	-0.052
231.6	47.454	-0.618	-0.36	0	34.7	0	1.984	2.036	-0.052
231.7	47.467	-0.618	-0.985	0	33.72	0	1.985	2.037	-0.052
231.8	47.473	-0.6	-0.791	0	32.73	0	1.986	2.038	-0.052
231.9	47.485	-0.598	-0.791	0	30.96	0	1.987	2.039	-0.052
232	47.491	-0.598	-0.71	0	27.86	0	1.988	2.04	-0.052
232.1	47.491	-0.615	-0.925	0	26.02	0	1.988	2.04	-0.052
232.2	47.491	-0.608	-0.452	0	25.67	0	1.989	2.041	-0.052
232.3	47.485	-0.608	-0.625	0	25.66	0	1.99	2.042	-0.052
232.4	47.485	-0.62	-1.01	0	25.55	0	1.991	2.042	-0.052
232.5	47.479	-0.62	-0.388	0	25.32	0	1.991	2.043	-0.052
232.6	47.473	-0.61	-0.378	0	24.05	0	1.992	2.044	-0.052
232.7	47.467	-0.603	-1.18	0	23.07	0	1.993	2.044	-0.052
232.8	47.46	-0.605	-0.78	0	22.33	0	1.993	2.045	-0.052
232.9	47.454	-0.605	-0.763	0	21.85	0	1.994	2.046	-0.052
233	47.442	-0.618	-0.862	0	20.92	0	1.994	2.046	-0.052
233.1	47.429	-0.62	-0.321	0	19.8	0	1.995	2.047	-0.052
233.2	47.417	-0.62	-0.809	0	18.8	0	1.995	2.047	-0.052
233.3	47.398	-0.593	-0.968	0	17.67	0	1.996	2.048	-0.052
233.4	47.38	-0.61	-1.547	0	17.17	0	1.996	2.048	-0.052
233.5	47.361	-0.61	-0.304	0	17.23	0	1.997	2.049	-0.052
233.6	47.342	-0.595	-0.526	0	17.34	0	1.997	2.049	-0.052
233.7	47.324	-0.583	-1.338	0	17.94	0	1.998	2.05	-0.052
233.8	47.305	-0.583	-0.809	0	18.22	0	1.998	2.05	-0.052
233.9	47.286	-0.598	-0.893	0	18.01	0	1.999	2.051	-0.052
234	47.268	-0.623	-0.671	0	17.99	0	1.999	2.051	-0.052
234.1	47.255	-0.623	0.134	0	17.99	0	2	2.052	-0.052
234.2	47.237	-0.615	-0.848	0	17.93	0	2	2.052	-0.052
234.3	47.218	-0.633	-1.282	0	18	0	2.001	2.053	-0.052

234.4	47.199	-0.633	-0.198	0	17.9	0	2.001	2.053	-0.052
234.5	47.181	-0.64	-0.646	0	18.26	0	2.002	2.054	-0.052
234.6	47.162	-0.608	-0.749	0	19.2	0	2.002	2.054	-0.052
234.7	47.15	-0.608	-1.335	0	20.43	0	2.003	2.055	-0.052
234.8	47.137	-0.61	-0.805	0	21.55	0	2.004	2.056	-0.052
234.9	47.125	-0.615	-0.438	0	22.51	0	2.004	2.056	-0.052
235	47.119	-0.615	-1.052	0	23.51	0	2.005	2.057	-0.052
235.1	47.112	-0.6	-0.696	0	23.98	0	2.006	2.057	-0.052
235.2	47.106	-0.61	-1.25	0	24.2	0	2.006	2.058	-0.052
235.3	47.1	-0.61	-0.551	0	24.2	0	2.006	2.058	-0.052
235.4	47.094	-0.6	-0.876	0	23.56	0	2.008	2.059	-0.052
235.5	47.088	-0.6	-0.795	0	23.61	0	2.008	2.06	-0.052
235.6	47.081	-0.613	-0.597	0	23.54	0	2.009	2.061	-0.052
235.7	47.075	-0.605	-0.438	0	23.64	0	2.009	2.061	-0.052
235.8	47.069	-0.615	-1.01	0	23.53	0	2.01	2.062	-0.052
235.9	47.063	-0.615	-0.625	0	23.98	0	2.011	2.063	-0.052
236	47.056	-0.613	-0.392	0	24.15	0	2.011	2.063	-0.052
236.1	47.05	-0.593	-0.639	0	24.19	0	2.012	2.064	-0.052
236.2	47.044	-0.593	-1.409	0	24.17	0	2.013	2.065	-0.052
236.3	47.044	-0.583	-0.823	0	24.15	0	2.013	2.065	-0.052
236.4	47.032	-0.59	-0.766	0	24.97	0	2.014	2.066	-0.052
236.5	47.032	-0.59	-0.848	0	25.65	0	2.015	2.067	-0.052
236.6	47.032	-0.615	-0.65	0	26.56	0	2.016	2.068	-0.052
236.7	47.032	-0.62	-0.565	0	27.47	0	2.016	2.068	-0.052
236.8	47.025	-0.62	-0.48	0	27.84	0	2.017	2.069	-0.052
236.9	47.032	-0.613	-0.975	0	28.26	0	2.018	2.07	-0.052
237	47.032	-0.608	-0.685	0	28.37	0	2.019	2.071	-0.052
237.1	47.038	-0.608	-0.682	0	28.27	0	2.02	2.071	-0.052
237.2	47.038	-0.59	-1.067	0	28.3	0	2.02	2.072	-0.052
237.3	47.038	-0.588	-1.218	0	28.33	0	2.021	2.073	-0.052
237.4	47.044	-0.588	-0.727	0	28.3	0	2.022	2.074	-0.052
237.5	47.044	-0.598	-0.438	0	28.35	0	2.023	2.075	-0.052
237.6	47.05	-0.6	-1.158	0	28.27	0	2.023	2.075	-0.052
237.7	47.05	-0.6	-0.766	0	28.36	0	2.024	2.076	-0.052
237.8	47.056	-0.593	-0.138	0	28.29	0	2.025	2.077	-0.052
237.9	47.056	-0.613	-1.324	0	28.36	0	2.026	2.078	-0.052
238	47.063	-0.613	-0.953	0	28.31	0	2.027	2.079	-0.052
238.1	47.063	-0.61	-0.039	0	28.31	0	2.027	2.079	-0.052
238.2	47.063	-0.6	-0.996	0	28.35	0	2.028	2.08	-0.052
238.3	47.069	-0.6	-1.381	0	28.3	0	2.029	2.081	-0.052
238.4	47.069	-0.62	-0.731	0	28.39	0	2.03	2.082	-0.052
238.5	47.069	-0.62	-0.403	0	28.31	0	2.031	2.082	-0.052
238.6	47.075	-0.615	-0.953	0	28.4	0	2.031	2.083	-0.052
238.7	47.075	-0.598	-1.109	0	28.29	0	2.032	2.084	-0.052
238.8	47.075	-0.59	-1.105	0	28.38	0	2.033	2.085	-0.052
238.9	47.081	-0.59	-0.756	0	28.32	0	2.034	2.086	-0.052
239	47.081	-0.625	-0.837	0	28.37	0	2.034	2.086	-0.052

239.1	47.088	-0.608	0.205	0	28.36	0	2.035	2.087	-0.052
239.2	47.088	-0.608	-0.791	0	28.35	0	2.036	2.088	-0.052
239.3	47.094	-0.613	-1.335	0	28.39	0	2.037	2.089	-0.052
239.4	47.094	-0.613	-0.614	0	28.31	0	2.038	2.09	-0.052
239.5	47.094	-0.613	-0.138	0	28.31	0	2.038	2.09	-0.052
239.6	47.1	-0.598	-1.176	0	28.31	0	2.039	2.091	-0.052
239.7	47.1	-0.595	-1.042	0	28.41	0	2.04	2.092	-0.052
239.8	47.1	-0.595	-0.953	0	28.36	0	2.041	2.093	-0.052
239.9	47.106	-0.6	-0.597	0	28.37	0	2.042	2.093	-0.052
240	47.106	-0.605	-0.54	0	28.39	0	2.042	2.094	-0.052
240.1	47.112	-0.605	-0.788	0	27.18	0	2.043	2.095	-0.052
240.2	47.112	-0.613	-0.551	0	26.11	0	2.044	2.096	-0.052
240.3	47.106	-0.605	-0.466	0	25.98	0	2.045	2.096	-0.052
240.4	47.106	-0.605	-1.105	0	25.28	0	2.045	2.097	-0.052
240.5	47.106	-0.598	-0.936	0	24.42	0	2.046	2.098	-0.052
240.6	47.1	-0.613	-0.777	0	24.16	0	2.047	2.099	-0.052
240.7	47.094	-0.613	-0.438	0	24.17	0	2.047	2.099	-0.052
240.8	47.088	-0.61	-0.466	0	24.23	0	2.048	2.1	-0.052
240.9	47.088	-0.615	-0.643	0	24.18	0	2.049	2.101	-0.052
241	47.081	-0.615	-0.975	0	24.14	0	2.049	2.101	-0.052
241.1	47.075	-0.613	-0.876	0	24.25	0	2.05	2.102	-0.052
241.2	47.069	-0.63	-0.893	0	24.18	0	2.051	2.103	-0.052
241.3	47.063	-0.63	-0.724	0	24.91	0	2.051	2.103	-0.052
241.4	47.063	-0.633	-0.537	0	25.62	0	2.052	2.104	-0.052
241.5	47.056	-0.633	-0.434	0	26.08	0	2.053	2.105	-0.052
241.6	47.056	-0.618	-1.434	0	26.17	0	2.054	2.105	-0.052
241.7	47.056	-0.625	-0.597	0	26.77	0	2.054	2.106	-0.052
241.8	47.056	-0.593	-0.247	0	27.34	0	2.055	2.107	-0.052
241.9	47.056	-0.593	-1.176	0	27.56	0	2.056	2.108	-0.052
242	47.056	-0.613	-1.462	0	27.49	0	2.057	2.108	-0.052
242.1	47.063	-0.613	-0.364	0	27.51	0	2.057	2.109	-0.052
242.2	47.063	-0.613	-0.261	0	27.52	0	2.058	2.11	-0.052
242.3	47.063	-0.595	-1.307	0	29.25	0	2.059	2.111	-0.052
242.4	47.069	-0.61	-1.105	0	31.33	0	2.06	2.112	-0.052
242.5	47.075	-0.61	-0.247	0	31.9	0	2.061	2.113	-0.052
242.6	47.088	-0.59	-0.494	0	32.73	0	2.062	2.113	-0.052
242.7	47.094	-0.58	-0.805	0	33.45	0	2.062	2.114	-0.052
242.8	47.106	-0.58	-1.363	0	34.42	0	2.063	2.115	-0.052
242.9	47.119	-0.628	-0.784	0	36.72	0	2.064	2.116	-0.052
243	47.137	-0.623	0.021	0	37.45	0	2.065	2.117	-0.052
243.1	47.156	-0.623	-0.29	0	38.09	0	2.067	2.118	-0.052
243.2	47.175	-0.608	-1.519	0	38.04	0	2.068	2.12	-0.052
243.3	47.193	-0.608	-0.35	0	38.1	0	2.069	2.121	-0.052
243.4	47.218	-0.608	-0.657	0	37.64	0	2.07	2.122	-0.052
243.5	47.237	-0.605	-0.851	0	36.03	0	2.071	2.123	-0.052
243.6	47.255	-0.595	-0.597	0	33.4	0	2.072	2.124	-0.052
243.7	47.268	-0.595	-0.939	0	33.4	0	2.072	2.124	-0.052

243.8	47.274	-0.595	-0.77	0	31.96	0	2.073	2.125	-0.052
243.9	47.286	-0.6	-0.908	0	31.95	0	2.074	2.126	-0.052
244	47.293	-0.6	-0.607	0	31.95	0	2.075	2.127	-0.052
244.1	47.305	-0.638	-1.067	0	31.98	0	2.076	2.128	-0.052
244.2	47.311	-0.63	0.007	0	32.29	0	2.077	2.129	-0.052
244.3	47.317	-0.63	-0.152	0	32.58	0	2.078	2.13	-0.052
244.4	47.33	-0.595	-1.808	0	32.51	0	2.079	2.131	-0.052
244.5	47.336	-0.595	-1.13	0	33.35	0	2.08	2.132	-0.052
244.6	47.348	-0.603	-0.922	0	33.35	0	2.081	2.133	-0.052
244.7	47.361	-0.608	-0.424	0	33.49	0	2.082	2.133	-0.052
244.8	47.373	-0.603	-0.844	0	33.4	0	2.082	2.134	-0.052
244.9	47.386	-0.603	-1.084	0	33.73	0	2.083	2.135	-0.052
245	47.398	-0.61	-0.982	0	34.24	0	2.084	2.136	-0.052
245.1	47.411	-0.6	-0.452	0	36.29	0	2.085	2.137	-0.052
245.2	47.423	-0.6	-0.671	0	37.89	0	2.086	2.138	-0.052
245.3	47.448	-0.593	-1.014	0	38.11	0	2.088	2.139	-0.052
245.4	47.467	-0.613	-0.823	0	38.09	0	2.089	2.14	-0.052
245.5	47.485	-0.613	-0.374	0	38.14	0	2.09	2.142	-0.052
245.6	47.504	-0.595	-0.657	0	38.13	0	2.091	2.143	-0.052
245.7	47.522	-0.595	-1.119	0	37.97	0	2.092	2.144	-0.052
245.8	47.541	-0.613	-0.657	0	37.98	0	2.093	2.145	-0.052
245.9	47.56	-0.615	-0.057	0	37.96	0	2.094	2.146	-0.052
246	47.585	-0.593	-0.554	0	38.04	0	2.095	2.147	-0.052
246.1	47.603	-0.593	-1.519	0	38.01	0	2.096	2.148	-0.052
246.2	47.622	-0.603	-1.19	0	38.09	0	2.097	2.149	-0.052
246.3	47.641	-0.618	-0.611	0	37.59	0	2.098	2.15	-0.052
246.4	47.659	-0.618	-0.424	0	36.91	0	2.099	2.151	-0.052
246.5	47.678	-0.615	-0.509	0	36.28	0	2.1	2.152	-0.052
246.6	47.69	-0.613	-0.968	0	36.22	0	2.101	2.153	-0.052
246.7	47.709	-0.613	-0.611	0	36.16	0	2.102	2.154	-0.052
246.8	47.728	-0.595	-0.307	0	35.5	0	2.103	2.155	-0.052
246.9	47.746	-0.61	-1.278	0	35.55	0	2.104	2.156	-0.052
247	47.759	-0.61	-0.908	0	35.55	0	2.105	2.157	-0.052
247.1	47.771	-0.61	-0.396	0	35.27	0	2.106	2.158	-0.052
247.2	47.783	-0.603	-0.939	0	34.7	0	2.107	2.159	-0.052
247.3	47.796	-0.603	-0.968	0	34.67	0	2.108	2.16	-0.052
247.4	47.815	-0.615	-0.756	0	34.66	0	2.109	2.161	-0.052
247.5	47.827	-0.615	-0.491	0	34.72	0	2.11	2.162	-0.052
247.6	47.833	-0.608	-0.777	0	34.71	0	2.111	2.163	-0.052
247.7	47.852	-0.613	-0.586	0	34.03	0	2.112	2.164	-0.052
247.8	47.864	-0.615	-0.127	0	32.92	0	2.113	2.165	-0.052
247.9	47.87	-0.615	-0.812	0	32.92	0	2.113	2.165	-0.052
248	47.877	-0.605	-0.629	0	31.04	0	2.114	2.166	-0.052
248.1	47.883	-0.603	-1.038	0	30.76	0	2.115	2.167	-0.052
248.2	47.889	-0.603	-0.512	0	30.41	0	2.116	2.168	-0.052
248.3	47.895	-0.6	-0.908	0	30.2	0	2.117	2.169	-0.052
248.4	47.895	-0.618	-1.038	0	29.2	0	2.118	2.17	-0.052

248.5	47.902	-0.618	-0.396	0	29.12	0	2.119	2.171	-0.052
248.6	47.902	-0.613	-0.713	0	29.16	0	2.119	2.171	-0.052
248.7	47.902	-0.618	-0.795	0	29.1	0	2.12	2.172	-0.052
248.8	47.902	-0.618	-0.879	0	29.19	0	2.121	2.173	-0.052
248.9	47.908	-0.61	-0.724	0	29.11	0	2.122	2.174	-0.052
249	47.908	-0.613	-0.865	0	29.17	0	2.123	2.175	-0.052
249.1	47.914	-0.613	-1.024	0	28.9	0	2.123	2.175	-0.052
249.2	47.914	-0.623	-0.844	0	28.37	0	2.124	2.176	-0.052
249.3	47.914	-0.613	-0.35	0	28.57	0	2.125	2.177	-0.052
249.4	47.914	-0.613	-1.324	0	28.98	0	2.126	2.178	-0.052
249.5	47.92	-0.608	-0.671	0	29.02	0	2.127	2.179	-0.052
249.6	47.92	-0.61	-0.862	0	28.97	0	2.127	2.179	-0.052
249.7	47.92	-0.61	-0.554	0	29.21	0	2.128	2.18	-0.052
249.8	47.92	-0.605	-1.19	0	29.66	0	2.129	2.181	-0.052
249.9	47.926	-0.613	-1.042	0	29.61	0	2.13	2.182	-0.052
250	47.933	-0.613	-0.713	0	29.66	0	2.131	2.183	-0.052
250.1	47.933	-0.595	-0.399	0	29.56	0	2.132	2.183	-0.052
250.2	47.939	-0.6	-1.282	0	29.52	0	2.132	2.184	-0.052
250.3	47.945	-0.6	-0.675	0	29.41	0	2.133	2.185	-0.052
250.4	47.945	-0.613	-0.713	0	29.47	0	2.134	2.186	-0.052
250.5	47.945	-0.613	-0.742	0	29.43	0	2.135	2.187	-0.052
250.6	47.951	-0.62	-0.268	0	29.46	0	2.136	2.188	-0.052
250.7	47.951	-0.61	-0.763	0	29.49	0	2.136	2.188	-0.052
250.8	47.957	-0.6	-0.586	0	29.42	0	2.137	2.189	-0.052
250.9	47.957	-0.6	-1.119	0	29.52	0	2.138	2.19	-0.052
251	47.957	-0.618	-0.982	0	29.42	0	2.139	2.191	-0.052
251.1	47.964	-0.61	-0.53	0	29.5	0	2.14	2.192	-0.052
251.2	47.964	-0.61	-0.346	0	29.46	0	2.141	2.192	-0.052
251.3	47.97	-0.585	-1.293	0	29.47	0	2.141	2.193	-0.052
251.4	47.97	-0.605	-1.162	0	29.48	0	2.142	2.194	-0.052
251.5	47.976	-0.605	-0.12	0	29.47	0	2.143	2.195	-0.052
251.6	47.976	-0.615	-0.6	0	29.52	0	2.144	2.196	-0.052
251.7	47.982	-0.613	-0.509	0	29.44	0	2.145	2.197	-0.052
251.8	47.988	-0.613	-0.516	0	29.53	0	2.145	2.197	-0.052
251.9	47.982	-0.583	-0.911	0	29.46	0	2.146	2.198	-0.052
252	47.988	-0.608	-1.038	0	29.49	0	2.147	2.199	-0.052
252.1	47.988	-0.608	-0.809	0	29.49	0	2.147	2.199	-0.052
252.2	47.995	-0.628	0.491	0	28.79	0	2.149	2.201	-0.052
252.3	47.995	-0.595	-0.321	0	28.89	0	2.15	2.201	-0.052
252.4	47.995	-0.595	-1.547	0	28.8	0	2.15	2.202	-0.052
252.5	47.995	-0.583	-1.293	0	28.9	0	2.151	2.203	-0.052
252.6	47.995	-0.628	-0.35	0	28.81	0	2.152	2.204	-0.052
252.7	48.001	-0.628	-0.166	0	28.87	0	2.153	2.205	-0.052
252.8	48.001	-0.63	-0.466	0	28.82	0	2.154	2.205	-0.052
252.9	48.001	-0.638	-0.713	0	28.81	0	2.154	2.206	-0.052
253	48.001	-0.638	-0.696	0	28.88	0	2.155	2.207	-0.052
253.1	48.007	-0.595	-0.565	0	28.81	0	2.156	2.208	-0.052

253.2	48.007	-0.603	-1.49	0	28.86	0	2.157	2.209	-0.052
253.3	48.007	-0.603	-0.809	0	28.79	0	2.158	2.209	-0.052
253.4	48.007	-0.608	0.307	0	28.86	0	2.158	2.21	-0.052
253.5	48.007	-0.608	-0.837	0	29.47	0	2.159	2.211	-0.052
253.6	48.013	-0.615	-0.837	0	29.46	0	2.16	2.212	-0.052
253.7	48.02	-0.618	-0.325	0	30.29	0	2.161	2.213	-0.052
253.8	48.02	-0.595	-0.982	0	30.23	0	2.162	2.214	-0.052
253.9	48.026	-0.595	-1.084	0	30.31	0	2.162	2.214	-0.052
254	48.026	-0.62	-0.742	0	30.24	0	2.163	2.215	-0.052
254.1	48.032	-0.61	-0.47	0	30.7	0	2.164	2.216	-0.052
254.2	48.038	-0.61	-0.809	0	30.88	0	2.165	2.217	-0.052
254.3	48.044	-0.59	-1.119	0	31.52	0	2.166	2.218	-0.052
254.4	48.051	-0.595	-1.088	0	31.7	0	2.167	2.219	-0.052
254.5	48.057	-0.595	-0.526	0	32.12	0	2.168	2.22	-0.052
254.6	48.063	-0.615	-0.54	0	32.42	0	2.169	2.221	-0.052
254.7	48.075	-0.61	-0.406	0	32.57	0	2.169	2.221	-0.052
254.8	48.075	-0.61	-0.593	0	33.24	0	2.17	2.222	-0.052
254.9	48.088	-0.623	-1.148	0	33.27	0	2.171	2.223	-0.052
255	48.1	-0.62	-0.138	0	33.27	0	2.172	2.224	-0.052
255.1	48.107	-0.62	-0.643	0	33.28	0	2.173	2.225	-0.052
255.2	48.119	-0.59	-0.968	0	33.29	0	2.174	2.226	-0.052
255.3	48.131	-0.595	-0.999	0	33.56	0	2.175	2.227	-0.052
255.4	48.138	-0.595	-1.052	0	34.75	0	2.176	2.228	-0.052
255.5	48.15	-0.62	-0.155	0	35.53	0	2.177	2.229	-0.052
255.6	48.162	-0.605	-0.48	0	35.51	0	2.178	2.23	-0.052
255.7	48.175	-0.605	-1.119	0	35.33	0	2.179	2.231	-0.052
255.8	48.187	-0.603	-1.247	0	35.35	0	2.18	2.232	-0.052
255.9	48.2	-0.613	-0.727	0	35.36	0	2.181	2.233	-0.052
256	48.212	-0.613	0.053	0	35.57	0	2.182	2.234	-0.052
256.1	48.231	-0.608	-0.964	0	36.77	0	2.183	2.235	-0.052
256.2	48.243	-0.603	-0.643	0	38.36	0	2.184	2.236	-0.052
256.3	48.262	-0.603	-1.017	0	38.36	0	2.184	2.236	-0.052
256.4	48.281	-0.595	-0.671	0	39.8	0	2.186	2.238	-0.052
256.5	48.305	-0.595	-0.982	0	39.53	0	2.187	2.239	-0.052
256.6	48.324	-0.603	-0.851	0	39.53	0	2.188	2.24	-0.052
256.7	48.343	-0.61	-0.657	0	39.57	0	2.189	2.241	-0.052
256.8	48.368	-0.605	-0.812	0	40.5	0	2.191	2.243	-0.052
256.9	48.386	-0.605	-0.593	0	40.48	0	2.192	2.244	-0.052
257	48.411	-0.588	-0.682	0	41.1	0	2.193	2.245	-0.052
257.1	48.43	-0.613	-1.006	0	41.99	0	2.194	2.246	-0.052
257.2	48.455	-0.613	-0.24	0	42.92	0	2.195	2.247	-0.052
257.3	48.479	-0.61	-0.24	0	43.12	0	2.196	2.248	-0.052
257.4	48.51	-0.6	-1.377	0	43.21	0	2.198	2.25	-0.052
257.5	48.535	-0.6	-0.809	0	43.17	0	2.199	2.251	-0.052
257.6	48.56	-0.593	-0.629	0	43.27	0	2.2	2.252	-0.052
257.7	48.591	-0.593	-0.798	0	43.07	0	2.201	2.253	-0.052
257.8	48.616	-0.585	-0.851	0	42.13	0	2.202	2.254	-0.052

257.9	48.641	-0.61	-1.095	0	40.02	0	2.204	2.255	-0.052
258	48.66	-0.613	-0.477	0	38.62	0	2.205	2.257	-0.052
258.1	48.678	-0.613	-0.509	0	37.86	0	2.206	2.258	-0.052
258.2	48.697	-0.61	-1.038	0	37.91	0	2.207	2.259	-0.052
258.3	48.709	-0.618	-0.823	0	37.93	0	2.208	2.26	-0.052
258.4	48.728	-0.618	-0.448	0	37.93	0	2.209	2.261	-0.052
258.5	48.747	-0.623	-0.671	0	37.9	0	2.21	2.262	-0.052
258.6	48.759	-0.633	-0.812	0	37.76	0	2.211	2.263	-0.052
258.7	48.778	-0.633	0.201	0	37.78	0	2.212	2.264	-0.052
258.8	48.79	-0.603	-0.48	0	37.76	0	2.213	2.265	-0.052
258.9	48.809	-0.625	-1.748	0	37.83	0	2.214	2.266	-0.052
259	48.821	-0.625	-0.41	0	37.83	0	2.215	2.267	-0.052
259.1	48.84	-0.603	-0.155	0	37.78	0	2.216	2.268	-0.052
259.2	48.858	-0.6	-1.49	0	37.91	0	2.217	2.269	-0.052
259.3	48.871	-0.6	-0.689	0	37.85	0	2.218	2.27	-0.052
259.4	48.889	-0.618	-0.484	0	37.88	0	2.219	2.271	-0.052
259.5	48.908	-0.618	-0.434	0	37.95	0	2.22	2.272	-0.052
259.6	48.921	-0.635	-0.24	0	37.84	0	2.221	2.273	-0.052
259.7	48.933	-0.648	-0.611	0	37.28	0	2.222	2.274	-0.052
259.8	48.952	-0.63	-0.406	0	35.64	0	2.223	2.275	-0.052
259.9	48.964	-0.63	-0.629	0	34.81	0	2.224	2.276	-0.052
260	48.976	-0.618	-0.809	0	34.08	0	2.225	2.277	-0.052
260.1	48.983	-0.62	-0.809	0	33.88	0	2.226	2.278	-0.052
260.2	48.995	-0.62	-0.862	0	33.75	0	2.227	2.279	-0.052
260.3	49.001	-0.623	-0.893	0	33.25	0	2.228	2.28	-0.052
260.4	49.008	-0.63	-0.848	0	32.47	0	2.229	2.281	-0.052
260.5	49.014	-0.63	-0.35	0	32.47	0	2.229	2.281	-0.052
260.6	49.02	-0.618	-0.809	0	32.44	0	2.231	2.283	-0.052
260.7	49.026	-0.613	-1.067	0	32.39	0	2.232	2.284	-0.052
260.8	49.032	-0.613	-0.982	0	32.46	0	2.233	2.285	-0.052
260.9	49.039	-0.608	-0.742	0	32.37	0	2.234	2.285	-0.052
261	49.045	-0.605	-0.911	0	32.44	0	2.234	2.286	-0.052
261.1	49.051	-0.605	-0.77	0	32.46	0	2.235	2.287	-0.052
261.2	49.057	-0.605	-0.731	0	32.41	0	2.236	2.288	-0.052
261.3	49.063	-0.593	-0.48	0	32.51	0	2.237	2.289	-0.052
261.4	49.063	-0.593	-1.353	0	32.41	0	2.238	2.29	-0.052
261.5	49.076	-0.6	-0.727	0	32.48	0	2.239	2.291	-0.052
261.6	49.082	-0.63	-0.24	0	32.41	0	2.24	2.292	-0.052
261.7	49.088	-0.63	-0.41	0	32.49	0	2.241	2.293	-0.052
261.8	49.088	-0.628	-0.244	0	32.45	0	2.242	2.294	-0.052
261.9	49.095	-0.61	-0.939	0	32.42	0	2.243	2.295	-0.052
262	49.101	-0.61	-1.271	0	32.51	0	2.243	2.295	-0.052
262.1	49.107	-0.605	-0.42	0	32.42	0	2.244	2.296	-0.052
262.2	49.113	-0.608	-0.922	0	32.52	0	2.245	2.297	-0.052
262.3	49.119	-0.608	-0.865	0	32.42	0	2.246	2.298	-0.052
262.4	49.126	-0.59	-0.551	0	32.53	0	2.247	2.299	-0.052
262.5	49.132	-0.59	-0.968	0	32.46	0	2.248	2.3	-0.052

262.6	49.138	-0.598	-0.809	0	32.48	0	2.249	2.301	-0.052
262.7	49.144	-0.603	-0.339	0	31.59	0	2.25	2.302	-0.052
262.8	49.15	-0.615	-0.809	0	30.96	0	2.251	2.303	-0.052
262.9	49.15	-0.615	-0.424	0	30.89	0	2.251	2.303	-0.052
263	49.15	-0.608	-0.727	0	30.32	0	2.252	2.304	-0.052
263.1	49.15	-0.613	-1.232	0	30.39	0	2.253	2.305	-0.052
263.2	49.15	-0.613	-0.682	0	29.73	0	2.254	2.306	-0.052
263.3	49.157	-0.62	-0.657	0	29.27	0	2.255	2.307	-0.052
263.4	49.15	-0.615	-0.784	0	27.14	0	2.256	2.307	-0.052
263.5	49.15	-0.615	-0.812	0	23.51	0	2.256	2.308	-0.052
263.6	49.132	-0.61	-0.837	0	21.33	0	2.257	2.309	-0.052
263.7	49.126	-0.63	-1.095	0	19.93	0	2.257	2.309	-0.052
263.8	49.107	-0.63	-0.194	0	19.54	0	2.258	2.31	-0.052
263.9	49.088	-0.615	-0.671	0	19.64	0	2.258	2.31	-0.052
264	49.07	-0.608	-0.968	0	19.66	0	2.259	2.311	-0.052
264.1	49.051	-0.608	-1.052	0	19.57	0	2.26	2.311	-0.052
264.2	49.032	-0.633	-0.41	0	19.68	0	2.26	2.312	-0.052
264.3	49.014	-0.613	-0.41	0	19.59	0	2.261	2.313	-0.052
264.4	48.995	-0.613	-0.851	0	19.56	0	2.261	2.313	-0.052
264.5	48.976	-0.605	-1.137	0	19.66	0	2.262	2.314	-0.052
264.6	48.958	-0.615	-0.625	0	19.53	0	2.262	2.314	-0.052
264.7	48.945	-0.615	-0.494	0	19.53	0	2.262	2.314	-0.052
264.8	48.927	-0.615	-0.643	0	19.35	0	2.263	2.315	-0.052
264.9	48.908	-0.628	-1.067	0	17.69	0	2.264	2.316	-0.052
265	48.889	-0.628	-0.48	0	14.44	0	2.264	2.316	-0.052
265.1	48.858	-0.635	-0.565	0	9.83	0	2.265	2.316	-0.052
265.2	48.827	-0.625	-0.646	0	7.08	0	2.265	2.317	-0.052
265.3	48.784	-0.625	-0.466	0	6.02	0	2.265	2.317	-0.052
265.4	48.747	-0.608	-1.338	0	4.97	0	2.265	2.317	-0.052
265.5	48.703	-0.608	-0.727	0	3.6	0	2.265	2.317	-0.052
265.6	48.653	-0.608	-1.134	0	2.15	0	2.265	2.317	-0.052
265.7	48.604	-0.62	-0.364	0	0.86	0	2.265	2.317	-0.052
265.8	48.554	-0.588	-0.335	0	0	0	2.265	2.317	-0.052
265.9	48.498	-0.588	-0.982	0	0	0	2.265	2.317	-0.052
266	48.442	-0.6	-0.975	0	0	0	2.265	2.317	-0.052
266.1	48.392	-0.6	-0.275	0	0	0	2.265	2.317	-0.052
266.2	48.343	-0.6	-0.494	0	0	0	2.265	2.317	-0.052
266.3	48.287	-0.598	-0.685	0	0	0	2.265	2.317	-0.052
266.4	48.231	-0.605	-0.35	0	0	0	2.265	2.317	-0.052
266.5	48.175	-0.605	-0.494	0	0	0	2.265	2.317	-0.052
266.6	48.125	-0.623	-0.42	0	0	0	2.265	2.317	-0.052
266.7	48.069	-0.618	-0.406	0	0.63	0	2.265	2.317	-0.052
266.8	48.02	-0.618	-0.893	0	1.49	0	2.265	2.317	-0.052
266.9	47.964	-0.61	-0.643	0	2.12	0	2.265	2.317	-0.052
267	47.92	-0.6	-0.823	0	2.28	0	2.265	2.317	-0.052
267.1	47.87	-0.6	-0.848	0	2.29	0	2.265	2.317	-0.052
267.2	47.821	-0.63	-0.742	0	2.36	0	2.266	2.317	-0.052

267.3	47.771	-0.623	-0.17	0	2.51	0	2.266	2.318	-0.052
267.4	47.728	-0.623	-0.48	0	2.65	0	2.266	2.318	-0.052
267.5	47.678	-0.62	-0.968	0	2.63	0	2.266	2.318	-0.052
267.6	47.628	-0.593	-0.498	0	2.97	0	2.266	2.318	-0.052
267.7	47.585	-0.593	-1.367	0	3.05	0	2.266	2.318	-0.052
267.8	47.535	-0.61	-0.982	0	3.04	0	2.266	2.318	-0.052
267.9	47.491	-0.62	-0.784	0	3.03	0	2.266	2.318	-0.052
268	47.442	-0.62	-0.335	0	3.17	0	2.266	2.318	-0.052
268.1	47.392	-0.615	-0.823	0	4.19	0	2.266	2.318	-0.052
268.2	47.348	-0.6	-0.865	0	5.8	0	2.266	2.318	-0.052
268.3	47.311	-0.6	-0.509	0	7.32	0	2.267	2.319	-0.052
268.4	47.274	-0.593	-1.526	0	7.85	0	2.267	2.319	-0.052
268.5	47.237	-0.593	-0.855	0	7.88	0	2.267	2.319	-0.052
268.6	47.199	-0.608	-0.011	0	7.87	0	2.267	2.319	-0.052
268.7	47.162	-0.61	-1.028	0	7.92	0	2.268	2.319	-0.052
268.8	47.125	-0.625	-0.742	0	8.13	0	2.268	2.32	-0.052
268.9	47.088	-0.625	-0.593	0	8.13	0	2.268	2.32	-0.052
269	47.05	-0.608	-0.537	0	8.08	0	2.268	2.32	-0.052
269.1	47.019	-0.605	-1.236	0	8.07	0	2.268	2.32	-0.052
269.2	46.982	-0.605	-1.031	0	7.51	0	2.269	2.321	-0.052
269.3	46.945	-0.61	-0.579	0	7.23	0	2.269	2.321	-0.052
269.4	46.907	-0.618	-1.067	0	6.98	0	2.269	2.321	-0.052
269.5	46.87	-0.618	-0.406	0	6.5	0	2.269	2.321	-0.052
269.6	46.827	-0.61	-0.523	0	6.51	0	2.269	2.321	-0.052
269.7	46.789	-0.628	-0.876	0	6.5	0	2.27	2.321	-0.052
269.8	46.752	-0.628	-0.727	0	6.51	0	2.27	2.322	-0.052
269.9	46.708	-0.638	-0.406	0	6.64	0	2.27	2.322	-0.052
270	46.671	-0.635	-0.77	0	6.64	0	2.27	2.322	-0.052
270.1	46.634	-0.635	-0.809	0	6.63	0	2.27	2.322	-0.052
270.2	46.597	-0.593	-0.982	0	6.63	0	2.27	2.322	-0.052
270.3	46.559	-0.59	-1.338	0	7.02	0	2.271	2.323	-0.052
270.4	46.516	-0.59	-0.996	0	7.26	0	2.271	2.323	-0.052
270.5	46.479	-0.613	-0.155	0	7.57	0	2.271	2.323	-0.052
270.6	46.441	-0.61	0.021	0	8.21	0	2.271	2.323	-0.052
270.7	46.41	-0.61	-1.067	0	8.85	0	2.272	2.323	-0.052
270.8	46.379	-0.615	-0.946	0	9.66	0	2.272	2.324	-0.052
270.9	46.348	-0.62	-0.335	0	10.67	0	2.272	2.324	-0.052
271	46.317	-0.62	-0.452	0	11.46	0	2.272	2.324	-0.052
271.1	46.286	-0.615	-0.851	0	11.47	0	2.273	2.325	-0.052
271.2	46.255	-0.62	-0.908	0	11.45	0	2.273	2.325	-0.052
271.3	46.23	-0.62	-0.42	0	11.42	0	2.273	2.325	-0.052
271.4	46.205	-0.63	-0.851	0	11.61	0	2.274	2.326	-0.052
271.5	46.174	-0.63	-0.494	0	11.99	0	2.274	2.326	-0.052
271.6	46.143	-0.623	-0.562	0	12.63	0	2.274	2.326	-0.052
271.7	46.118	-0.603	-0.498	0	13.06	0	2.275	2.327	-0.052
271.8	46.093	-0.615	-0.939	0	13.01	0	2.275	2.327	-0.052
271.9	46.068	-0.615	-0.526	0	13.04	0	2.275	2.327	-0.052

272	46.05	-0.62	-0.283	0	13.05	0	2.276	2.328	-0.052
272.1	46.025	-0.625	-0.494	0	12.57	0	2.276	2.328	-0.052
272.2	46	-0.625	-0.579	0	12.23	0	2.277	2.328	-0.052
272.3	45.975	-0.63	-0.48	0	12	0	2.277	2.329	-0.052
272.4	45.944	-0.633	-0.742	0	11.78	0	2.277	2.329	-0.052
272.5	45.919	-0.633	-0.526	0	11.33	0	2.278	2.329	-0.052
272.6	45.888	-0.605	-0.562	0	10.92	0	2.278	2.33	-0.052
272.7	45.863	-0.603	-1.194	0	10.75	0	2.278	2.33	-0.052
272.8	45.832	-0.603	-0.643	0	10.76	0	2.278	2.33	-0.052
272.9	45.807	-0.603	-0.77	0	10.73	0	2.279	2.331	-0.052
273	45.776	-0.628	-1.112	0	10.21	0	2.279	2.331	-0.052
273.1	45.745	-0.628	-0.184	0	10.21	0	2.279	2.331	-0.052
273.2	45.72	-0.615	-0.198	0	10.14	0	2.28	2.331	-0.052
273.3	45.683	-0.618	-1.067	0	10.27	0	2.28	2.332	-0.052
273.4	45.658	-0.618	-1.116	0	10.35	0	2.28	2.332	-0.052
273.5	45.627	-0.63	-0.583	0	10.32	0	2.28	2.332	-0.052
273.6	45.602	-0.62	-0.6	0	10.36	0	2.281	2.333	-0.052
273.7	45.571	-0.62	-0.936	0	10.33	0	2.281	2.333	-0.052
273.8	45.54	-0.63	-1.134	0	10.3	0	2.281	2.333	-0.052
273.9	45.509	-0.628	-0.434	0	10.33	0	2.282	2.333	-0.052
274	45.478	-0.628	-0.653	0	10.79	0	2.282	2.334	-0.052
274.1	45.453	-0.608	-1.176	0	10.9	0	2.282	2.334	-0.052
274.2	45.422	-0.618	-1.151	0	11.52	0	2.282	2.334	-0.052
274.3	45.397	-0.618	-0.54	0	11.51	0	2.283	2.335	-0.052
274.4	45.373	-0.618	-0.823	0	11.43	0	2.283	2.335	-0.052
274.5	45.348	-0.618	-0.643	0	11.48	0	2.283	2.335	-0.052
274.6	45.317	-0.62	-1.176	0	11.5	0	2.284	2.336	-0.052
274.7	45.292	-0.628	-0.494	0	11.45	0	2.284	2.336	-0.052
274.8	45.267	-0.6	-0.908	0	11.44	0	2.284	2.336	-0.052
274.9	45.236	-0.6	-1.278	0	11.75	0	2.285	2.337	-0.052
275	45.211	-0.61	-0.657	0	12.07	0	2.285	2.337	-0.052
275.1	45.186	-0.625	-0.456	0	12.02	0	2.285	2.337	-0.052
275.2	45.161	-0.625	-0.614	0	13.03	0	2.286	2.338	-0.052
275.3	45.136	-0.62	-0.742	0	14.21	0	2.286	2.338	-0.052
275.4	45.118	-0.615	-0.727	0	14.37	0	2.287	2.338	-0.052
275.5	45.099	-0.615	-0.95	0	14.42	0	2.287	2.339	-0.052
275.6	45.074	-0.615	-0.54	0	14.36	0	2.287	2.339	-0.052
275.7	45.056	-0.615	-0.625	0	14.77	0	2.288	2.34	-0.052
275.8	45.037	-0.615	-1.067	0	15	0	2.288	2.34	-0.052
275.9	45.018	-0.615	-0.498	0	14.92	0	2.289	2.341	-0.052
276	45	-0.62	-0.982	0	15	0	2.289	2.341	-0.052
276.1	44.981	-0.62	-0.837	0	14.93	0	2.289	2.341	-0.052
276.2	44.962	-0.615	-0.643	0	15.01	0	2.29	2.342	-0.052
276.3	44.944	-0.615	-1.176	0	15.29	0	2.29	2.342	-0.052
276.4	44.925	-0.615	-0.643	0	15.28	0	2.291	2.343	-0.052
276.5	44.906	-0.608	-0.823	0	15.51	0	2.291	2.343	-0.052
276.6	44.888	-0.628	-0.579	0	15.44	0	2.292	2.343	-0.052

276.7	44.869	-0.628	-0.208	0	15.53	0	2.292	2.344	-0.052
276.8	44.851	-0.633	-0.184	0	15.42	0	2.292	2.344	-0.052
276.9	44.838	-0.61	-0.756	0	15.45	0	2.293	2.344	-0.052
277	44.82	-0.61	-1.232	0	14.9	0	2.293	2.345	-0.052
277.1	44.801	-0.655	-0.893	0	14.91	0	2.294	2.346	-0.052
277.2	44.782	-0.658	-0.12	0	14.91	0	2.294	2.346	-0.052
277.3	44.757	-0.658	-0.42	0	14.91	0	2.294	2.346	-0.052
277.4	44.739	-0.61	-1.261	0	14.93	0	2.295	2.347	-0.052
277.5	44.739	-0.61	-1.314	0	14.86	0	2.295	2.347	-0.052
277.6	44.701	-0.608	-0.565	0	14.89	0	2.296	2.348	-0.052
277.7	44.683	-0.603	-1.151	0	14.9	0	2.296	2.348	-0.052
277.8	44.664	-0.613	-0.756	0	14.85	0	2.297	2.348	-0.052
277.9	44.639	-0.613	-0.685	0	14.88	0	2.297	2.349	-0.052
278	44.621	-0.64	-0.321	0	14.83	0	2.297	2.349	-0.052
278.1	44.602	-0.63	-0.307	0	14.88	0	2.298	2.35	-0.052
278.2	44.583	-0.63	-0.498	0	14.82	0	2.298	2.35	-0.052
278.3	44.565	-0.603	-1.353	0	14.86	0	2.299	2.351	-0.052
278.4	44.546	-0.603	-0.639	0	14.83	0	2.299	2.351	-0.052
278.5	44.527	-0.603	-0.915	0	14.81	0	2.299	2.351	-0.052
278.6	44.509	-0.613	-0.699	0	14.87	0	2.3	2.352	-0.052
278.7	44.484	-0.613	-0.523	0	14.78	0	2.3	2.352	-0.052
278.8	44.465	-0.605	-0.685	0	14.85	0	2.301	2.353	-0.052
278.9	44.447	-0.615	-0.893	0	14.78	0	2.301	2.353	-0.052
279	44.428	-0.63	-0.607	0	14.97	0	2.302	2.353	-0.052
279.1	44.409	-0.63	-0.48	0	14.82	0	2.302	2.354	-0.052
279.2	44.391	-0.628	-0.523	0	13.73	0	2.302	2.354	-0.052
279.3	44.372	-0.62	-0.922	0	11.02	0	2.303	2.355	-0.052
279.4	44.347	-0.62	-0.424	0	7.79	0	2.303	2.355	-0.052
279.5	44.316	-0.613	-1.098	0	6.68	0	2.303	2.355	-0.052
279.6	44.279	-0.625	-0.893	0	6.07	0	2.303	2.355	-0.052
279.7	44.242	-0.625	-0.283	0	5.98	0	2.303	2.355	-0.052
279.8	44.204	-0.61	-0.922	0	5.68	0	2.304	2.355	-0.052
279.9	44.167	-0.61	-1.056	0	5.39	0	2.304	2.356	-0.052
280	44.13	-0.61	-0.646	0	5.39	0	2.304	2.356	-0.052
280.1	44.093	-0.613	-0.593	0	5.08	0	2.304	2.356	-0.052
280.2	44.055	-0.605	-0.812	0	4.32	0	2.304	2.356	-0.052
280.3	44.012	-0.605	-0.671	0	2.92	0	2.304	2.356	-0.052
280.4	43.968	-0.608	-1.194	0	1.54	0	2.304	2.356	-0.052
280.5	43.925	-0.608	-0.586	0	0.62	0	2.304	2.356	-0.052
280.6	43.875	-0.615	-0.607	0	0	0	2.304	2.356	-0.052
280.7	43.825	-0.62	-0.742	0	0	0	2.304	2.356	-0.052
280.8	43.776	-0.615	-0.565	0	0	0	2.304	2.356	-0.052
280.9	43.732	-0.615	-0.66	0	0	0	2.304	2.356	-0.052
281	43.682	-0.63	-0.756	0	0	0	2.304	2.356	-0.052
281.1	43.633	-0.628	-0.364	0	0	0	2.304	2.356	-0.052
281.2	43.589	-0.628	-0.823	0	0	0	2.304	2.356	-0.052
281.3	43.533	-0.63	-0.893	0	0	0	2.304	2.356	-0.052

281.4	43.484	-0.64	-0.816	0	0	0	2.304	2.356	-0.052
281.5	43.434	-0.64	-0.643	0	0	0	2.304	2.356	-0.052
281.6	43.39	-0.623	-0.222	0	0	0	2.304	2.356	-0.052
281.7	43.341	-0.623	-1.095	0	-0.87	0	2.304	2.356	-0.052
281.8	43.272	-0.608	-1.406	0	-6.2	0	2.304	2.356	-0.052
281.9	43.198	-0.638	-0.893	0	-9.34	0	2.304	2.356	-0.052
282	43.111	-0.62	-0.17	0	-11.16	0	2.304	2.356	-0.053
282.1	43.024	-0.62	-0.29	0	-15.14	0	2.303	2.356	-0.053
282.2	42.918	-0.618	-1.547	0	-17.99	0	2.303	2.356	-0.054
282.3	42.806	-0.62	-0.35	0	-20.79	0	2.302	2.356	-0.054
282.4	42.682	-0.62	-0.406	0	-24.37	0	2.301	2.356	-0.055
282.5	42.558	-0.618	-0.996	0	-29.52	0	2.301	2.356	-0.056
282.6	42.396	-0.633	-0.54	0	-33.52	0	2.3	2.356	-0.057
282.7	42.266	-0.633	-0.717	0	-34.79	0	2.299	2.356	-0.058
282.8	42.117	-0.623	-0.89	0	-35.16	0	2.298	2.356	-0.059
282.9	41.961	-0.623	-0.851	0	-37.89	0	2.297	2.356	-0.06
283	41.8	-0.623	-0.35	0	-43.94	0	2.295	2.356	-0.061
283.1	41.613	-0.62	-0.823	0	-47.63	0	2.294	2.356	-0.062
283.2	41.421	-0.625	-0.879	0	-49.5	0	2.293	2.356	-0.064
283.3	41.228	-0.625	-0.184	0	-49.91	0	2.291	2.356	-0.065
283.4	41.029	-0.618	-1.342	0	-41.58	0	2.29	2.356	-0.066
283.5	40.855	-0.618	-0.671	0	-34.97	0	2.289	2.356	-0.067
283.6	40.7	-0.623	-0.424	0	-32.59	0	2.288	2.356	-0.068
283.7	40.551	-0.618	-0.968	0	-33.01	0	2.287	2.356	-0.069
283.8	40.395	-0.638	-1.052	0	-35.4	0	2.286	2.356	-0.07
283.9	40.24	-0.638	-0.554	0	-40.51	0	2.285	2.356	-0.071
284	40.066	-0.615	-0.35	0	-41.6	0	2.284	2.356	-0.072
284.1	39.892	-0.593	-0.996	0	-41.07	0	2.283	2.356	-0.073
284.2	39.712	-0.593	-1.656	0	-38.06	0	2.282	2.356	-0.074
284.3	39.55	-0.603	-0.699	0	-35.76	0	2.281	2.356	-0.075
284.4	39.395	-0.608	-0.685	0	-35.23	0	2.28	2.356	-0.076
284.5	39.233	-0.608	-0.922	0	-34.08	0	2.279	2.356	-0.077
284.6	39.084	-0.613	-0.551	0	-32.79	0	2.278	2.356	-0.078
284.7	38.935	-0.613	-0.657	0	-32.56	0	2.277	2.356	-0.079
284.8	38.786	-0.613	-0.639	0	-32.03	0	2.276	2.356	-0.08
284.9	38.643	-0.635	-0.551	0	-26.25	0	2.276	2.356	-0.081
285	38.513	-0.633	-0.756	0	-22.08	0	2.275	2.356	-0.081
285.1	38.395	-0.633	-0.35	0	-19.6	0	2.274	2.356	-0.082
285.2	38.289	-0.615	-1.127	0	-19.04	0	2.274	2.356	-0.082
285.3	38.177	-0.613	-0.879	0	-17.89	0	2.273	2.356	-0.083
285.4	38.078	-0.613	-0.742	0	-17.17	0	2.273	2.356	-0.083
285.5	37.972	-0.605	-1.127	0	-16.89	0	2.272	2.356	-0.084
285.6	37.873	-0.615	-0.922	0	-17.01	0	2.272	2.356	-0.084
285.7	37.773	-0.615	-0.304	0	-17.01	0	2.272	2.356	-0.084
285.8	37.68	-0.6	-0.756	0	-20.38	0	2.271	2.356	-0.085
285.9	37.568	-0.593	-0.982	0	-23.7	0	2.27	2.356	-0.086
286	37.425	-0.593	-1.045	0	-26.43	0	2.269	2.356	-0.087

286.1	37.288	-0.615	-0.922	0	-28.1	0	2.269	2.356	-0.088
286.2	37.152	-0.618	-0.463	0	-31.72	0	2.268	2.356	-0.088
286.3	36.996	-0.618	-0.509	0	-35.79	0	2.267	2.356	-0.089
286.4	36.847	-0.615	-1.028	0	-36.64	0	2.266	2.356	-0.09
286.5	36.661	-0.615	-0.763	0	-36.71	0	2.265	2.356	-0.091
286.6	36.506	-0.633	-0.184	0	-37.81	0	2.264	2.356	-0.092
286.7	36.332	-0.608	-0.335	0	-39.57	0	2.263	2.356	-0.094
286.8	36.145	-0.61	-1.134	0	-39.77	0	2.262	2.356	-0.095
286.9	35.94	-0.61	-0.657	0	-39.5	0	2.26	2.356	-0.096
287	35.772	-0.613	-0.54	0	-39.15	0	2.259	2.356	-0.097
287.1	35.574	-0.615	-0.509	0	-33.34	0	2.258	2.356	-0.098
287.2	35.412	-0.615	-0.699	0	-24.04	0	2.258	2.356	-0.098
287.3	35.294	-0.623	-0.798	0	-21.43	0	2.257	2.356	-0.099
287.4	35.163	-0.65	-0.565	0	-20.94	0	2.257	2.356	-0.1
287.5	35.045	-0.65	-0.406	0	-16.75	0	2.256	2.356	-0.1
287.6	34.952	-0.623	-0.021	0	-12.58	0	2.256	2.356	-0.1
287.7	34.859	-0.623	-1.148	0	-11.22	0	2.255	2.356	-0.101
287.8	34.772	-0.62	-1.134	0	-10.54	0	2.255	2.356	-0.101
287.9	34.691	-0.605	-0.551	0	-10.4	0	2.255	2.356	-0.101
288	34.617	-0.6	-1.148	0	-10.39	0	2.255	2.356	-0.102
288.1	34.523	-0.6	-1.045	0	-8.84	0	2.254	2.356	-0.102
288.2	34.449	-0.62	-0.494	0	-6.98	0	2.254	2.356	-0.102
288.3	34.387	-0.618	-0.512	0	-6.29	0	2.254	2.356	-0.102
288.4	34.318	-0.618	-0.922	0	-6.34	0	2.254	2.356	-0.102
288.5	34.256	-0.628	-0.509	0	-6.34	0	2.254	2.356	-0.103
288.6	34.182	-0.608	-0.42	0	-6.26	0	2.253	2.356	-0.103
288.7	34.113	-0.608	-1.134	0	-6.33	0	2.253	2.356	-0.103
288.8	34.045	-0.63	-1.01	0	-6.27	0	2.253	2.356	-0.103
288.9	33.989	-0.615	-0.081	0	-6.23	0	2.253	2.356	-0.103
289	33.914	-0.615	-0.996	0	-6.29	0	2.253	2.356	-0.103
289.1	33.84	-0.64	-0.982	0	-6.2	0	2.253	2.356	-0.104
289.2	33.772	-0.628	0.078	0	-6.25	0	2.252	2.356	-0.104
289.3	33.709	-0.628	-0.629	0	-6.2	0	2.252	2.356	-0.104
289.4	33.647	-0.62	-1.37	0	-6.17	0	2.252	2.356	-0.104
289.5	33.573	-0.62	-0.689	0	-6.32	0	2.252	2.356	-0.104
289.6	33.511	-0.62	-0.713	0	-6.81	0	2.252	2.356	-0.105
289.7	33.43	-0.615	-0.657	0	-8.39	0	2.251	2.356	-0.105
289.8	33.343	-0.605	-0.48	0	-10.35	0	2.251	2.356	-0.105
289.9	33.262	-0.605	-0.745	0	-10.35	0	2.251	2.356	-0.105
290	33.175	-0.6	-1.081	0	-11.13	0	2.251	2.356	-0.106
290.1	33.076	-0.615	-0.759	0	-11.1	0	2.25	2.356	-0.106
290.2	32.989	-0.615	-0.494	0	-11.05	0	2.25	2.356	-0.106
290.3	32.914	-0.625	-0.335	0	-10.68	0	2.25	2.356	-0.107
290.4	32.827	-0.623	-0.639	0	-10.68	0	2.249	2.356	-0.107
290.5	32.734	-0.623	-0.777	0	-10.6	0	2.249	2.356	-0.107
290.6	32.647	-0.618	-0.837	0	-10.62	0	2.249	2.356	-0.107
290.7	32.572	-0.618	-0.908	0	-10.5	0	2.248	2.356	-0.108

290.8	32.485	-0.628	-0.251	0	-10.53	0	2.248	2.356	-0.108
290.9	32.405	-0.618	-0.671	0	-10.47	0	2.248	2.356	-0.108
291	32.305	-0.603	-0.837	0	-10.42	0	2.248	2.356	-0.109
291.1	32.224	-0.603	-1.067	0	-10.43	0	2.247	2.356	-0.109
291.2	32.144	-0.625	-0.823	0	-10.33	0	2.247	2.356	-0.109
291.3	32.057	-0.638	-0.48	0	-10.37	0	2.247	2.356	-0.109
291.4	31.976	-0.638	-0.035	0	-10.28	0	2.246	2.356	-0.11
291.5	31.883	-0.633	-1.067	0	-10.28	0	2.246	2.356	-0.11
291.6	31.802	-0.618	-0.953	0	-10.27	0	2.246	2.356	-0.11
291.7	31.727	-0.618	-1.077	0	-10.17	0	2.246	2.356	-0.111
291.8	31.634	-0.6	-0.593	0	-10.32	0	2.245	2.356	-0.111
291.9	31.553	-0.595	-0.982	0	-10.56	0	2.245	2.356	-0.111
292	31.472	-0.595	-0.657	0	-11.14	0	2.245	2.356	-0.112
292.1	31.373	-0.63	-0.823	0	-11.3	0	2.244	2.356	-0.112
292.2	31.292	-0.658	-0.756	0	-11.23	0	2.244	2.356	-0.112
292.3	31.205	-0.658	0.533	0	-11.22	0	2.244	2.356	-0.112
292.4	31.106	-0.603	-0.982	0	-11.11	0	2.243	2.356	-0.113
292.5	31.019	-0.603	-1.727	0	-11.11	0	2.243	2.356	-0.113
292.6	30.926	-0.605	-0.742	0	-11.07	0	2.243	2.356	-0.113
292.7	30.845	-0.62	-0.166	0	-11.22	0	2.243	2.356	-0.114
292.8	30.745	-0.615	-0.166	0	-11.69	0	2.242	2.356	-0.114
292.9	30.646	-0.615	-0.982	0	-12.61	0	2.242	2.356	-0.114
293	30.565	-0.598	-0.657	0	-13.6	0	2.241	2.356	-0.115
293.1	30.46	-0.6	-0.982	0	-13.77	0	2.241	2.356	-0.115
293.2	30.36	-0.6	-0.823	0	-13.76	0	2.241	2.356	-0.116
293.3	30.248	-0.615	-0.565	0	-13.62	0	2.24	2.356	-0.116
293.4	30.149	-0.628	-0.908	0	-13.65	0	2.24	2.356	-0.116
293.5	30.056	-0.628	-0.35	0	-13.51	0	2.24	2.356	-0.117
293.6	29.956	-0.618	-0.982	0	-13.91	0	2.239	2.356	-0.117
293.7	29.851	-0.618	-1.052	0	-15.22	0	2.239	2.356	-0.117
293.8	29.739	-0.625	-0.742	0	-16.31	0	2.238	2.356	-0.118
293.9	29.627	-0.603	-0.452	0	-16.32	0	2.238	2.356	-0.118
294	29.509	-0.595	-1.031	0	-16.26	0	2.237	2.356	-0.119
294.1	29.397	-0.595	-1.172	0	-16.26	0	2.237	2.356	-0.119
294.2	29.273	-0.623	-0.095	0	-16.08	0	2.237	2.356	-0.12
294.3	29.161	-0.61	-0.152	0	-14.66	0	2.236	2.356	-0.12
294.4	29.055	-0.61	-1.476	0	-11.19	0	2.236	2.356	-0.12
294.5	28.981	-0.61	-0.89	0	-10.55	0	2.236	2.356	-0.121
294.6	28.881	-0.648	-0.713	0	-9.68	0	2.235	2.356	-0.121
294.7	28.813	-0.648	-0.166	0	-4.82	0	2.235	2.356	-0.121
294.8	28.745	-0.635	-0.166	0	0	0	2.235	2.356	-0.121
294.9	28.701	-0.618	-0.865	0	0.54	0	2.235	2.356	-0.121
295	28.658	-0.618	-1.148	0	0.53	0	2.235	2.356	-0.121
295.1	28.627	-0.63	-0.908	0	0.55	0	2.235	2.356	-0.121
295.2	28.589	-0.62	-0.42	0	0.57	0	2.235	2.356	-0.121
295.3	28.552	-0.62	-0.494	0	0.55	0	2.235	2.356	-0.121
295.4	28.515	-0.59	-1.377	0	0.55	0	2.235	2.356	-0.121

295.5	28.484	-0.59	-1.293	0	0.55	0	2.235	2.356	-0.121
295.6	28.44	-0.595	-0.579	0	0.55	0	2.235	2.356	-0.121
295.7	28.409	-0.603	-0.784	0	0.56	0	2.235	2.356	-0.121
295.8	28.372	-0.6	-0.494	0	0.57	0	2.235	2.356	-0.121
295.9	28.335	-0.6	-1.014	0	0.74	0	2.235	2.356	-0.121
296	28.297	-0.62	-0.565	0	2.28	0	2.235	2.356	-0.121
296.1	28.266	-0.623	-0.519	0	5.34	0	2.235	2.357	-0.121
296.2	28.241	-0.623	-0.424	0	8.91	0	2.236	2.357	-0.121
296.3	28.235	-0.613	-0.639	0	14.67	0	2.236	2.357	-0.121
296.4	28.235	-0.61	-0.494	0	19.96	0	2.237	2.358	-0.121
296.5	28.26	-0.61	-0.763	0	21.51	0	2.237	2.358	-0.121
296.6	28.291	-0.62	-0.494	0	24.03	0	2.238	2.359	-0.121
296.7	28.322	-0.62	-0.304	0	28.89	0	2.239	2.36	-0.121
296.8	28.378	-0.6	-0.805	0	31.23	0	2.24	2.361	-0.121
296.9	28.434	-0.63	-1.19	0	31.18	0	2.24	2.362	-0.121
297	28.49	-0.638	-0.152	0	31.16	0	2.241	2.362	-0.121
297.1	28.546	-0.638	-0.021	0	31.44	0	2.242	2.363	-0.121
297.2	28.602	-0.58	-1.134	0	32.89	0	2.243	2.364	-0.121
297.3	28.67	-0.593	-1.635	0	37.84	0	2.244	2.365	-0.121
297.4	28.738	-0.593	-0.876	0	42.88	0	2.245	2.367	-0.121
297.5	28.825	-0.608	-0.078	0	44.57	0	2.247	2.368	-0.121
297.6	28.919	-0.603	-0.908	0	49.73	0	2.248	2.369	-0.121
297.7	29.037	-0.603	-1.119	0	52.13	0	2.249	2.371	-0.121
297.8	29.149	-0.625	-0.48	0	53.78	0	2.251	2.372	-0.121
297.9	29.248	-0.618	-0.406	0	55.38	0	2.252	2.374	-0.121
298	29.366	-0.618	-0.805	0	60.73	0	2.254	2.375	-0.121
298.1	29.503	-0.618	-0.953	0	66.15	0	2.256	2.377	-0.121
298.2	29.658	-0.623	-0.724	0	68.14	0	2.258	2.379	-0.121
298.3	29.813	-0.623	-0.565	0	68.14	0	2.258	2.379	-0.121
298.4	29.95	-0.635	-0.494	0	71.91	0	2.262	2.383	-0.121
298.5	30.124	-0.635	-0.823	0	74.27	0	2.264	2.385	-0.121
298.6	30.286	-0.625	-0.784	0	77.94	0	2.266	2.387	-0.121
298.7	30.441	-0.61	-1.391	0	78.29	0	2.268	2.389	-0.121
298.8	30.634	-0.623	-1.028	0	78.39	0	2.27	2.392	-0.121
298.9	30.801	-0.623	-0.494	0	79.39	0	2.273	2.394	-0.121
299	30.975	-0.61	-0.509	0	82.42	0	2.275	2.396	-0.121
299.1	31.137	-0.613	-1.307	0	88.64	0	2.277	2.399	-0.121
299.2	31.342	-0.613	-0.685	0	92.45	0	2.28	2.401	-0.121
299.3	31.541	-0.625	-0.77	0	99.19	0	2.283	2.404	-0.121
299.4	31.746	-0.63	-0.639	0	109.49	0	2.286	2.407	-0.121
299.5	31.963	-0.63	-0.551	0	129.82	0	2.289	2.41	-0.121
299.6	32.212	-0.603	-1.158	0	133.77	0	2.293	2.414	-0.121
299.7	32.467	-0.603	-1.148	0	138.77	0	2.297	2.418	-0.121
299.8	32.703	-0.618	-0.639	0	140.83	0	2.301	2.422	-0.121
299.9	32.989	-0.615	-0.48	0	142.52	0	2.305	2.426	-0.121
300	33.243	-0.615	-0.953	0	144.61	0	2.309	2.43	-0.121
300.1	33.498	-0.615	-0.519	0	147.19	0	2.313	2.434	-0.121

300.2	33.759	-0.63	-0.876	0	150.3	0	2.317	2.438	-0.121
300.3	33.989	-0.625	-0.48	0	154.42	0	2.321	2.443	-0.121
300.4	34.244	-0.625	-0.756	0	158.5	0	2.326	2.447	-0.121
300.5	34.523	-0.61	-1.338	0	161.15	0	2.33	2.451	-0.121
300.6	34.784	-0.595	-0.791	0	160.82	0	2.335	2.456	-0.121
300.7	35.052	-0.595	-0.876	0	145.86	0	2.339	2.46	-0.121
300.8	35.313	-0.625	-0.653	0	137.42	0	2.343	2.464	-0.121
300.9	35.58	-0.633	-0.208	0	133	0	2.346	2.467	-0.121
301	35.841	-0.633	-0.565	0	132.65	0	2.35	2.471	-0.121
301.1	36.071	-0.608	-0.752	0	131.05	0	2.354	2.475	-0.121
301.2	36.325	-0.613	-1.363	0	128.15	0	2.357	2.478	-0.121
301.3	36.574	-0.613	-0.434	0	119.98	0	2.361	2.482	-0.121
301.4	36.804	-0.603	-0.724	0	105.68	0	2.363	2.485	-0.121
301.5	37.028	-0.603	-0.968	0	95.43	0	2.366	2.487	-0.121
301.6	37.183	-0.615	-0.953	0	92.49	0	2.369	2.49	-0.121
301.7	37.369	-0.61	-0.434	0	92.5	0	2.371	2.492	-0.121
301.8	37.537	-0.595	-0.953	0	92.13	0	2.374	2.495	-0.121
301.9	37.705	-0.595	-1.204	0	91.41	0	2.376	2.497	-0.121
302	37.866	-0.63	-0.837	0	91.41	0	2.379	2.5	-0.121
302.1	38.003	-0.63	0.007	0	92.24	0	2.381	2.503	-0.121
302.2	38.183	-0.63	-0.639	0	92.7	0	2.384	2.505	-0.121
302.3	38.326	-0.603	-1.038	0	92.67	0	2.387	2.508	-0.121
302.4	38.488	-0.62	-1.342	0	92.62	0	2.389	2.51	-0.121
302.5	38.656	-0.62	-0.42	0	92.62	0	2.389	2.51	-0.121
302.6	38.817	-0.6	-0.466	0	89.21	0	2.394	2.515	-0.121
302.7	38.954	-0.6	-1.278	0	85.99	0	2.397	2.518	-0.121
302.8	39.097	-0.605	-0.763	0	82.46	0	2.399	2.52	-0.121
302.9	39.233	-0.605	-0.304	0	79.49	0	2.401	2.522	-0.121
303	39.37	-0.6	-0.791	0	76.78	0	2.403	2.524	-0.121
303.1	39.488	-0.6	-1.119	0	68.48	0	2.405	2.526	-0.121
303.2	39.594	-0.613	-0.466	0	60.53	0	2.407	2.528	-0.121
303.3	39.681	-0.608	-0.304	0	57.51	0	2.408	2.529	-0.121
303.4	39.774	-0.608	-0.837	0	56.77	0	2.41	2.531	-0.121
303.5	39.849	-0.613	-0.953	0	56.74	0	2.412	2.533	-0.121
303.6	39.929	-0.608	-0.583	0	56.69	0	2.413	2.534	-0.121
303.7	40.004	-0.608	-1.063	0	56.61	0	2.415	2.536	-0.121
303.8	40.078	-0.635	-0.625	0	56.61	0	2.416	2.537	-0.121
303.9	40.159	-0.625	-0.187	0	56.61	0	2.418	2.539	-0.121
304	40.24	-0.625	-0.48	0	57.66	0	2.419	2.541	-0.121
304.1	40.321	-0.633	-1.119	0	59.34	0	2.421	2.542	-0.121
304.2	40.402	-0.643	-0.509	0	60.23	0	2.423	2.544	-0.121
304.3	40.489	-0.643	-0.261	0	60.52	0	2.424	2.546	-0.121
304.4	40.569	-0.593	-0.805	0	60.54	0	2.426	2.547	-0.121
304.5	40.656	-0.593	-1.932	0	60.23	0	2.428	2.549	-0.121
304.6	40.75	-0.615	-0.364	0	59.29	0	2.429	2.551	-0.121
304.7	40.83	-0.605	-0.007	0	58.06	0	2.431	2.552	-0.121
304.8	40.911	-0.618	-1.172	0	56.51	0	2.433	2.554	-0.121

304.9	40.986	-0.618	-0.448	0	55.35	0	2.434	2.555	-0.121
305	41.048	-0.618	-0.318	0	54.38	0	2.436	2.557	-0.121
305.1	41.122	-0.6	-0.749	0	53.71	0	2.437	2.558	-0.121
305.2	41.191	-0.6	-1.081	0	53.4	0	2.439	2.56	-0.121
305.3	41.259	-0.615	-1.119	0	53.98	0	2.44	2.561	-0.121
305.4	41.321	-0.62	-0.346	0	54.36	0	2.442	2.563	-0.121
305.5	41.39	-0.62	-0.551	0	54.82	0	2.443	2.564	-0.121
305.6	41.464	-0.613	-0.304	0	56.15	0	2.445	2.566	-0.121
305.7	41.532	-0.613	-0.699	0	56.29	0	2.446	2.567	-0.121
305.8	41.613	-0.61	-1.561	0	56.29	0	2.448	2.569	-0.121
305.9	41.688	-0.628	-0.551	0	56.25	0	2.449	2.571	-0.121
306	41.762	-0.633	-0.29	0	56.22	0	2.451	2.572	-0.121
306.1	41.824	-0.633	-0.653	0	56.2	0	2.453	2.574	-0.121
306.2	41.893	-0.603	-0.653	0	56.23	0	2.454	2.575	-0.121
306.3	41.967	-0.603	-1.363	0	56.29	0	2.456	2.577	-0.121
306.4	42.042	-0.603	-0.985	0	56.12	0	2.457	2.578	-0.121
306.5	42.11	-0.62	-0.667	0	55.63	0	2.459	2.58	-0.121
306.6	42.179	-0.62	-0.494	0	55.19	0	2.46	2.581	-0.121
306.7	42.241	-0.62	-0.953	0	55.19	0	2.46	2.581	-0.121
306.8	42.309	-0.62	-1.052	0	52.96	0	2.463	2.584	-0.121
306.9	42.371	-0.615	-0.738	0	49.01	0	2.465	2.586	-0.121
307	42.427	-0.615	-0.537	0	47.62	0	2.466	2.587	-0.121
307.1	42.477	-0.615	-1.119	0	46.61	0	2.467	2.588	-0.121
307.2	42.527	-0.615	-0.551	0	46.14	0	2.469	2.59	-0.121
307.3	42.576	-0.615	-1.247	0	46.18	0	2.47	2.591	-0.121
307.4	42.626	-0.61	-0.625	0	46.22	0	2.471	2.592	-0.121
307.5	42.676	-0.61	-0.953	0	46.18	0	2.472	2.594	-0.121
307.6	42.725	-0.61	-1.119	0	46.21	0	2.474	2.595	-0.121
307.7	42.775	-0.615	-0.452	0	46.3	0	2.475	2.596	-0.121
307.8	42.819	-0.605	-0.593	0	46.91	0	2.476	2.597	-0.121
307.9	42.868	-0.605	-1.074	0	48.19	0	2.478	2.599	-0.121
308	42.918	-0.615	-0.819	0	50.72	0	2.479	2.6	-0.121
308.1	42.962	-0.61	-0.593	0	53.9	0	2.48	2.602	-0.121
308.2	43.018	-0.61	-0.819	0	55.86	0	2.482	2.603	-0.121
308.3	43.061	-0.608	-0.851	0	56.76	0	2.484	2.605	-0.121
308.4	43.111	-0.628	-0.71	0	52.84	0	2.485	2.606	-0.121
308.5	43.16	-0.628	-0.791	0	52.84	0	2.485	2.606	-0.121
308.6	43.204	-0.623	-0.081	0	45.82	0	2.488	2.609	-0.121
308.7	43.247	-0.623	-0.706	0	46.35	0	2.489	2.61	-0.121
308.8	43.297	-0.603	-1.402	0	46.85	0	2.49	2.611	-0.121
308.9	43.341	-0.633	-0.876	0	46.83	0	2.492	2.613	-0.121
309	43.384	-0.613	-0.208	0	46.97	0	2.493	2.614	-0.121
309.1	43.428	-0.613	-1.363	0	47.82	0	2.494	2.615	-0.121
309.2	43.477	-0.625	-0.791	0	48.18	0	2.495	2.617	-0.121
309.3	43.527	-0.62	-0.35	0	47.85	0	2.497	2.618	-0.121
309.4	43.583	-0.62	-0.805	0	47.89	0	2.498	2.619	-0.121
309.5	43.626	-0.62	-0.682	0	47.91	0	2.499	2.621	-0.121

309.6	43.682	-0.62	-0.89	0	47.99	0	2.501	2.622	-0.121
309.7	43.72	-0.62	-0.653	0	47.92	0	2.502	2.623	-0.121
309.8	43.769	-0.618	-1.119	0	47.95	0	2.503	2.625	-0.121
309.9	43.819	-0.608	-0.777	0	47.99	0	2.505	2.626	-0.121
310	43.863	-0.608	-0.791	0	48.04	0	2.506	2.627	-0.121
310.1	43.912	-0.635	-1.038	0	48.04	0	2.507	2.629	-0.121
310.2	43.968	-0.62	0.364	0	47.96	0	2.509	2.63	-0.121
310.3	44.012	-0.62	-0.805	0	48.01	0	2.51	2.631	-0.121
310.4	44.055	-0.608	-0.996	0	48.11	0	2.511	2.633	-0.121
310.5	44.099	-0.608	-0.819	0	48.11	0	2.513	2.634	-0.121
310.6	44.155	-0.618	-0.791	0	47.9	0	2.514	2.635	-0.121
310.7	44.192	-0.633	-0.304	0	48	0	2.515	2.637	-0.121
310.8	44.242	-0.623	-0.653	0	48.02	0	2.517	2.638	-0.121
310.9	44.291	-0.623	-0.953	0	48.02	0	2.517	2.638	-0.121
311	44.329	-0.615	-0.452	0	46.19	0	2.519	2.641	-0.121
311.1	44.372	-0.618	-1.204	0	44.47	0	2.521	2.642	-0.121
311.2	44.409	-0.618	-0.653	0	43.58	0	2.522	2.643	-0.121
311.3	44.447	-0.65	-0.505	0	42.65	0	2.523	2.644	-0.121
311.4	44.484	-0.655	-0.208	0	41.72	0	2.524	2.645	-0.121
311.5	44.521	-0.655	-0.318	0	41.72	0	2.525	2.646	-0.121
311.6	44.552	-0.615	-0.862	0	41.48	0	2.527	2.648	-0.121
311.7	44.583	-0.615	-1.391	0	40.75	0	2.528	2.649	-0.121
311.8	44.621	-0.608	-1.176	0	40.26	0	2.529	2.65	-0.121
311.9	44.646	-0.61	-0.625	0	39.04	0	2.53	2.651	-0.121
312	44.677	-0.588	-0.862	0	37.84	0	2.531	2.652	-0.121
312.1	44.701	-0.588	-1.218	0	36.71	0	2.532	2.653	-0.121
312.2	44.726	-0.683	-1.19	0	35.84	0	2.533	2.654	-0.121
312.3	44.751	-0.663	0.636	0	34.87	0	2.534	2.655	-0.121
312.4	44.77	-0.663	0.011	0	33.95	0	2.535	2.656	-0.121
312.5	44.782	-0.615	-2.257	0	33.36	0	2.536	2.657	-0.121
312.6	44.801	-0.623	-1.423	0	33.23	0	2.537	2.658	-0.121
312.7	44.82	-0.623	-0.579	0	32.63	0	2.538	2.659	-0.121
312.8	44.832	-0.63	-0.237	0	32.73	0	2.538	2.66	-0.121
312.9	44.851	-0.64	-1.052	0	32.41	0	2.539	2.661	-0.121
313	44.869	-0.64	-0.36	0	31.97	0	2.54	2.661	-0.121
313.1	44.875	-0.608	-0.639	0	31.94	0	2.541	2.662	-0.121
313.2	44.894	-0.598	-1.377	0	31.95	0	2.542	2.663	-0.121
313.3	44.906	-0.598	-1.307	0	32.2	0	2.543	2.664	-0.121
313.4	44.919	-0.603	-1.024	0	32.46	0	2.544	2.665	-0.121
313.5	44.931	-0.603	-0.332	0	32.53	0	2.545	2.666	-0.121
313.6	44.95	-0.6	-0.851	0	32.48	0	2.546	2.667	-0.121
313.7	44.962	-0.61	-1.105	0	32.56	0	2.547	2.668	-0.121
313.8	44.981	-0.605	-0.48	0	32.47	0	2.547	2.669	-0.121
313.9	44.993	-0.605	-0.749	0	33.14	0	2.548	2.669	-0.121
314	45.012	-0.63	-0.622	0	33.61	0	2.549	2.67	-0.121
314.1	45.025	-0.62	-0.237	0	34.8	0	2.55	2.671	-0.121
314.2	45.043	-0.62	-0.523	0	34.88	0	2.551	2.672	-0.121

314.3	45.062	-0.61	-1.074	0	34.79	0	2.552	2.673	-0.121
314.4	45.08	-0.62	-0.579	0	34.75	0	2.553	2.674	-0.121
314.5	45.093	-0.62	-0.452	0	34.86	0	2.554	2.675	-0.121
314.6	45.118	-0.598	-0.819	0	34.79	0	2.555	2.676	-0.121
314.7	45.136	-0.598	-1.134	0	34.88	0	2.556	2.677	-0.121
314.8	45.155	-0.583	-1.575	0	34.83	0	2.557	2.678	-0.121
314.9	45.174	-0.603	-0.438	0	34.84	0	2.558	2.679	-0.121
315	45.192	-0.603	0.092	0	34.88	0	2.559	2.68	-0.121
315.1	45.211	-0.603	-1.624	0	34.88	0	2.559	2.68	-0.121
315.2	45.23	-0.605	-0.48	0	35	0	2.561	2.682	-0.121
315.3	45.248	-0.595	-0.48	0	34.84	0	2.562	2.683	-0.121
315.4	45.267	-0.595	-1.091	0	34.99	0	2.563	2.684	-0.121
315.5	45.286	-0.608	-0.48	0	34.88	0	2.564	2.685	-0.121
315.6	45.304	-0.603	-0.565	0	34.97	0	2.565	2.686	-0.121
315.7	45.323	-0.603	-0.939	0	35.61	0	2.566	2.687	-0.121
315.8	45.348	-0.603	-0.48	0	36.2	0	2.567	2.688	-0.121
315.9	45.366	-0.598	-0.713	0	37.32	0	2.568	2.689	-0.121
316	45.385	-0.598	-0.611	0	37.22	0	2.569	2.69	-0.121
316.1	45.41	-0.618	-0.699	0	37.16	0	2.57	2.691	-0.121
316.2	45.428	-0.613	-0.48	0	37.05	0	2.571	2.692	-0.121
316.3	45.453	-0.613	-0.562	0	37.16	0	2.572	2.693	-0.121
316.4	45.472	-0.603	-0.968	0	37.18	0	2.573	2.694	-0.121
316.5	45.503	-0.603	-0.805	0	37.18	0	2.574	2.695	-0.121
316.6	45.522	-0.595	-1.01	0	37.23	0	2.575	2.696	-0.121
316.7	45.547	-0.595	-0.982	0	37.12	0	2.576	2.697	-0.121
316.8	45.571	-0.603	-0.696	0	37.24	0	2.577	2.698	-0.121
316.9	45.584	-0.603	-0.604	0	37.17	0	2.578	2.699	-0.121
317	45.609	-0.608	-0.71	0	37.25	0	2.579	2.7	-0.121
317.1	45.634	-0.603	-0.89	0	37.23	0	2.58	2.701	-0.121
317.2	45.658	-0.603	-0.968	0	37.2	0	2.581	2.702	-0.121
317.3	45.677	-0.635	-0.742	0	37.12	0	2.582	2.703	-0.121
317.4	45.702	-0.618	-0.304	0	37.04	0	2.583	2.704	-0.121
317.5	45.72	-0.618	-0.537	0	37.13	0	2.584	2.705	-0.121
317.6	45.745	-0.618	-1.826	0	37.13	0	2.585	2.707	-0.121
317.7	45.764	-0.618	-0.403	0	37.12	0	2.586	2.708	-0.121
317.8	45.789	-0.628	-0.551	0	37.2	0	2.587	2.709	-0.121
317.9	45.807	-0.618	-0.576	0	37.15	0	2.588	2.71	-0.121
318	45.832	-0.608	-0.886	0	37.25	0	2.59	2.711	-0.121
318.1	45.857	-0.608	-1.293	0	37.23	0	2.591	2.712	-0.121
318.2	45.876	-0.598	-0.639	0	37.2	0	2.592	2.713	-0.121
318.3	45.894	-0.598	-0.805	0	37.35	0	2.593	2.714	-0.121
318.4	45.919	-0.598	-0.929	0	37.14	0	2.594	2.715	-0.121
318.5	45.938	-0.603	-0.657	0	37.02	0	2.595	2.716	-0.121
318.6	45.963	-0.595	-0.639	0	37.06	0	2.596	2.717	-0.121
318.7	45.981	-0.595	-0.968	0	37.02	0	2.597	2.718	-0.121
318.8	46.006	-0.61	-0.48	0	37.13	0	2.598	2.719	-0.121
318.9	46.025	-0.628	-0.685	0	37.04	0	2.599	2.72	-0.121

319	46.05	-0.628	-0.237	0	37.13	0	2.6	2.721	-0.121
319.1	46.068	-0.6	-0.611	0	37.15	0	2.601	2.722	-0.121
319.2	46.093	-0.595	-1.134	0	37.11	0	2.602	2.723	-0.121
319.3	46.112	-0.595	-1.232	0	37.11	0	2.602	2.723	-0.121
319.4	46.137	-0.61	-0.77	0	38.12	0	2.604	2.725	-0.121
319.5	46.155	-0.61	-0.448	0	39.53	0	2.605	2.726	-0.121
319.6	46.187	-0.623	-0.385	0	40.8	0	2.606	2.727	-0.121
319.7	46.211	-0.62	-0.611	0	42.21	0	2.607	2.729	-0.121
319.8	46.236	-0.613	-0.978	0	43.56	0	2.609	2.73	-0.121
319.9	46.274	-0.613	-0.805	0	45.48	0	2.61	2.731	-0.121
320	46.305	-0.618	-0.565	0	47.03	0	2.611	2.732	-0.121
320.1	46.342	-0.608	-0.597	0	48.04	0	2.613	2.734	-0.121
320.2	46.385	-0.608	-1.363	0	48.4	0	2.614	2.735	-0.121
320.3	46.429	-0.613	-0.565	0	48.36	0	2.615	2.736	-0.121
320.4	46.472	-0.62	-0.844	0	48.47	0	2.617	2.738	-0.121
320.5	46.51	-0.62	-0.48	0	48.22	0	2.618	2.739	-0.121
320.6	46.559	-0.605	-0.851	0	48.33	0	2.619	2.74	-0.121
320.7	46.59	-0.605	-1.134	0	48.38	0	2.621	2.742	-0.121
320.8	46.634	-0.618	-0.565	0	48.42	0	2.622	2.743	-0.121
320.9	46.671	-0.605	-0.523	0	48.47	0	2.623	2.744	-0.121
321	46.708	-0.598	-1.204	0	48.25	0	2.625	2.746	-0.121
321.1	46.752	-0.598	-0.968	0	48.32	0	2.626	2.747	-0.121
321.2	46.789	-0.615	-0.639	0	48.39	0	2.627	2.748	-0.121
321.3	46.833	-0.618	-0.48	0	49.15	0	2.629	2.75	-0.121
321.4	46.87	-0.618	-0.434	0	49.57	0	2.63	2.751	-0.121
321.5	46.914	-0.615	-0.71	0	49.39	0	2.631	2.753	-0.121
321.6	46.951	-0.63	-0.653	0	49.42	0	2.633	2.754	-0.121
321.7	46.994	-0.63	-0.194	0	50.13	0	2.634	2.755	-0.121
321.8	47.038	-0.63	-0.968	0	50.68	0	2.636	2.757	-0.121
321.9	47.081	-0.615	-0.48	0	51.51	0	2.637	2.758	-0.121
322	47.125	-0.615	-0.138	0	52.41	0	2.638	2.76	-0.121
322.1	47.168	-0.603	-1.377	0	53.83	0	2.64	2.761	-0.121
322.2	47.218	-0.613	-0.48	0	54.43	0	2.641	2.763	-0.121
322.3	47.268	-0.613	-1.01	0	55.31	0	2.643	2.764	-0.121
322.4	47.324	-0.61	-0.364	0	55.35	0	2.645	2.766	-0.121
322.5	47.373	-0.61	-0.953	0	55.25	0	2.646	2.767	-0.121
322.6	47.429	-0.598	-1.204	0	55.32	0	2.648	2.769	-0.121
322.7	47.473	-0.605	-0.724	0	55.4	0	2.649	2.77	-0.121
322.8	47.529	-0.598	-0.639	0	55.37	0	2.651	2.772	-0.121
322.9	47.572	-0.598	-0.763	0	57.2	0	2.652	2.773	-0.121
323	47.628	-0.63	-0.565	0	60.63	0	2.654	2.775	-0.121
323.1	47.684	-0.625	-0.318	0	62.05	0	2.656	2.777	-0.121
323.2	47.746	-0.625	-1.01	0	65.27	0	2.658	2.779	-0.121
323.3	47.815	-0.61	-1.01	0	66.92	0	2.659	2.78	-0.121
323.4	47.883	-0.605	-0.819	0	67.84	0	2.661	2.782	-0.121
323.5	47.957	-0.605	-0.862	0	67.84	0	2.661	2.782	-0.121
323.6	48.026	-0.61	-0.639	0	67.82	0	2.665	2.786	-0.121

323.7	48.1	-0.61	-0.452	0	67.92	0	2.667	2.788	-0.121
323.8	48.169	-0.628	-0.78	0	67.88	0	2.669	2.79	-0.121
323.9	48.237	-0.613	-0.124	0	67.9	0	2.671	2.792	-0.121
324	48.305	-0.62	-1.218	0	67.14	0	2.673	2.794	-0.121
324.1	48.374	-0.62	-0.968	0	66.26	0	2.674	2.796	-0.121
324.2	48.442	-0.603	-0.523	0	65.35	0	2.676	2.797	-0.121
324.3	48.51	-0.613	-1.307	0	64.45	0	2.678	2.799	-0.121
324.4	48.573	-0.613	-0.724	0	64.4	0	2.68	2.801	-0.121
324.5	48.629	-0.608	-0.318	0	64.51	0	2.682	2.803	-0.121
324.6	48.697	-0.588	-0.791	0	64.4	0	2.683	2.804	-0.121
324.7	48.759	-0.588	-1.663	0	64.44	0	2.685	2.806	-0.121
324.8	48.821	-0.608	-0.452	0	64.47	0	2.687	2.808	-0.121
324.9	48.883	-0.61	-0.237	0	64.35	0	2.689	2.81	-0.121
325	48.945	-0.61	-0.791	0	64.43	0	2.691	2.812	-0.121
325.1	49.001	-0.598	-0.685	0	64.32	0	2.692	2.813	-0.121
325.2	49.063	-0.608	-1.052	0	64.38	0	2.694	2.815	-0.121
325.3	49.126	-0.608	-0.685	0	64.4	0	2.696	2.817	-0.121
325.4	49.188	-0.613	-0.152	0	65.17	0	2.698	2.819	-0.121
325.5	49.25	-0.613	-0.805	0	65.7	0	2.7	2.821	-0.121
325.6	49.312	-0.608	-1.052	0	65.61	0	2.701	2.822	-0.121
325.7	49.374	-0.608	-0.72	0	65.66	0	2.703	2.824	-0.121
325.8	49.436	-0.595	-0.805	0	66.68	0	2.705	2.826	-0.121
325.9	49.498	-0.595	-1.176	0	66.55	0	2.707	2.828	-0.121
326	49.561	-0.6	-0.685	0	66.75	0	2.709	2.83	-0.121
326.1	49.623	-0.613	-0.318	0	66.81	0	2.711	2.832	-0.121
326.2	49.685	-0.613	-0.625	0	66.72	0	2.712	2.834	-0.121
326.3	49.753	-0.603	-0.166	0	67.86	0	2.714	2.835	-0.121
326.4	49.822	-0.608	-1.324	0	67.98	0	2.716	2.837	-0.121
326.5	49.877	-0.608	-0.727	0	67.85	0	2.718	2.839	-0.121
326.6	49.946	-0.6	-0.187	0	68.01	0	2.72	2.841	-0.121
326.7	50.014	-0.6	-0.791	0	67.92	0	2.722	2.843	-0.121
326.8	50.07	-0.598	-0.791	0	67.93	0	2.724	2.845	-0.121
326.9	50.132	-0.623	-0.466	0	67.93	0	2.726	2.847	-0.121
327	50.194	-0.625	-0.399	0	67.79	0	2.728	2.849	-0.121
327.1	50.263	-0.625	-0.48	0	67.7	0	2.729	2.851	-0.121
327.2	50.331	-0.59	-0.805	0	67.75	0	2.731	2.852	-0.121
327.3	50.387	-0.6	-1.307	0	67.74	0	2.733	2.854	-0.121
327.4	50.449	-0.6	-0.639	0	67.69	0	2.735	2.856	-0.121
327.5	50.505	-0.615	-0.237	0	67.8	0	2.737	2.858	-0.121
327.6	50.58	-0.618	-0.682	0	67.77	0	2.739	2.86	-0.121
327.7	50.636	-0.618	-0.791	0	67.77	0	2.739	2.86	-0.121
327.8	50.691	-0.59	-1.052	0	68.62	0	2.743	2.864	-0.121
327.9	50.76	-0.605	-1.052	0	68.89	0	2.745	2.866	-0.121
328	50.822	-0.605	-0.724	0	70.45	0	2.746	2.868	-0.121
328.1	50.884	-0.605	-0.152	0	71.99	0	2.748	2.87	-0.121
328.2	50.952	-0.59	-1.024	0	73.16	0	2.751	2.872	-0.121
328.3	51.021	-0.59	-1.134	0	73.93	0	2.753	2.874	-0.121

328.4	51.089	-0.598	-1.109	0	75.31	0	2.755	2.876	-0.121
328.5	51.164	-0.598	-0.639	0	76.34	0	2.757	2.878	-0.121
328.6	51.244	-0.608	-0.152	0	77.06	0	2.759	2.88	-0.121
328.7	51.313	-0.603	-0.805	0	78.3	0	2.761	2.882	-0.121
328.8	51.387	-0.6	-0.805	0	78.17	0	2.763	2.884	-0.121
328.9	51.462	-0.6	-1.01	0	78.24	0	2.765	2.887	-0.121
329	51.543	-0.598	-0.554	0	78.2	0	2.768	2.889	-0.121
329.1	51.617	-0.583	-0.738	0	78.22	0	2.77	2.891	-0.121
329.2	51.698	-0.583	-1.307	0	78.11	0	2.772	2.893	-0.121
329.3	51.766	-0.598	-0.519	0	78.23	0	2.774	2.895	-0.121
329.4	51.847	-0.59	-0.318	0	78.05	0	2.776	2.897	-0.121
329.5	51.916	-0.59	-0.805	0	78.22	0	2.778	2.9	-0.121
329.6	51.99	-0.598	-0.819	0	79.26	0	2.781	2.902	-0.121
329.7	52.071	-0.598	-0.332	0	82.27	0	2.783	2.904	-0.121
329.8	52.139	-0.615	-0.332	0	84.48	0	2.785	2.906	-0.121
329.9	52.226	-0.605	-0.699	0	84.33	0	2.788	2.909	-0.121
330	52.313	-0.605	-1.052	0	84.43	0	2.79	2.911	-0.121
330.1	52.388	-0.605	-1.137	0	84.24	0	2.792	2.913	-0.121
330.2	52.475	-0.62	-0.491	0	84.31	0	2.795	2.916	-0.121
330.3	52.562	-0.61	0.007	0	84.26	0	2.797	2.918	-0.121
330.4	52.643	-0.61	-1.476	0	84.29	0	2.799	2.92	-0.121
330.5	52.717	-0.618	-0.48	0	84.29	0	2.802	2.923	-0.121
330.6	52.804	-0.613	-0.639	0	84.28	0	2.804	2.925	-0.121
330.7	52.879	-0.613	-1.148	0	84.26	0	2.806	2.927	-0.121
330.8	52.953	-0.615	-0.198	0	84.2	0	2.809	2.93	-0.121
330.9	53.034	-0.608	-0.653	0	84.26	0	2.811	2.932	-0.121
331	53.115	-0.608	-1.293	0	84.17	0	2.813	2.935	-0.121
331.1	53.196	-0.633	-0.48	0	83.45	0	2.816	2.937	-0.121
331.2	53.27	-0.618	0.053	0	82.14	0	2.818	2.939	-0.121
331.3	53.351	-0.618	-0.805	0	80.34	0	2.82	2.941	-0.121
331.4	53.419	-0.633	-1.035	0	79.17	0	2.822	2.944	-0.121
331.5	53.488	-0.633	-0.152	0	79.27	0	2.825	2.946	-0.121
331.6	53.568	-0.608	-0.48	0	79.15	0	2.827	2.948	-0.121
331.7	53.637	-0.608	-0.805	0	79.29	0	2.829	2.95	-0.121
331.8	53.699	-0.618	-0.89	0	79.24	0	2.831	2.952	-0.121
331.9	53.767	-0.618	-0.533	0	79.24	0	2.831	2.952	-0.121
332	53.836	-0.613	-0.222	0	79.25	0	2.836	2.957	-0.121
332.1	53.91	-0.598	-0.72	0	79.18	0	2.838	2.959	-0.121
332.2	53.985	-0.598	-1.024	0	79.33	0	2.84	2.961	-0.121
332.3	54.053	-0.595	-0.982	0	79.15	0	2.842	2.963	-0.121
332.4	54.121	-0.593	-0.583	0	79.26	0	2.844	2.966	-0.121
332.5	54.184	-0.593	-0.865	0	79.13	0	2.847	2.968	-0.121
332.6	54.246	-0.598	-0.494	0	79.23	0	2.849	2.97	-0.121
332.7	54.314	-0.598	-0.523	0	79.15	0	2.851	2.972	-0.121
332.8	54.389	-0.605	-0.523	0	79.11	0	2.853	2.974	-0.121
332.9	54.451	-0.603	-0.551	0	79.16	0	2.855	2.977	-0.121
333	54.519	-0.605	-0.611	0	79.03	0	2.858	2.979	-0.121

333.1	54.581	-0.605	-0.908	0	79.11	0	2.86	2.981	-0.121
333.2	54.643	-0.603	-0.434	0	78.99	0	2.862	2.983	-0.121
333.3	54.706	-0.588	-0.653	0	79.1	0	2.864	2.985	-0.121
333.4	54.78	-0.588	-1.052	0	79.08	0	2.866	2.988	-0.121
333.5	54.842	-0.6	-1.024	0	78.96	0	2.869	2.99	-0.121
333.6	54.904	-0.638	-0.205	0	79.09	0	2.871	2.992	-0.121
333.7	54.966	-0.638	-0.434	0	78.13	0	2.873	2.994	-0.121
333.8	55.035	-0.585	-1.321	0	74.85	0	2.875	2.996	-0.121
333.9	55.091	-0.588	-1.434	0	72.84	0	2.877	2.998	-0.121
334	55.153	-0.588	-0.819	0	71.79	0	2.879	3	-0.121
334.1	55.203	-0.605	-0.494	0	71.97	0	2.881	3.002	-0.121
334.2	55.259	-0.618	-0.653	0	72.47	0	2.883	3.004	-0.121
334.3	55.308	-0.618	-0.653	0	73.2	0	2.885	3.006	-0.121
334.4	55.364	-0.613	-0.318	0	74.22	0	2.887	3.008	-0.121
334.5	55.42	-0.613	-0.904	0	75.03	0	2.889	3.01	-0.121
334.6	55.482	-0.603	-1.148	0	75.09	0	2.891	3.012	-0.121
334.7	55.532	-0.603	-1.19	0	75.16	0	2.893	3.015	-0.121
334.8	55.588	-0.603	-1.19	0	75.8	0	2.896	3.017	-0.121
334.9	55.65	-0.603	-0.957	0	76.3	0	2.898	3.019	-0.121
335	55.706	-0.613	-0.378	0	76.36	0	2.9	3.021	-0.121
335.1	55.762	-0.613	-0.611	0	77.55	0	2.902	3.023	-0.121
335.2	55.83	-0.613	-0.819	0	78.75	0	2.904	3.025	-0.121
335.3	55.88	-0.608	-1.218	0	80.59	0	2.906	3.027	-0.121
335.4	55.954	-0.618	-0.805	0	81.28	0	2.909	3.03	-0.121
335.5	56.01	-0.618	-0.364	0	81.27	0	2.911	3.032	-0.121
335.6	56.079	-0.6	-0.89	0	81.21	0	2.913	3.034	-0.121
335.7	56.141	-0.6	-0.982	0	81.27	0	2.915	3.037	-0.121
335.8	56.203	-0.595	-1.067	0	81.27	0	2.918	3.039	-0.121
335.9	56.271	-0.618	-0.639	0	81.17	0	2.92	3.041	-0.121
336	56.334	-0.615	-0.494	0	79.96	0	2.922	3.043	-0.121
336.1	56.396	-0.615	-0.562	0	79.96	0	2.922	3.043	-0.121
336.2	56.458	-0.603	-1.307	0	79.99	0	2.927	3.048	-0.121
336.3	56.526	-0.605	-0.805	0	80.17	0	2.929	3.05	-0.121
336.4	56.576	-0.605	-0.653	0	79.62	0	2.931	3.052	-0.121
336.5	56.638	-0.605	-0.865	0	78.88	0	2.933	3.054	-0.121
336.6	56.706	-0.608	-0.862	0	77.66	0	2.935	3.056	-0.121
336.7	56.762	-0.608	-0.318	0	75.29	0	2.937	3.059	-0.121
336.8	56.812	-0.608	-0.819	0	73.57	0	2.939	3.061	-0.121
336.9	56.868	-0.603	-0.639	0	71.08	0	2.941	3.063	-0.121
337	56.911	-0.603	-0.865	0	64.62	0	2.943	3.064	-0.121
337.1	56.955	-0.6	-0.653	0	53.98	0	2.945	3.066	-0.121
337.2	56.98	-0.603	-1.155	0	47.6	0	2.946	3.067	-0.121
337.3	56.992	-0.603	-0.332	0	44.37	0	2.947	3.068	-0.121
337.4	56.998	-0.613	-0.653	0	41.97	0	2.948	3.07	-0.121
337.5	57.005	-0.613	-0.523	0	39.97	0	2.95	3.071	-0.121
337.6	57.005	-0.593	-0.494	0	37.8	0	2.951	3.072	-0.121
337.7	56.998	-0.593	-0.653	0	37.4	0	2.952	3.073	-0.121

337.8	56.998	-0.59	-0.653	0	37.04	0	2.953	3.074	-0.121
337.9	56.992	-0.59	-0.904	0	37.04	0	2.954	3.075	-0.121
338	56.986	-0.608	-0.784	0	36.99	0	2.955	3.076	-0.121
338.1	56.986	-0.603	-0.403	0	37.24	0	2.956	3.077	-0.121
338.2	56.98	-0.603	-0.622	0	38.64	0	2.957	3.078	-0.121
338.3	56.98	-0.598	-0.982	0	40.87	0	2.958	3.079	-0.121
338.4	56.98	-0.603	-0.653	0	44.01	0	2.959	3.08	-0.121
338.5	56.986	-0.603	-0.639	0	46.97	0	2.961	3.082	-0.121
338.6	56.992	-0.605	-0.388	0	50.03	0	2.962	3.083	-0.121
338.7	57.011	-0.605	-0.509	0	50.86	0	2.963	3.084	-0.121
338.8	57.023	-0.598	-0.537	0	50.91	0	2.965	3.086	-0.121
338.9	57.042	-0.6	-1.391	0	50.87	0	2.966	3.087	-0.121
339	57.061	-0.595	-0.48	0	50.96	0	2.968	3.089	-0.121
339.1	57.073	-0.595	-0.332	0	50.91	0	2.969	3.09	-0.121
339.2	57.092	-0.585	-1.232	0	50.95	0	2.97	3.092	-0.121
339.3	57.11	-0.613	-0.819	0	50.98	0	2.972	3.093	-0.121
339.4	57.123	-0.613	0.162	0	51.78	0	2.973	3.094	-0.121
339.5	57.141	-0.595	-0.523	0	53.61	0	2.975	3.096	-0.121
339.6	57.166	-0.595	-1.307	0	55.03	0	2.976	3.097	-0.121
339.7	57.185	-0.595	-0.982	0	58.46	0	2.978	3.099	-0.121
339.8	57.21	-0.6	-0.537	0	58.94	0	2.98	3.101	-0.121
339.9	57.241	-0.608	-0.727	0	58.98	0	2.981	3.102	-0.121
340	57.266	-0.608	-0.466	0	58.78	0	2.983	3.104	-0.121
340.1	57.297	-0.62	-0.494	0	58.73	0	2.984	3.106	-0.121
340.2	57.328	-0.628	-0.583	0	58.74	0	2.986	3.107	-0.121
340.3	57.353	-0.628	-0.639	0	58.74	0	2.986	3.107	-0.121
340.4	57.377	-0.613	-0.48	0	58.83	0	2.989	3.11	-0.121
340.5	57.408	-0.613	-0.816	0	58.89	0	2.991	3.112	-0.121
340.6	57.44	-0.61	-0.819	0	58.94	0	2.993	3.114	-0.121
340.7	57.458	-0.61	-0.194	0	58.9	0	2.994	3.115	-0.121
340.8	57.489	-0.625	-0.109	0	59.42	0	2.996	3.117	-0.121
340.9	57.52	-0.625	-0.653	0	59.76	0	2.998	3.119	-0.121
341	57.545	-0.615	-1.148	0	59.77	0	2.999	3.12	-0.121
341.1	57.576	-0.595	-0.59	0	59.79	0	3.001	3.122	-0.121
341.2	57.607	-0.595	-1.148	0	59.85	0	3.003	3.124	-0.121
341.3	57.632	-0.595	-1.052	0	59.88	0	3.004	3.125	-0.121
341.4	57.663	-0.593	-0.653	0	59.89	0	3.006	3.127	-0.121
341.5	57.688	-0.593	-1.148	0	59.88	0	3.008	3.129	-0.121
341.6	57.719	-0.605	-0.494	0	59.86	0	3.009	3.13	-0.121
341.7	57.75	-0.605	-0.622	0	59.57	0	3.011	3.132	-0.121
341.8	57.775	-0.61	-0.622	0	58.36	0	3.012	3.134	-0.121
341.9	57.8	-0.625	-0.466	0	55.73	0	3.014	3.135	-0.121
342	57.825	-0.608	-0.166	0	53.22	0	3.015	3.137	-0.121
342.1	57.843	-0.608	-0.982	0	50.69	0	3.017	3.138	-0.121
342.2	57.856	-0.613	-0.833	0	50.17	0	3.018	3.139	-0.121
342.3	57.868	-0.615	-0.509	0	50.09	0	3.02	3.141	-0.121
342.4	57.887	-0.615	-0.494	0	50.02	0	3.021	3.142	-0.121

342.5	57.899	-0.613	-0.865	0	49.93	0	3.022	3.144	-0.121
342.6	57.912	-0.598	-0.833	0	50.83	0	3.024	3.145	-0.121
342.7	57.924	-0.598	-0.982	0	51.75	0	3.025	3.146	-0.121
342.8	57.943	-0.598	-0.819	0	52.13	0	3.027	3.148	-0.121
342.9	57.955	-0.588	-0.448	0	53.12	0	3.028	3.149	-0.121
343	57.974	-0.588	-0.833	0	53.55	0	3.03	3.151	-0.121
343.1	57.993	-0.598	-0.879	0	55.5	0	3.031	3.152	-0.121
343.2	58.011	-0.59	-0.494	0	56.51	0	3.033	3.154	-0.121
343.3	58.036	-0.59	-0.636	0	56.9	0	3.034	3.156	-0.121
343.4	58.061	-0.588	-1.162	0	56.82	0	3.036	3.157	-0.121
343.5	58.08	-0.588	-0.653	0	56.68	0	3.038	3.159	-0.121
343.6	58.111	-0.598	-0.653	0	56.65	0	3.039	3.16	-0.121
343.7	58.129	-0.598	-0.699	0	56.71	0	3.041	3.162	-0.121
343.8	58.148	-0.598	-0.699	0	56.73	0	3.042	3.163	-0.121
343.9	58.173	-0.598	-0.685	0	56.73	0	3.044	3.165	-0.121
344	58.198	-0.603	-0.583	0	56.78	0	3.045	3.167	-0.121
344.1	58.216	-0.608	-0.579	0	56.79	0	3.047	3.168	-0.121
344.2	58.241	-0.608	-0.583	0	56.85	0	3.049	3.17	-0.121
344.3	58.26	-0.585	-0.554	0	56.87	0	3.05	3.171	-0.121
344.4	58.285	-0.585	-1.148	0	56.86	0	3.052	3.173	-0.121
344.5	58.309	-0.585	-0.819	0	56.86	0	3.052	3.173	-0.121
344.6	58.328	-0.6	-0.392	0	56.89	0	3.055	3.176	-0.121
344.7	58.353	-0.6	-0.667	0	56.62	0	3.057	3.178	-0.121
344.8	58.372	-0.615	-0.667	0	56.72	0	3.058	3.179	-0.121
344.9	58.396	-0.61	-0.18	0	56.67	0	3.06	3.181	-0.121
345	58.421	-0.598	-0.865	0	56.74	0	3.061	3.182	-0.121
345.1	58.44	-0.598	-1.321	0	56.77	0	3.063	3.184	-0.121
345.2	58.459	-0.6	-0.424	0	56.75	0	3.064	3.186	-0.121
345.3	58.483	-0.593	-0.713	0	56.82	0	3.066	3.187	-0.121
345.4	58.502	-0.593	-1.247	0	56.8	0	3.068	3.189	-0.121
345.5	58.527	-0.595	-0.569	0	56.8	0	3.069	3.19	-0.121
345.6	58.546	-0.603	-0.579	0	56.87	0	3.071	3.192	-0.121
345.7	58.564	-0.603	-0.752	0	56.82	0	3.072	3.193	-0.121
345.8	58.589	-0.6	-0.332	0	56.6	0	3.074	3.195	-0.121
345.9	58.608	-0.6	-0.833	0	55.45	0	3.075	3.197	-0.121
346	58.633	-0.6	-0.823	0	53.43	0	3.077	3.198	-0.121
346.1	58.645	-0.608	-0.908	0	51.07	0	3.078	3.199	-0.121
346.2	58.664	-0.6	-0.509	0	49.94	0	3.08	3.201	-0.121
346.3	58.67	-0.6	-0.996	0	50	0	3.081	3.202	-0.121
346.4	58.689	-0.583	-0.653	0	49.92	0	3.082	3.204	-0.121
346.5	58.695	-0.583	-0.936	0	48.93	0	3.084	3.205	-0.121
346.6	58.701	-0.598	-0.752	0	48.98	0	3.085	3.206	-0.121
346.7	58.72	-0.598	-1.451	0	49.02	0	3.087	3.208	-0.121
346.8	58.726	-0.593	-1.338	0	48.99	0	3.088	3.209	-0.121
346.9	58.732	-0.593	-0.879	0	49.03	0	3.089	3.21	-0.121
347	58.744	-0.598	-0.607	0	49.08	0	3.091	3.212	-0.121
347.1	58.751	-0.6	-0.996	0	49	0	3.092	3.213	-0.121

347.2	58.763	-0.6	-0.879	0	49.05	0	3.093	3.214	-0.121
347.3	58.776	-0.605	-0.876	0	49.11	0	3.095	3.216	-0.121
347.4	58.782	-0.608	-0.611	0	49.01	0	3.096	3.217	-0.121
347.5	58.794	-0.608	-0.18	0	49.12	0	3.097	3.219	-0.121
347.6	58.807	-0.613	-0.833	0	49.1	0	3.099	3.22	-0.121
347.7	58.813	-0.613	-0.509	0	49.06	0	3.1	3.221	-0.121
347.8	58.825	-0.623	-0.509	0	49.11	0	3.102	3.223	-0.121
347.9	58.831	-0.618	-1.148	0	49.09	0	3.103	3.224	-0.121
348	58.844	-0.61	-1.024	0	49.04	0	3.104	3.225	-0.121
348.1	58.85	-0.61	-0.639	0	49.14	0	3.106	3.227	-0.121
348.2	58.856	-0.608	-1.056	0	49.05	0	3.107	3.228	-0.121
348.3	58.869	-0.61	-0.752	0	49.14	0	3.108	3.229	-0.121
348.4	58.875	-0.61	-0.194	0	49.14	0	3.11	3.231	-0.121
348.5	58.881	-0.593	-1.176	0	49.11	0	3.111	3.232	-0.121
348.6	58.887	-0.585	-0.837	0	49.21	0	3.112	3.234	-0.121
348.7	58.9	-0.585	-0.833	0	49.21	0	3.112	3.234	-0.121
348.8	58.906	-0.58	-0.713	0	49.21	0	3.115	3.236	-0.121
348.9	58.912	-0.593	-0.766	0	49.18	0	3.117	3.238	-0.121
349	58.925	-0.593	-0.268	0	49.23	0	3.118	3.239	-0.121
349.1	58.937	-0.595	-0.537	0	49.18	0	3.119	3.24	-0.121
349.2	58.943	-0.593	-0.667	0	49.08	0	3.121	3.242	-0.121
349.3	58.949	-0.593	-1.095	0	48.97	0	3.122	3.243	-0.121
349.4	58.962	-0.595	-0.727	0	48.91	0	3.123	3.244	-0.121
349.5	58.968	-0.595	-0.667	0	48.99	0	3.125	3.246	-0.121
349.6	58.974	-0.6	-1.01	0	48.93	0	3.126	3.247	-0.121
349.7	58.987	-0.6	-0.332	0	49.01	0	3.127	3.249	-0.121
349.8	58.993	-0.6	-0.332	0	48.97	0	3.129	3.25	-0.121
349.9	59.005	-0.6	-0.851	0	47.82	0	3.13	3.251	-0.121
350	59.012	-0.583	-0.851	0	45.98	0	3.131	3.253	-0.121
350.1	59.012	-0.59	-1.056	0	43.41	0	3.133	3.254	-0.121
350.2	59.018	-0.59	-0.685	0	41.87	0	3.134	3.255	-0.121
350.3	59.018	-0.603	-0.523	0	40.78	0	3.135	3.256	-0.121
350.4	59.018	-0.608	-0.551	0	39.96	0	3.136	3.257	-0.121
350.5	59.012	-0.608	-0.346	0	39.1	0	3.137	3.258	-0.121
350.6	59.005	-0.605	-0.851	0	38.17	0	3.138	3.259	-0.121
350.7	58.999	-0.605	-0.812	0	37.33	0	3.139	3.26	-0.121
350.8	58.993	-0.603	-0.727	0	36.53	0	3.14	3.261	-0.121
350.9	58.981	-0.6	-0.685	0	35.74	0	3.141	3.262	-0.121
351	58.974	-0.595	-0.727	0	34.8	0	3.142	3.263	-0.121
351.1	58.962	-0.595	-0.851	0	33.81	0	3.143	3.264	-0.121
351.2	58.949	-0.585	-0.893	0	33.19	0	3.144	3.265	-0.121
351.3	58.937	-0.59	-0.982	0	32.28	0	3.145	3.266	-0.121
351.4	58.918	-0.59	-0.593	0	31.37	0	3.146	3.267	-0.121
351.5	58.906	-0.61	-0.685	0	29.68	0	3.147	3.268	-0.121
351.6	58.881	-0.608	-0.523	0	27.65	0	3.147	3.269	-0.121
351.7	58.862	-0.608	-0.102	0	26.75	0	3.148	3.269	-0.121
351.8	58.838	-0.603	-1.102	0	26.27	0	3.149	3.27	-0.121

351.9	58.813	-0.598	-0.523	0	26.19	0	3.15	3.271	-0.121
352	58.794	-0.598	-0.6	0	26.17	0	3.15	3.271	-0.121
352.1	58.769	-0.595	-0.975	0	26.52	0	3.151	3.272	-0.121
352.2	58.744	-0.598	-0.727	0	26.96	0	3.152	3.273	-0.121
352.3	58.72	-0.598	-0.523	0	26.88	0	3.153	3.274	-0.121
352.4	58.695	-0.61	-0.565	0	26.98	0	3.153	3.274	-0.121
352.5	58.676	-0.61	-0.378	0	26.88	0	3.154	3.275	-0.121
352.6	58.651	-0.603	-0.523	0	26.87	0	3.155	3.276	-0.121
352.7	58.626	-0.603	-0.685	0	26.9	0	3.156	3.277	-0.121
352.8	58.608	-0.595	-0.77	0	26.83	0	3.156	3.277	-0.121
352.9	58.583	-0.595	-1.141	0	26.83	0	3.156	3.277	-0.121
353	58.558	-0.603	-0.378	0	26.86	0	3.158	3.279	-0.121
353.1	58.539	-0.608	-1.024	0	26.83	0	3.159	3.28	-0.121
353.2	58.515	-0.608	-0.406	0	27.23	0	3.159	3.28	-0.121
353.3	58.49	-0.613	-0.858	0	27.28	0	3.16	3.281	-0.121
353.4	58.471	-0.608	-0.569	0	28.01	0	3.161	3.282	-0.121
353.5	58.446	-0.608	-0.653	0	27.98	0	3.162	3.283	-0.121
353.6	58.434	-0.618	-1.024	0	28.33	0	3.162	3.284	-0.121
353.7	58.409	-0.618	-0.569	0	28.21	0	3.163	3.284	-0.121
353.8	58.39	-0.623	-0.569	0	28.29	0	3.164	3.285	-0.121
353.9	58.372	-0.6	-0.865	0	28.23	0	3.165	3.286	-0.121
354	58.353	-0.598	-1.01	0	28.39	0	3.166	3.287	-0.121
354.1	58.328	-0.598	-1.321	0	29.02	0	3.166	3.287	-0.121
354.2	58.316	-0.6	-0.583	0	28.97	0	3.167	3.288	-0.121
354.3	58.291	-0.608	-0.622	0	29.15	0	3.168	3.289	-0.121
354.4	58.272	-0.608	-0.607	0	29.69	0	3.169	3.29	-0.121
354.5	58.254	-0.605	-0.537	0	30.9	0	3.17	3.291	-0.121
354.6	58.241	-0.585	-0.685	0	31.59	0	3.171	3.292	-0.121
354.7	58.222	-0.585	-1.109	0	31.73	0	3.171	3.293	-0.121
354.8	58.21	-0.643	-0.833	0	31.68	0	3.172	3.293	-0.121
354.9	58.191	-0.628	0.562	0	31.67	0	3.173	3.294	-0.121
355	58.173	-0.628	-0.035	0	32.39	0	3.174	3.295	-0.121
355.1	58.16	-0.6	-1.706	0	32.39	0	3.175	3.296	-0.121
355.2	58.142	-0.593	-0.537	0	32.37	0	3.176	3.297	-0.121
355.3	58.129	-0.593	-0.579	0	32.38	0	3.177	3.298	-0.121
355.4	58.117	-0.61	-1.056	0	32.38	0	3.178	3.299	-0.121
355.5	58.104	-0.61	-0.297	0	32.35	0	3.179	3.3	-0.121
355.6	58.092	-0.595	-0.671	0	32.38	0	3.179	3.301	-0.121
355.7	58.08	-0.595	-0.908	0	32.31	0	3.18	3.301	-0.121
355.8	58.061	-0.595	-0.908	0	32.37	0	3.181	3.302	-0.121
355.9	58.055	-0.595	-0.625	0	32.29	0	3.182	3.303	-0.121
356	58.042	-0.595	-0.636	0	32.39	0	3.183	3.304	-0.121
356.1	58.024	-0.6	-0.798	0	32.4	0	3.184	3.305	-0.121
356.2	58.017	-0.6	-1.095	0	33.77	0	3.185	3.306	-0.121
356.3	57.999	-0.595	-0.194	0	33.73	0	3.186	3.307	-0.121
356.4	57.993	-0.598	-0.95	0	33.83	0	3.187	3.308	-0.121
356.5	57.98	-0.598	-1.024	0	33.7	0	3.188	3.309	-0.121

356.6	57.968	-0.59	-0.378	0	33.81	0	3.189	3.31	-0.121
356.7	57.962	-0.59	-0.639	0	33.68	0	3.19	3.311	-0.121
356.8	57.949	-0.595	-0.72	0	33.82	0	3.19	3.312	-0.121
356.9	57.937	-0.593	-0.699	0	34	0	3.191	3.313	-0.121
357	57.93	-0.578	-0.699	0	34.16	0	3.192	3.314	-0.121
357.1	57.918	-0.578	-1.01	0	34.16	0	3.192	3.314	-0.121
357.2	57.906	-0.598	-0.908	0	33.47	0	3.194	3.315	-0.121
357.3	57.893	-0.615	-0.667	0	33.44	0	3.195	3.316	-0.121
357.4	57.881	-0.615	0.035	0	33.45	0	3.196	3.317	-0.121
357.5	57.868	-0.598	-0.537	0	33.46	0	3.197	3.318	-0.121
357.6	57.862	-0.59	-1.218	0	32.9	0	3.198	3.319	-0.121
357.7	57.843	-0.59	-0.819	0	32.73	0	3.199	3.32	-0.121
357.8	57.837	-0.61	-0.992	0	32.21	0	3.2	3.321	-0.121
357.9	57.825	-0.6	-0.194	0	31.42	0	3.201	3.322	-0.121
358	57.806	-0.6	-0.784	0	30.76	0	3.201	3.323	-0.121
358.1	57.794	-0.6	-0.95	0	30.25	0	3.202	3.323	-0.121
358.2	57.775	-0.603	-0.742	0	29.6	0	3.203	3.324	-0.121
358.3	57.763	-0.603	-0.523	0	28.34	0	3.204	3.325	-0.121
358.4	57.744	-0.593	-1.07	0	27.51	0	3.205	3.326	-0.121
358.5	57.719	-0.593	-0.713	0	27.5	0	3.205	3.327	-0.121
358.6	57.701	-0.603	-0.378	0	27.44	0	3.206	3.327	-0.121
358.7	57.688	-0.603	-0.865	0	27.51	0	3.207	3.328	-0.121
358.8	57.663	-0.618	-0.837	0	27.42	0	3.208	3.329	-0.121
358.9	57.645	-0.618	-0.699	0	27.48	0	3.209	3.33	-0.121
359	57.626	-0.603	-0.12	0	27.46	0	3.209	3.33	-0.121
359.1	57.607	-0.603	-1.367	0	27.72	0	3.21	3.331	-0.121
359.2	57.582	-0.603	-0.742	0	28.25	0	3.211	3.332	-0.121
359.3	57.57	-0.598	-0.936	0	28.3	0	3.212	3.333	-0.121
359.4	57.551	-0.6	-0.826	0	29.22	0	3.212	3.334	-0.121
359.5	57.533	-0.6	-0.583	0	29.63	0	3.213	3.334	-0.121
359.6	57.52	-0.613	-0.784	0	30.19	0	3.214	3.335	-0.121
359.7	57.502	-0.613	-0.226	0	30.88	0	3.215	3.336	-0.121
359.8	57.489	-0.63	-0.226	0	33.16	0	3.216	3.337	-0.121
359.9	57.477	-0.603	-0.583	0	34.27	0	3.217	3.338	-0.121
360	57.464	-0.598	-0.819	0	35.53	0	3.218	3.339	-0.121
360.1	57.458	-0.598	-1.07	0	35.46	0	3.219	3.34	-0.121
360.2	57.458	-0.6	-0.537	0	35.54	0	3.22	3.341	-0.121
360.3	57.446	-0.595	-0.636	0	35.5	0	3.221	3.342	-0.121
360.4	57.44	-0.595	-0.784	0	35.53	0	3.222	3.343	-0.121
360.5	57.433	-0.608	-0.727	0	35.46	0	3.223	3.344	-0.121
360.6	57.427	-0.623	-0.625	0	35.57	0	3.224	3.345	-0.121
360.7	57.421	-0.623	-0.24	0	34.95	0	3.225	3.346	-0.121
360.8	57.415	-0.615	-0.304	0	33.81	0	3.226	3.347	-0.121
360.9	57.402	-0.61	-1.084	0	32.25	0	3.227	3.348	-0.121
361	57.396	-0.61	-0.307	0	30.37	0	3.227	3.349	-0.121
361.1	57.377	-0.598	-1.024	0	29.03	0	3.228	3.349	-0.121
361.2	57.359	-0.6	-1.25	0	28.21	0	3.229	3.35	-0.121

361.3	57.346	-0.6	-0.392	0	28.21	0	3.229	3.35	-0.121
361.4	57.328	-0.598	-0.823	0	28.06	0	3.231	3.352	-0.121
361.5	57.309	-0.598	-0.537	0	28.15	0	3.231	3.352	-0.121
361.6	57.29	-0.58	-0.551	0	28.02	0	3.232	3.353	-0.121
361.7	57.272	-0.58	-0.434	0	28.12	0	3.233	3.354	-0.121
361.8	57.253	-0.608	-0.434	0	28.01	0	3.234	3.355	-0.121
361.9	57.235	-0.608	-0.742	0	28.17	0	3.234	3.356	-0.121
362	57.216	-0.605	-0.551	0	28.24	0	3.235	3.356	-0.121
362.1	57.203	-0.593	-0.537	0	28.26	0	3.236	3.357	-0.121
362.2	57.179	-0.593	-1.25	0	28.24	0	3.237	3.358	-0.121
362.3	57.166	-0.59	-0.597	0	28.18	0	3.238	3.359	-0.121
362.4	57.148	-0.608	-0.791	0	28.24	0	3.238	3.359	-0.121
362.5	57.129	-0.608	-0.537	0	28.15	0	3.239	3.36	-0.121
362.6	57.104	-0.593	-0.226	0	28.77	0	3.24	3.361	-0.121
362.7	57.085	-0.593	-0.922	0	28.86	0	3.241	3.362	-0.121
362.8	57.073	-0.588	-0.978	0	29.09	0	3.242	3.363	-0.121
362.9	57.054	-0.61	-0.551	0	29.56	0	3.242	3.363	-0.121
363	57.036	-0.6	-0.148	0	30.38	0	3.243	3.364	-0.121
363.1	57.023	-0.6	-1.321	0	30.59	0	3.244	3.365	-0.121
363.2	57.011	-0.615	-0.699	0	31.39	0	3.245	3.366	-0.121
363.3	56.992	-0.61	-0.392	0	32.81	0	3.246	3.367	-0.121
363.4	56.986	-0.61	-0.685	0	33.58	0	3.247	3.368	-0.121
363.5	56.98	-0.625	-0.636	0	33.81	0	3.248	3.369	-0.121
363.6	56.967	-0.635	-0.607	0	34.56	0	3.249	3.37	-0.121
363.7	56.961	-0.635	-0.611	0	35.76	0	3.25	3.371	-0.121
363.8	56.955	-0.603	-0.713	0	36.23	0	3.251	3.372	-0.121
363.9	56.949	-0.608	-1.123	0	36.93	0	3.252	3.373	-0.121
364	56.942	-0.608	-1.01	0	37.57	0	3.253	3.374	-0.121
364.1	56.942	-0.615	-0.713	0	38.01	0	3.254	3.375	-0.121
364.2	56.942	-0.6	-0.713	0	38.66	0	3.255	3.376	-0.121
364.3	56.936	-0.6	-0.791	0	38.65	0	3.256	3.377	-0.121
364.4	56.942	-0.58	-1.01	0	38.65	0	3.257	3.378	-0.121
364.5	56.936	-0.58	-0.879	0	38.64	0	3.258	3.379	-0.121
364.6	56.936	-0.613	-0.378	0	38.62	0	3.259	3.38	-0.121
364.7	56.936	-0.613	-0.551	0	38.67	0	3.26	3.381	-0.121
364.8	56.936	-0.615	-0.551	0	38.6	0	3.261	3.382	-0.121
364.9	56.936	-0.615	-0.699	0	38.68	0	3.262	3.384	-0.121
365	56.936	-0.6	-0.713	0	38.6	0	3.263	3.385	-0.121
365.1	56.93	-0.605	-0.879	0	38.7	0	3.265	3.386	-0.121
365.2	56.93	-0.605	-0.551	0	38.58	0	3.266	3.387	-0.121
365.3	56.93	-0.605	-0.636	0	38.67	0	3.267	3.388	-0.121
365.4	56.93	-0.608	-0.65	0	38.61	0	3.268	3.389	-0.121
365.5	56.93	-0.608	-0.851	0	38.61	0	3.268	3.389	-0.121
365.6	56.93	-0.62	-0.237	0	38.62	0	3.27	3.391	-0.121
365.7	56.93	-0.62	-0.78	0	38.63	0	3.271	3.392	-0.121
365.8	56.924	-0.613	-0.756	0	38.63	0	3.272	3.393	-0.121
365.9	56.924	-0.598	-1.01	0	38.61	0	3.273	3.394	-0.121

366	56.924	-0.635	-1.406	0	38.66	0	3.274	3.395	-0.121
366.1	56.918	-0.635	0.092	0	38.57	0	3.275	3.396	-0.121
366.2	56.924	-0.615	-0.283	0	38.68	0	3.276	3.397	-0.121
366.3	56.918	-0.625	-1.575	0	38.59	0	3.277	3.399	-0.121
366.4	56.918	-0.625	-0.632	0	38.66	0	3.278	3.4	-0.121
366.5	56.918	-0.605	-0.565	0	38.58	0	3.28	3.401	-0.121
366.6	56.911	-0.588	-0.833	0	38.62	0	3.281	3.402	-0.121
366.7	56.911	-0.588	-1.367	0	38.65	0	3.282	3.403	-0.121
366.8	56.911	-0.61	-0.364	0	38.61	0	3.283	3.404	-0.121
366.9	56.911	-0.593	-0.212	0	38.68	0	3.284	3.405	-0.121
367	56.905	-0.593	-1.038	0	38.58	0	3.285	3.406	-0.121
367.1	56.911	-0.608	-1.127	0	38.67	0	3.286	3.407	-0.121
367.2	56.905	-0.605	-0.078	0	38.57	0	3.287	3.408	-0.121
367.3	56.899	-0.605	-0.798	0	38.64	0	3.288	3.409	-0.121
367.4	56.905	-0.62	-1.038	0	38.56	0	3.289	3.41	-0.121
367.5	56.899	-0.62	-0.198	0	38.66	0	3.29	3.411	-0.121
367.6	56.899	-0.598	-0.798	0	38.6	0	3.291	3.412	-0.121
367.7	56.899	-0.598	-0.667	0	38.66	0	3.292	3.414	-0.121
367.8	56.893	-0.613	-0.611	0	38.65	0	3.294	3.415	-0.121
367.9	56.887	-0.613	-0.392	0	38.61	0	3.295	3.416	-0.121
368	56.893	-0.603	-0.992	0	38.67	0	3.296	3.417	-0.121
368.1	56.887	-0.605	-0.713	0	38.6	0	3.297	3.418	-0.121
368.2	56.887	-0.605	-0.978	0	38.68	0	3.298	3.419	-0.121
368.3	56.887	-0.628	-0.035	0	38.58	0	3.299	3.42	-0.121
368.4	56.88	-0.64	-0.463	0	38.68	0	3.3	3.421	-0.121
368.5	56.88	-0.64	-0.893	0	38.6	0	3.301	3.422	-0.121
368.6	56.88	-0.625	-0.237	0	38.67	0	3.302	3.423	-0.121
368.7	56.88	-0.625	-1.024	0	38.59	0	3.303	3.424	-0.121
368.8	56.874	-0.62	-1.052	0	38.64	0	3.304	3.425	-0.121
368.9	56.88	-0.6	-0.364	0	38.57	0	3.305	3.426	-0.121
369	56.874	-0.598	-0.893	0	38.62	0	3.306	3.428	-0.121
369.1	56.874	-0.598	-1.109	0	38.62	0	3.307	3.429	-0.121
369.2	56.874	-0.623	-0.463	0	38.58	0	3.309	3.43	-0.121
369.3	56.874	-0.63	-0.212	0	38.64	0	3.31	3.431	-0.121
369.4	56.874	-0.63	-0.992	0	38.58	0	3.311	3.432	-0.121
369.5	56.874	-0.608	-0.406	0	38.66	0	3.312	3.433	-0.121
369.6	56.874	-0.583	-0.848	0	38.59	0	3.313	3.434	-0.121
369.7	56.868	-0.583	-1.769	0	38.59	0	3.313	3.434	-0.121
369.8	56.874	-0.605	-0.908	0	38.59	0	3.315	3.436	-0.121
369.9	56.868	-0.61	-0.148	0	38.63	0	3.316	3.437	-0.121
370	56.868	-0.61	-0.713	0	38.61	0	3.317	3.438	-0.121
370.1	56.868	-0.61	-0.431	0	38.58	0	3.318	3.439	-0.121
370.2	56.868	-0.6	-0.607	0	39.09	0	3.319	3.44	-0.121
370.3	56.868	-0.6	-0.865	0	39.37	0	3.32	3.441	-0.121
370.4	56.868	-0.603	-0.95	0	39.43	0	3.321	3.443	-0.121
370.5	56.868	-0.603	-0.784	0	39.32	0	3.323	3.444	-0.121
370.6	56.868	-0.613	-0.622	0	39.43	0	3.324	3.445	-0.121

370.7	56.868	-0.613	-0.625	0	39.34	0	3.325	3.446	-0.121
370.8	56.868	-0.613	-0.71	0	39.43	0	3.326	3.447	-0.121
370.9	56.868	-0.613	-0.851	0	39.34	0	3.327	3.448	-0.121
371	56.868	-0.61	-0.685	0	39.41	0	3.328	3.449	-0.121
371.1	56.868	-0.598	-0.392	0	39.34	0	3.329	3.45	-0.121
371.2	56.868	-0.598	-1.123	0	39.42	0	3.33	3.451	-0.121
371.3	56.868	-0.62	-0.95	0	39.39	0	3.331	3.452	-0.121
371.4	56.868	-0.608	-0.283	0	39.39	0	3.332	3.454	-0.121
371.5	56.868	-0.608	-0.403	0	39.4	0	3.333	3.455	-0.121
371.6	56.874	-0.62	-1.649	0	39.39	0	3.335	3.456	-0.121
371.7	56.874	-0.62	-0.078	0	39.44	0	3.336	3.457	-0.121
371.8	56.868	-0.633	-0.134	0	39.37	0	3.337	3.458	-0.121
371.9	56.874	-0.605	-0.908	0	39.41	0	3.338	3.459	-0.121
372	56.874	-0.598	-0.862	0	39.37	0	3.339	3.46	-0.121
372.1	56.868	-0.598	-1.024	0	39.47	0	3.34	3.461	-0.121
372.2	56.874	-0.603	-0.463	0	39.37	0	3.341	3.462	-0.121
372.3	56.874	-0.595	-0.667	0	39.47	0	3.342	3.463	-0.121
372.4	56.874	-0.595	-1.024	0	39.36	0	3.343	3.464	-0.121
372.5	56.874	-0.598	-0.537	0	39.58	0	3.344	3.466	-0.121
372.6	56.874	-0.618	-0.784	0	39.54	0	3.346	3.467	-0.121
372.7	56.874	-0.618	-0.392	0	39.63	0	3.347	3.468	-0.121
372.8	56.874	-0.603	-0.332	0	39.55	0	3.348	3.469	-0.121
372.9	56.874	-0.61	-1.275	0	39.6	0	3.349	3.47	-0.121
373	56.874	-0.61	-0.622	0	39.57	0	3.35	3.471	-0.121
373.1	56.874	-0.625	-0.537	0	39.6	0	3.351	3.472	-0.121
373.2	56.874	-0.615	-0.865	0	39.61	0	3.352	3.473	-0.121
373.3	56.874	-0.615	-0.699	0	39.54	0	3.353	3.474	-0.121
373.4	56.874	-0.595	-0.95	0	39.64	0	3.354	3.475	-0.121
373.5	56.874	-0.595	-0.773	0	39.52	0	3.355	3.477	-0.121
373.6	56.874	-0.62	-0.727	0	39.44	0	3.357	3.478	-0.121
373.7	56.874	-0.62	-0.448	0	39.41	0	3.358	3.479	-0.121
373.8	56.874	-0.598	-0.392	0	39.41	0	3.359	3.48	-0.121
373.9	56.874	-0.598	-1.441	0	39.41	0	3.359	3.48	-0.121
374	56.874	-0.603	-0.865	0	39.39	0	3.361	3.482	-0.121
374.1	56.874	-0.62	-0.667	0	39.45	0	3.362	3.483	-0.121
374.2	56.874	-0.62	-0.77	0	39.38	0	3.363	3.484	-0.121
374.3	56.874	-0.625	-0.311	0	39.46	0	3.364	3.485	-0.121
374.4	56.88	-0.605	-0.685	0	39.37	0	3.365	3.486	-0.121
374.5	56.874	-0.605	-1.151	0	39.4	0	3.366	3.488	-0.121
374.6	56.874	-0.61	-1.109	0	38.59	0	3.367	3.489	-0.121
374.7	56.88	-0.61	0.035	0	38.69	0	3.369	3.49	-0.121
374.8	56.874	-0.638	0.12	0	38.63	0	3.37	3.491	-0.121
374.9	56.874	-0.61	-0.537	0	38.61	0	3.371	3.492	-0.121
375	56.874	-0.62	-1.451	0	37.64	0	3.372	3.493	-0.121
375.1	56.874	-0.62	-0.364	0	37.66	0	3.373	3.494	-0.121
375.2	56.868	-0.598	0.035	0	37.68	0	3.374	3.495	-0.121
375.3	56.868	-0.59	-1.109	0	37.65	0	3.375	3.496	-0.121

375.4	56.868	-0.59	-1.303	0	37.7	0	3.376	3.497	-0.121
375.5	56.862	-0.603	-0.537	0	37.64	0	3.377	3.498	-0.121
375.6	56.862	-0.605	-0.145	0	37.68	0	3.378	3.499	-0.121
375.7	56.862	-0.605	-0.84	0	37.32	0	3.379	3.5	-0.121
375.8	56.855	-0.63	-0.537	0	36.95	0	3.38	3.501	-0.121
375.9	56.855	-0.633	-0.226	0	36.95	0	3.381	3.502	-0.121
376	56.849	-0.633	-0.713	0	36.93	0	3.382	3.503	-0.121
376.1	56.849	-0.615	-0.851	0	36.98	0	3.383	3.504	-0.121
376.2	56.843	-0.613	-0.671	0	36.89	0	3.384	3.505	-0.121
376.3	56.837	-0.613	-0.537	0	36.49	0	3.385	3.506	-0.121
376.4	56.831	-0.615	-0.653	0	35.66	0	3.386	3.507	-0.121
376.5	56.831	-0.615	-0.784	0	35.2	0	3.387	3.508	-0.121
376.6	56.818	-0.618	-0.092	0	34.07	0	3.388	3.509	-0.121
376.7	56.812	-0.618	-0.622	0	33.78	0	3.389	3.51	-0.121
376.8	56.8	-0.62	-0.622	0	32.85	0	3.39	3.511	-0.121
376.9	56.793	-0.62	-0.685	0	31.74	0	3.391	3.512	-0.121
377	56.781	-0.6	-0.537	0	30.74	0	3.392	3.513	-0.121
377.1	56.768	-0.608	-1.19	0	29.78	0	3.393	3.514	-0.121
377.2	56.756	-0.608	-0.798	0	29.36	0	3.393	3.514	-0.121
377.3	56.737	-0.615	-0.417	0	28.13	0	3.394	3.515	-0.121
377.4	56.725	-0.608	-0.597	0	27.62	0	3.395	3.516	-0.121
377.5	56.706	-0.608	-0.908	0	26.99	0	3.396	3.517	-0.121
377.6	56.688	-0.615	-0.95	0	26.82	0	3.396	3.517	-0.121
377.7	56.669	-0.615	-0.565	0	26.91	0	3.397	3.518	-0.121
377.8	56.65	-0.625	-0.537	0	26.78	0	3.398	3.519	-0.121
377.9	56.632	-0.63	-0.622	0	26.96	0	3.399	3.52	-0.121
378	56.613	-0.633	-0.378	0	27.05	0	3.399	3.52	-0.121
378.1	56.601	-0.633	-0.565	0	27.05	0	3.399	3.52	-0.121
378.2	56.582	-0.603	-0.812	0	27.05	0	3.401	3.522	-0.121
378.3	56.563	-0.615	-1.194	0	27.04	0	3.402	3.523	-0.121
378.4	56.545	-0.615	-0.378	0	27.04	0	3.402	3.523	-0.121
378.5	56.526	-0.608	-0.166	0	26.99	0	3.403	3.524	-0.121
378.6	56.507	-0.605	-1.109	0	27.05	0	3.404	3.525	-0.121
378.7	56.489	-0.605	-0.699	0	26.96	0	3.405	3.526	-0.121
378.8	56.47	-0.608	-0.699	0	27.02	0	3.405	3.526	-0.121
378.9	56.452	-0.595	-0.551	0	26.91	0	3.406	3.527	-0.121
379	56.433	-0.595	-1.25	0	27.02	0	3.407	3.528	-0.121
379.1	56.421	-0.603	-0.879	0	26.94	0	3.408	3.529	-0.121
379.2	56.396	-0.618	-0.127	0	26.98	0	3.408	3.529	-0.121
379.3	56.377	-0.618	-0.378	0	26.94	0	3.409	3.53	-0.121
379.4	56.365	-0.615	-0.392	0	26.9	0	3.41	3.531	-0.121
379.5	56.346	-0.615	-0.551	0	26.94	0	3.411	3.532	-0.121
379.6	56.327	-0.61	-0.614	0	26.89	0	3.411	3.532	-0.121
379.7	56.309	-0.61	-0.713	0	26.93	0	3.412	3.533	-0.121
379.8	56.29	-0.61	-0.713	0	26.83	0	3.413	3.534	-0.121
379.9	56.271	-0.61	-0.537	0	26.93	0	3.414	3.535	-0.121
380	56.259	-0.608	-0.653	0	26.83	0	3.414	3.535	-0.121

380.1	56.234	-0.603	-0.614	0	26.92	0	3.415	3.536	-0.121
380.2	56.222	-0.603	-0.865	0	26.82	0	3.416	3.537	-0.121
380.3	56.203	-0.643	-0.784	0	26.87	0	3.417	3.538	-0.121
380.4	56.184	-0.62	0.106	0	26.83	0	3.417	3.538	-0.121
380.5	56.166	-0.62	-1.218	0	26.82	0	3.418	3.539	-0.121
380.6	56.147	-0.578	-1.533	0	26.84	0	3.419	3.54	-0.121
380.7	56.128	-0.578	-0.477	0	26.79	0	3.42	3.541	-0.121
380.8	56.11	-0.603	-0.392	0	26.85	0	3.42	3.541	-0.121
380.9	56.091	-0.61	0.251	0	26.76	0	3.421	3.542	-0.121
381	56.079	-0.608	-0.742	0	26.81	0	3.422	3.543	-0.121
381.1	56.06	-0.608	-1.123	0	26.93	0	3.423	3.544	-0.121
381.2	56.041	-0.615	-0.696	0	27.28	0	3.423	3.544	-0.121
381.3	56.029	-0.635	-0.784	0	27.49	0	3.424	3.545	-0.121
381.4	56.01	-0.635	-0.311	0	28.37	0	3.425	3.546	-0.121
381.5	55.998	-0.613	-0.622	0	29.13	0	3.426	3.547	-0.121
381.6	55.986	-0.618	-1.232	0	30.44	0	3.426	3.548	-0.121
381.7	55.973	-0.618	-0.65	0	32.38	0	3.427	3.549	-0.121
381.8	55.967	-0.633	-0.463	0	33.89	0	3.428	3.549	-0.121
381.9	55.961	-0.615	-0.477	0	34.78	0	3.429	3.55	-0.121
382	55.954	-0.615	-0.713	0	35.4	0	3.43	3.551	-0.121
382.1	55.948	-0.623	-1.01	0	36.16	0	3.431	3.552	-0.121
382.2	55.948	-0.62	-0.42	0	36.1	0	3.432	3.553	-0.121
382.3	55.948	-0.62	-0.378	0	36.1	0	3.432	3.553	-0.121
382.4	55.942	-0.6	-1.321	0	36.09	0	3.434	3.555	-0.121
382.5	55.942	-0.6	-0.699	0	36.18	0	3.435	3.556	-0.121
382.6	55.942	-0.628	-0.699	0	36.55	0	3.436	3.557	-0.121
382.7	55.936	-0.628	0.021	0	38.3	0	3.437	3.559	-0.121
382.8	55.942	-0.633	0.078	0	39.8	0	3.438	3.56	-0.121
382.9	55.942	-0.633	-0.537	0	40.46	0	3.44	3.561	-0.121
383	55.942	-0.615	-1.589	0	41.33	0	3.441	3.562	-0.121
383.1	55.948	-0.63	-0.622	0	43.23	0	3.442	3.563	-0.121
383.2	55.954	-0.63	-0.162	0	44.96	0	3.443	3.564	-0.121
383.3	55.967	-0.603	-0.699	0	45.3	0	3.444	3.566	-0.121
383.4	55.979	-0.625	-1.466	0	45.28	0	3.446	3.567	-0.121
383.5	55.992	-0.625	-0.865	0	45.26	0	3.447	3.568	-0.121
383.6	56.004	-0.608	0.021	0	45.31	0	3.448	3.569	-0.121
383.7	56.01	-0.608	-1.314	0	45.4	0	3.45	3.571	-0.121
383.8	56.023	-0.593	-1.314	0	46.28	0	3.451	3.572	-0.121
383.9	56.035	-0.613	-0.491	0	46.4	0	3.452	3.573	-0.121
384	56.048	-0.623	-0.212	0	48.05	0	3.453	3.575	-0.121
384.1	56.06	-0.623	-0.378	0	47.92	0	3.455	3.576	-0.121
384.2	56.079	-0.61	-0.798	0	47.9	0	3.456	3.577	-0.121
384.3	56.091	-0.618	-0.756	0	47.67	0	3.457	3.579	-0.121
384.4	56.11	-0.618	-0.505	0	47.14	0	3.459	3.58	-0.121
384.5	56.122	-0.61	-0.307	0	47.17	0	3.46	3.581	-0.121
384.6	56.135	-0.608	-0.699	0	47.17	0	3.461	3.582	-0.121
384.7	56.153	-0.608	-0.766	0	47.22	0	3.463	3.584	-0.121

384.8	56.166	-0.6	-0.607	0	47.18	0	3.464	3.585	-0.121
384.9	56.178	-0.603	-0.908	0	47.27	0	3.465	3.586	-0.121
385	56.197	-0.603	-0.279	0	47.24	0	3.467	3.588	-0.121
385.1	56.209	-0.595	-0.837	0	47.34	0	3.468	3.589	-0.121
385.2	56.222	-0.598	-0.699	0	47.23	0	3.469	3.59	-0.121
385.3	56.234	-0.598	-0.565	0	47.35	0	3.471	3.592	-0.121
385.4	56.247	-0.615	-0.523	0	47.24	0	3.472	3.593	-0.121
385.5	56.265	-0.615	-0.364	0	47.36	0	3.473	3.594	-0.121
385.6	56.278	-0.608	-0.378	0	47.28	0	3.474	3.596	-0.121
385.7	56.29	-0.608	-0.406	0	47.37	0	3.476	3.597	-0.121
385.8	56.302	-0.62	-0.463	0	47.33	0	3.477	3.598	-0.121
385.9	56.321	-0.62	-0.378	0	47.42	0	3.478	3.6	-0.121
386	56.334	-0.608	-1.19	0	47.38	0	3.48	3.601	-0.121
386.1	56.346	-0.608	-0.713	0	47.42	0	3.481	3.602	-0.121
386.2	56.358	-0.608	-0.893	0	47.4	0	3.482	3.603	-0.121
386.3	56.377	-0.615	-0.364	0	47.43	0	3.484	3.605	-0.121
386.4	56.389	-0.62	-0.607	0	47.21	0	3.485	3.606	-0.121
386.5	56.402	-0.62	-0.989	0	47.21	0	3.485	3.606	-0.121
386.6	56.414	-0.623	-0.162	0	47.25	0	3.488	3.609	-0.121
386.7	56.433	-0.623	-0.95	0	47.2	0	3.489	3.61	-0.121
386.8	56.445	-0.628	-0.865	0	47.3	0	3.49	3.611	-0.121
386.9	56.458	-0.618	0.134	0	47.22	0	3.492	3.613	-0.121
387	56.47	-0.62	-1.109	0	47.3	0	3.493	3.614	-0.121
387.1	56.489	-0.62	-0.893	0	47.29	0	3.494	3.615	-0.121
387.2	56.495	-0.605	-0.537	0	47.24	0	3.495	3.617	-0.121
387.3	56.507	-0.605	-1.052	0	47.36	0	3.497	3.618	-0.121
387.4	56.52	-0.605	-0.918	0	48.15	0	3.498	3.619	-0.121
387.5	56.532	-0.61	-0.448	0	51.75	0	3.5	3.621	-0.121
387.6	56.551	-0.6	-0.463	0	53.91	0	3.501	3.622	-0.121
387.7	56.576	-0.6	-1.204	0	54.03	0	3.503	3.624	-0.121
387.8	56.594	-0.615	-0.48	0	53.84	0	3.504	3.625	-0.121
387.9	56.619	-0.598	-0.166	0	53.98	0	3.506	3.627	-0.121
388	56.644	-0.598	-1.519	0	54.02	0	3.507	3.628	-0.121
388.1	56.663	-0.613	-0.908	0	54.17	0	3.509	3.63	-0.121
388.2	56.688	-0.598	-0.42	0	54.11	0	3.51	3.631	-0.121
388.3	56.713	-0.598	-0.463	0	54.21	0	3.512	3.633	-0.121
388.4	56.737	-0.64	-1.603	0	54.2	0	3.513	3.634	-0.121
388.5	56.756	-0.64	0.374	0	54.22	0	3.515	3.636	-0.121
388.6	56.781	-0.618	-0.551	0	54.21	0	3.516	3.637	-0.121
388.7	56.8	-0.618	-1.095	0	54.25	0	3.518	3.639	-0.121
388.8	56.831	-0.598	-1.038	0	54.29	0	3.519	3.64	-0.121
388.9	56.855	-0.598	-0.879	0	54.31	0	3.521	3.642	-0.121
389	56.874	-0.613	-0.297	0	54.22	0	3.522	3.643	-0.121
389.1	56.893	-0.623	-0.922	0	53.14	0	3.524	3.645	-0.121
389.2	56.918	-0.623	-0.406	0	52.2	0	3.525	3.646	-0.121
389.3	56.936	-0.605	-0.865	0	52.22	0	3.527	3.648	-0.121
389.4	56.955	-0.618	-1.338	0	52.1	0	3.528	3.649	-0.121

389.5	56.974	-0.618	-0.523	0	52.14	0	3.529	3.651	-0.121
389.6	56.992	-0.598	-0.364	0	52.13	0	3.531	3.652	-0.121
389.7	57.011	-0.598	-0.84	0	52.2	0	3.532	3.653	-0.121
389.8	57.029	-0.598	-0.812	0	51.12	0	3.534	3.655	-0.121
389.9	57.054	-0.615	-0.607	0	51.07	0	3.535	3.656	-0.121
390	57.067	-0.615	-0.491	0	50.2	0	3.537	3.658	-0.121
390.1	57.085	-0.615	-0.696	0	49.87	0	3.538	3.659	-0.121
390.2	57.098	-0.623	-0.699	0	49.11	0	3.539	3.66	-0.121
390.3	57.116	-0.618	-0.639	0	49.12	0	3.541	3.662	-0.121
390.4	57.129	-0.618	-0.551	0	47.74	0	3.542	3.663	-0.121
390.5	57.141	-0.62	-0.893	0	47.05	0	3.543	3.664	-0.121
390.6	57.154	-0.603	-0.364	0	45.89	0	3.545	3.666	-0.121
390.7	57.16	-0.603	-0.713	0	45.89	0	3.545	3.666	-0.121
390.8	57.172	-0.59	-1.204	0	45.02	0	3.547	3.668	-0.121
390.9	57.179	-0.595	-0.554	0	44.27	0	3.548	3.669	-0.121
391	57.185	-0.595	-0.551	0	42.95	0	3.549	3.671	-0.121
391.1	57.197	-0.62	-0.565	0	40.96	0	3.551	3.672	-0.121
391.2	57.197	-0.605	-0.297	0	39.83	0	3.552	3.673	-0.121
391.3	57.197	-0.605	-0.879	0	38.23	0	3.553	3.674	-0.121
391.4	57.197	-0.613	-1.137	0	37.46	0	3.554	3.675	-0.121
391.5	57.191	-0.613	-0.565	0	36.87	0	3.555	3.676	-0.121
391.6	57.191	-0.628	-0.42	0	35.58	0	3.556	3.677	-0.121
391.7	57.191	-0.628	-1.024	0	34.51	0	3.557	3.678	-0.121
391.8	57.172	-0.603	-1.024	0	32.29	0	3.558	3.679	-0.121
391.9	57.166	-0.603	-1.084	0	30.4	0	3.559	3.68	-0.121
392	57.154	-0.6	-0.865	0	30.44	0	3.559	3.681	-0.121
392.1	57.135	-0.6	-0.922	0	30.38	0	3.56	3.681	-0.121
392.2	57.123	-0.6	-0.48	0	30.19	0	3.561	3.682	-0.121
392.3	57.11	-0.618	-0.713	0	30.25	0	3.562	3.683	-0.121
392.4	57.098	-0.623	-0.48	0	30.2	0	3.563	3.684	-0.121
392.5	57.079	-0.623	-0.448	0	30.29	0	3.564	3.685	-0.121
392.6	57.067	-0.613	-0.551	0	30.31	0	3.564	3.686	-0.121
392.7	57.054	-0.613	-0.964	0	30.5	0	3.565	3.686	-0.121
392.8	57.042	-0.603	-0.879	0	30.33	0	3.566	3.687	-0.121
392.9	57.023	-0.613	-0.713	0	30.5	0	3.567	3.688	-0.121
393	57.017	-0.61	-0.491	0	30.39	0	3.568	3.689	-0.121
393.1	57.005	-0.61	-0.918	0	30.5	0	3.569	3.69	-0.121
393.2	56.986	-0.643	-0.879	0	30.39	0	3.57	3.691	-0.121
393.3	56.974	-0.618	-0.311	0	30.46	0	3.57	3.691	-0.121
393.4	56.961	-0.618	-1.003	0	30.34	0	3.571	3.692	-0.121
393.5	56.949	-0.613	-1.487	0	30.38	0	3.572	3.693	-0.121
393.6	56.93	-0.618	-0.756	0	30.34	0	3.573	3.694	-0.121
393.7	56.924	-0.618	-0.18	0	29.7	0	3.574	3.695	-0.121
393.8	56.905	-0.6	-1.038	0	29.66	0	3.575	3.696	-0.121
393.9	56.887	-0.598	-0.851	0	28.84	0	3.575	3.696	-0.121
394	56.874	-0.598	-0.798	0	28.39	0	3.576	3.697	-0.121
394.1	56.855	-0.608	-0.713	0	27.12	0	3.577	3.698	-0.121

394.2	56.837	-0.608	-0.332	0	26.88	0	3.578	3.699	-0.121
394.3	56.818	-0.608	-0.537	0	26.74	0	3.578	3.699	-0.121
394.4	56.8	-0.613	-0.636	0	26.2	0	3.579	3.7	-0.121
394.5	56.781	-0.613	-0.537	0	26.18	0	3.58	3.701	-0.121
394.6	56.762	-0.608	-0.378	0	25.79	0	3.581	3.702	-0.121
394.7	56.744	-0.608	-1.024	0	24.79	0	3.581	3.702	-0.121
394.8	56.719	-0.613	-1.024	0	22.68	0	3.582	3.703	-0.121
394.9	56.694	-0.613	-0.523	0	22.68	0	3.582	3.703	-0.121
395	56.669	-0.598	-0.583	0	19.88	0	3.583	3.704	-0.121
395.1	56.638	-0.615	-1.109	0	19.45	0	3.584	3.705	-0.121
395.2	56.607	-0.615	-0.24	0	19.45	0	3.584	3.705	-0.121
395.3	56.576	-0.618	-0.494	0	19.44	0	3.585	3.706	-0.121
395.4	56.545	-0.623	-0.378	0	19.4	0	3.585	3.706	-0.121
395.5	56.514	-0.623	-0.819	0	19.83	0	3.586	3.707	-0.121
395.6	56.489	-0.605	-0.378	0	20.2	0	3.586	3.707	-0.121
395.7	56.458	-0.605	-0.908	0	20.19	0	3.587	3.708	-0.121
395.8	56.433	-0.608	-0.908	0	20.08	0	3.587	3.709	-0.121
395.9	56.402	-0.59	-0.417	0	20.12	0	3.588	3.709	-0.121
396	56.371	-0.588	-1.024	0	20.16	0	3.589	3.71	-0.121
396.1	56.346	-0.588	-1.01	0	20.22	0	3.589	3.71	-0.121
396.2	56.315	-0.623	-0.064	0	20.68	0	3.59	3.711	-0.121
396.3	56.284	-0.613	-0.212	0	21.09	0	3.59	3.711	-0.121
396.4	56.259	-0.613	-1.19	0	22.99	0	3.591	3.712	-0.121
396.5	56.234	-0.615	-0.788	0	25.79	0	3.592	3.713	-0.121
396.6	56.215	-0.61	-0.134	0	27.52	0	3.592	3.713	-0.121
396.7	56.197	-0.61	-0.865	0	30.49	0	3.593	3.714	-0.121
396.8	56.184	-0.608	-1.01	0	32.47	0	3.594	3.715	-0.121
396.9	56.178	-0.615	-0.667	0	34.89	0	3.595	3.716	-0.121
397	56.172	-0.615	-0.494	0	38.31	0	3.596	3.717	-0.121
397.1	56.172	-0.625	-0.667	0	42.38	0	3.597	3.718	-0.121
397.2	56.178	-0.62	-0.77	0	43.71	0	3.599	3.72	-0.121
397.3	56.184	-0.62	-0.95	0	43.86	0	3.6	3.721	-0.121
397.4	56.191	-0.633	-0.607	0	44.36	0	3.601	3.722	-0.121
397.5	56.203	-0.633	-0.212	0	44.43	0	3.602	3.723	-0.121
397.6	56.215	-0.61	-0.819	0	44.44	0	3.603	3.725	-0.121
397.7	56.222	-0.61	-0.699	0	44.44	0	3.605	3.726	-0.121
397.8	56.228	-0.6	-0.699	0	44.51	0	3.606	3.727	-0.121
397.9	56.24	-0.6	-1.024	0	45.25	0	3.607	3.728	-0.121
398	56.247	-0.605	-0.607	0	45.62	0	3.608	3.73	-0.121
398.1	56.259	-0.613	-0.699	0	46.04	0	3.61	3.731	-0.121
398.2	56.265	-0.613	-0.784	0	47.96	0	3.611	3.732	-0.121
398.3	56.284	-0.605	-0.667	0	48.12	0	3.612	3.734	-0.121
398.4	56.302	-0.598	-1.07	0	49.9	0	3.614	3.735	-0.121
398.5	56.315	-0.598	-1.01	0	54.01	0	3.615	3.736	-0.121
398.6	56.334	-0.633	-0.742	0	55.75	0	3.617	3.738	-0.121
398.7	56.365	-0.633	-0.537	0	57.13	0	3.618	3.74	-0.121
398.8	56.396	-0.623	-0.537	0	59.35	0	3.62	3.741	-0.121

398.9	56.427	-0.6	-1.176	0	61.39	0	3.622	3.743	-0.121
399	56.458	-0.593	-0.727	0	62.64	0	3.623	3.745	-0.121
399.1	56.495	-0.593	-1.19	0	62.64	0	3.623	3.745	-0.121
399.2	56.532	-0.623	-0.48	0	63.87	0	3.627	3.748	-0.121
399.3	56.57	-0.6	-0.035	0	65.66	0	3.629	3.75	-0.121
399.4	56.607	-0.6	-0.699	0	65.84	0	3.631	3.752	-0.121
399.5	56.65	-0.625	-1.218	0	65.81	0	3.633	3.754	-0.121
399.6	56.688	-0.635	-0.268	0	65.63	0	3.634	3.755	-0.121
399.7	56.731	-0.635	-0.127	0	65.72	0	3.636	3.757	-0.121
399.8	56.768	-0.6	-0.752	0	65.78	0	3.638	3.759	-0.121
399.9	56.806	-0.603	-1.406	0	65.81	0	3.64	3.761	-0.121
400	56.849	-0.603	-0.908	0	65.86	0	3.642	3.763	-0.121
400.1	56.887	-0.6	-0.523	0	65.82	0	3.643	3.765	-0.121
400.2	56.924	-0.625	-0.978	0	65.68	0	3.645	3.766	-0.121
400.3	56.967	-0.625	-0.463	0	65.75	0	3.647	3.768	-0.121
400.4	57.005	-0.603	0.035	0	65.61	0	3.649	3.77	-0.121
400.5	57.048	-0.603	-1.303	0	65.66	0	3.651	3.772	-0.121
400.6	57.085	-0.618	-0.851	0	65.7	0	3.653	3.774	-0.121
400.7	57.123	-0.618	-0.685	0	65.74	0	3.654	3.776	-0.121
400.8	57.166	-0.618	-0.685	0	65.54	0	3.656	3.777	-0.121
400.9	57.203	-0.618	-0.893	0	65.59	0	3.658	3.779	-0.121
401	57.241	-0.613	-0.936	0	65.67	0	3.66	3.781	-0.121
401.1	57.278	-0.61	-0.865	0	65.66	0	3.662	3.783	-0.121
401.2	57.315	-0.61	-0.685	0	65.74	0	3.664	3.785	-0.121
401.3	57.359	-0.585	-0.71	0	65.42	0	3.665	3.786	-0.121
401.4	57.396	-0.603	-1.218	0	64.42	0	3.667	3.788	-0.121
401.5	57.433	-0.603	-0.551	0	64.53	0	3.669	3.79	-0.121
401.6	57.471	-0.625	-0.194	0	64.06	0	3.671	3.792	-0.121
401.7	57.508	-0.625	-0.24	0	62.74	0	3.672	3.794	-0.121
401.8	57.539	-0.63	-0.24	0	60.85	0	3.674	3.795	-0.121
401.9	57.576	-0.603	-0.819	0	57.96	0	3.676	3.797	-0.121
402	57.595	-0.608	-1.176	0	55.25	0	3.677	3.798	-0.121
402.1	57.626	-0.608	-0.194	0	53.4	0	3.679	3.8	-0.121
402.2	57.645	-0.63	-0.583	0	52.22	0	3.68	3.801	-0.121
402.3	57.663	-0.61	-0.364	0	51.49	0	3.682	3.803	-0.121
402.4	57.682	-0.61	-0.685	0	50.37	0	3.683	3.804	-0.121
402.5	57.694	-0.588	-1.444	0	48.78	0	3.684	3.806	-0.121
402.6	57.707	-0.605	-0.742	0	47.54	0	3.686	3.807	-0.121
402.7	57.719	-0.605	-0.48	0	47.3	0	3.687	3.808	-0.121
402.8	57.725	-0.595	-0.18	0	46.6	0	3.688	3.809	-0.121
402.9	57.738	-0.605	-1.035	0	46.65	0	3.69	3.811	-0.121
403	57.744	-0.605	-0.893	0	46.64	0	3.691	3.812	-0.121
403.1	57.756	-0.62	0.279	0	46.6	0	3.692	3.813	-0.121
403.2	57.763	-0.62	-0.607	0	45.76	0	3.693	3.815	-0.121
403.3	57.775	-0.62	-0.509	0	45.76	0	3.693	3.815	-0.121
403.4	57.775	-0.615	-0.696	0	44.73	0	3.696	3.817	-0.121
403.5	57.781	-0.615	-0.833	0	44.74	0	3.697	3.818	-0.121

403.6	57.788	-0.613	-0.879	0	44.75	0	3.698	3.82	-0.121
403.7	57.794	-0.613	-0.392	0	44.76	0	3.7	3.821	-0.121
403.8	57.8	-0.595	-0.392	0	44.76	0	3.701	3.822	-0.121
403.9	57.806	-0.595	-0.996	0	44.77	0	3.702	3.823	-0.121
404	57.812	-0.61	-0.706	0	44.79	0	3.703	3.825	-0.121
404.1	57.819	-0.608	-0.275	0	44.76	0	3.705	3.826	-0.121
404.2	57.825	-0.608	-1.148	0	44.76	0	3.706	3.827	-0.121
404.3	57.831	-0.613	-0.081	0	44.79	0	3.707	3.828	-0.121
404.4	57.837	-0.61	-0.509	0	44.56	0	3.708	3.83	-0.121
404.5	57.843	-0.61	-1.176	0	42.15	0	3.71	3.831	-0.121
404.6	57.843	-0.6	-0.491	0	39.78	0	3.711	3.832	-0.121
404.7	57.85	-0.6	-1.19	0	38.41	0	3.712	3.833	-0.121
404.8	57.843	-0.603	-1.19	0	37.88	0	3.713	3.834	-0.121
404.9	57.843	-0.618	-0.18	0	37.89	0	3.714	3.835	-0.121
405	57.843	-0.615	-0.667	0	37.88	0	3.715	3.836	-0.121
405.1	57.837	-0.615	-0.18	0	37.92	0	3.716	3.837	-0.121
405.2	57.831	-0.598	-1.201	0	37.93	0	3.717	3.838	-0.121
405.3	57.831	-0.605	-1.119	0	37.9	0	3.718	3.839	-0.121
405.4	57.825	-0.605	-0.261	0	37.5	0	3.719	3.84	-0.121
405.5	57.819	-0.603	-0.893	0	35.8	0	3.72	3.841	-0.121
405.6	57.819	-0.608	-0.667	0	34.05	0	3.721	3.842	-0.121
405.7	57.806	-0.608	-0.833	0	33.39	0	3.722	3.843	-0.121
405.8	57.794	-0.618	-0.537	0	33.44	0	3.723	3.844	-0.121
405.9	57.788	-0.623	-0.713	0	33.42	0	3.724	3.845	-0.121
406	57.775	-0.623	-0.653	0	33.35	0	3.725	3.846	-0.121
406.1	57.763	-0.635	-0.724	0	33.38	0	3.726	3.847	-0.121
406.2	57.756	-0.625	-0.509	0	33.4	0	3.727	3.848	-0.121
406.3	57.744	-0.625	-0.66	0	33.31	0	3.728	3.849	-0.121
406.4	57.738	-0.618	-1.335	0	33.37	0	3.728	3.85	-0.121
406.5	57.725	-0.618	-0.819	0	33.76	0	3.729	3.851	-0.121
406.6	57.713	-0.61	-0.219	0	34.95	0	3.73	3.852	-0.121
406.7	57.707	-0.61	-1.148	0	35.36	0	3.731	3.852	-0.121
406.8	57.701	-0.603	-1.148	0	35.94	0	3.732	3.853	-0.121
406.9	57.694	-0.603	-0.833	0	36.68	0	3.733	3.855	-0.121
407	57.688	-0.595	-0.494	0	38.41	0	3.734	3.856	-0.121
407.1	57.682	-0.59	-0.438	0	39.14	0	3.736	3.857	-0.121
407.2	57.682	-0.59	-1.19	0	40.28	0	3.737	3.858	-0.121
407.3	57.682	-0.623	-0.551	0	40.52	0	3.738	3.859	-0.121
407.4	57.682	-0.623	-0.166	0	40.6	0	3.739	3.86	-0.121
407.5	57.682	-0.623	-0.833	0	40.6	0	3.739	3.86	-0.121
407.6	57.682	-0.603	-0.964	0	40.59	0	3.741	3.862	-0.121
407.7	57.682	-0.603	-0.784	0	39.54	0	3.742	3.863	-0.121
407.8	57.682	-0.595	-0.724	0	39.52	0	3.743	3.864	-0.121
407.9	57.682	-0.605	-0.865	0	39.57	0	3.744	3.866	-0.121
408	57.682	-0.6	-0.18	0	39.5	0	3.746	3.867	-0.121
408.1	57.682	-0.6	-0.48	0	39.59	0	3.747	3.868	-0.121
408.2	57.682	-0.6	-1.038	0	39.51	0	3.748	3.869	-0.121

408.3	57.676	-0.618	-0.833	0	39.58	0	3.749	3.87	-0.121
408.4	57.676	-0.618	0.018	0	39.53	0	3.75	3.871	-0.121
408.5	57.676	-0.6	-0.964	0	39.57	0	3.751	3.872	-0.121
408.6	57.676	-0.615	-1.3	0	39.55	0	3.752	3.873	-0.121
408.7	57.676	-0.615	-0.463	0	39.56	0	3.753	3.874	-0.121
408.8	57.676	-0.605	-0.226	0	39.56	0	3.754	3.875	-0.121
408.9	57.676	-0.578	-0.833	0	39.53	0	3.755	3.877	-0.121
409	57.676	-0.578	-1.338	0	39.58	0	3.757	3.878	-0.121
409.1	57.676	-0.605	-0.865	0	39.53	0	3.758	3.879	-0.121
409.2	57.669	-0.628	-0.378	0	39.6	0	3.759	3.88	-0.121
409.3	57.669	-0.628	0.191	0	39.52	0	3.76	3.881	-0.121
409.4	57.669	-0.583	-0.346	0	39.63	0	3.761	3.882	-0.121
409.5	57.663	-0.583	-1.504	0	39.53	0	3.762	3.883	-0.121
409.6	57.663	-0.61	-0.844	0	39.6	0	3.763	3.884	-0.121
409.7	57.663	-0.61	-1.056	0	39.51	0	3.764	3.885	-0.121
409.8	57.663	-0.608	-1.081	0	39.55	0	3.765	3.886	-0.121
409.9	57.663	-0.608	-1.049	0	39.53	0	3.766	3.888	-0.121
410	57.657	-0.625	-0.724	0	39.56	0	3.768	3.889	-0.121
410.1	57.651	-0.628	-0.724	0	39.55	0	3.769	3.89	-0.121
410.2	57.651	-0.628	-0.18	0	39.53	0	3.77	3.891	-0.121
410.3	57.645	-0.61	-0.897	0	39.57	0	3.771	3.892	-0.121
410.4	57.645	-0.608	-1.215	0	39.54	0	3.772	3.893	-0.121
410.5	57.645	-0.608	-0.579	0	39.6	0	3.773	3.894	-0.121
410.6	57.645	-0.598	-1.19	0	39.5	0	3.774	3.895	-0.121
410.7	57.645	-0.598	-1.01	0	39.6	0	3.775	3.896	-0.121
410.8	57.645	-0.6	-1.07	0	39.52	0	3.776	3.897	-0.121
410.9	57.638	-0.628	-0.459	0	39.58	0	3.777	3.899	-0.121
411	57.638	-0.62	-0.194	0	39.52	0	3.779	3.9	-0.121
411.1	57.638	-0.62	-0.653	0	39.58	0	3.78	3.901	-0.121
411.2	57.638	-0.615	-0.982	0	39.5	0	3.781	3.902	-0.121
411.3	57.638	-0.6	-0.48	0	39.56	0	3.782	3.903	-0.121
411.4	57.638	-0.6	-0.78	0	39.54	0	3.783	3.904	-0.121
411.5	57.632	-0.623	-0.699	0	39.53	0	3.784	3.905	-0.121
411.6	57.632	-0.605	-0.106	0	39.55	0	3.785	3.906	-0.121
411.7	57.632	-0.605	-0.897	0	39.55	0	3.785	3.906	-0.121
411.8	57.632	-0.575	-1.006	0	39.55	0	3.787	3.908	-0.121
411.9	57.632	-0.578	-1.01	0	39.53	0	3.788	3.91	-0.121
412	57.632	-0.578	-0.777	0	39.54	0	3.79	3.911	-0.121
412.1	57.632	-0.605	-0.166	0	39.51	0	3.791	3.912	-0.121
412.2	57.632	-0.603	-0.473	0	39.58	0	3.792	3.913	-0.121
412.3	57.632	-0.603	-0.579	0	39.49	0	3.793	3.914	-0.121
412.4	57.626	-0.633	-1.148	0	39.58	0	3.794	3.915	-0.121
412.5	57.626	-0.633	-0.007	0	39.48	0	3.795	3.916	-0.121
412.6	57.626	-0.605	-0.653	0	39.58	0	3.796	3.917	-0.121
412.7	57.626	-0.605	-0.653	0	39.47	0	3.797	3.918	-0.121
412.8	57.626	-0.6	-0.65	0	39.58	0	3.798	3.919	-0.121
412.9	57.62	-0.6	-0.537	0	39.49	0	3.799	3.921	-0.121

413	57.62	-0.608	-1.035	0	40.52	0	3.801	3.922	-0.121
413.1	57.62	-0.595	-0.519	0	40.53	0	3.802	3.923	-0.121
413.2	57.62	-0.595	-0.71	0	40.63	0	3.803	3.924	-0.121
413.3	57.62	-0.61	-1.201	0	40.58	0	3.804	3.925	-0.121
413.4	57.62	-0.603	-0.191	0	41.35	0	3.805	3.926	-0.121
413.5	57.626	-0.603	-0.844	0	41.53	0	3.806	3.927	-0.121
413.6	57.626	-0.595	-0.819	0	42.12	0	3.807	3.928	-0.121
413.7	57.626	-0.595	-0.699	0	42.24	0	3.809	3.93	-0.121
413.8	57.632	-0.61	-0.727	0	43.15	0	3.81	3.931	-0.121
413.9	57.632	-0.618	-0.403	0	43.14	0	3.811	3.932	-0.121
414	57.638	-0.61	-0.752	0	43.11	0	3.812	3.933	-0.121
414.1	57.638	-0.61	-0.982	0	43.11	0	3.813	3.934	-0.121
414.2	57.645	-0.603	-0.65	0	43.75	0	3.815	3.936	-0.121
414.3	57.651	-0.6	-0.653	0	44.66	0	3.816	3.937	-0.121
414.4	57.657	-0.6	-0.699	0	44.64	0	3.817	3.938	-0.121
414.5	57.663	-0.61	-0.494	0	44.66	0	3.818	3.939	-0.121
414.6	57.669	-0.605	-0.332	0	45.39	0	3.82	3.941	-0.121
414.7	57.676	-0.605	-0.968	0	46.73	0	3.821	3.942	-0.121
414.8	57.688	-0.59	-0.724	0	47.38	0	3.822	3.943	-0.121
414.9	57.701	-0.588	-0.583	0	47.73	0	3.823	3.945	-0.121
415	57.707	-0.588	-0.247	0	49.81	0	3.825	3.946	-0.121
415.1	57.725	-0.6	-0.699	0	51.06	0	3.826	3.947	-0.121
415.2	57.738	-0.608	-0.678	0	52.17	0	3.828	3.949	-0.121
415.3	57.756	-0.608	-0.65	0	53.55	0	3.829	3.95	-0.121
415.4	57.775	-0.62	-0.304	0	54.16	0	3.831	3.952	-0.121
415.5	57.794	-0.62	-0.191	0	54.1	0	3.832	3.953	-0.121
415.6	57.819	-0.613	-1.052	0	54.15	0	3.834	3.955	-0.121
415.7	57.837	-0.613	0.162	0	54.15	0	3.835	3.956	-0.121
415.8	57.856	-0.615	0.222	0	54.22	0	3.837	3.958	-0.121
415.9	57.875	-0.615	-1.006	0	54.22	0	3.837	3.958	-0.121
416	57.899	-0.61	-0.982	0	55.45	0	3.84	3.961	-0.121
416.1	57.918	-0.608	-0.812	0	56.36	0	3.841	3.962	-0.121
416.2	57.943	-0.608	-0.865	0	56.09	0	3.843	3.964	-0.121
416.3	57.968	-0.608	-0.678	0	56.17	0	3.844	3.966	-0.121
416.4	57.986	-0.58	-0.519	0	56.17	0	3.846	3.967	-0.121
416.5	58.011	-0.58	-1.296	0	56.21	0	3.848	3.969	-0.121
416.6	58.036	-0.595	-1.024	0	56.19	0	3.849	3.97	-0.121
416.7	58.055	-0.595	-0.166	0	56.24	0	3.851	3.972	-0.121
416.8	58.08	-0.605	-0.166	0	57.26	0	3.852	3.973	-0.121
416.9	58.098	-0.605	-0.332	0	57.26	0	3.854	3.975	-0.121
417	58.129	-0.615	-0.89	0	58.82	0	3.856	3.977	-0.121
417.1	58.154	-0.615	-0.191	0	60.38	0	3.857	3.978	-0.121
417.2	58.179	-0.583	-0.547	0	60.32	0	3.859	3.98	-0.121
417.3	58.21	-0.595	-1.522	0	60.38	0	3.861	3.982	-0.121
417.4	58.241	-0.595	-0.929	0	60.18	0	3.862	3.983	-0.121
417.5	58.266	-0.605	-0.166	0	61.26	0	3.864	3.985	-0.121
417.6	58.297	-0.62	-0.848	0	61.42	0	3.866	3.987	-0.121

417.7	58.328	-0.62	-0.473	0	62.39	0	3.867	3.988	-0.121
417.8	58.353	-0.615	-0.48	0	62.31	0	3.869	3.99	-0.121
417.9	58.384	-0.615	-1.148	0	62.42	0	3.871	3.992	-0.121
418	58.415	-0.615	-0.724	0	62.39	0	3.873	3.994	-0.121
418.1	58.446	-0.633	-0.678	0	62.87	0	3.874	3.995	-0.121
418.2	58.477	-0.613	-0.191	0	64.86	0	3.876	3.997	-0.121
418.3	58.508	-0.613	-1.01	0	67.15	0	3.878	3.999	-0.121
418.4	58.546	-0.613	-1.067	0	68.12	0	3.88	4.001	-0.121
418.5	58.589	-0.613	-0.523	0	68.47	0	3.882	4.003	-0.121
418.6	58.626	-0.605	-0.678	0	69.8	0	3.884	4.005	-0.121
418.7	58.664	-0.605	-0.727	0	70.11	0	3.886	4.007	-0.121
418.8	58.707	-0.615	-0.727	0	71.1	0	3.888	4.009	-0.121
418.9	58.744	-0.615	-0.452	0	72.35	0	3.89	4.011	-0.121
419	58.788	-0.595	-0.844	0	72.41	0	3.892	4.013	-0.121
419.1	58.831	-0.613	-1.377	0	72.6	0	3.894	4.015	-0.121
419.2	58.875	-0.613	-0.678	0	72.64	0	3.896	4.017	-0.121
419.3	58.918	-0.593	-0.155	0	72.54	0	3.898	4.019	-0.121
419.4	58.962	-0.588	-0.865	0	71.39	0	3.9	4.021	-0.121
419.5	59.005	-0.588	-1.437	0	71.46	0	3.902	4.023	-0.121
419.6	59.049	-0.638	-0.71	0	70.45	0	3.904	4.025	-0.121
419.7	59.086	-0.638	-0.763	0	69.29	0	3.906	4.027	-0.121
419.8	59.13	-0.608	-0.678	0	69.22	0	3.907	4.029	-0.121
419.9	59.161	-0.593	-1.624	0	69.32	0	3.909	4.031	-0.121
420	59.198	-0.6	-0.89	0	69.36	0	3.911	4.032	-0.121
420.1	59.242	-0.6	-0.614	0	69.36	0	3.911	4.032	-0.121
420.2	59.273	-0.6	-0.597	0	69.44	0	3.915	4.036	-0.121
420.3	59.31	-0.61	-0.833	0	69.19	0	3.917	4.038	-0.121
420.4	59.347	-0.61	-0.653	0	69.15	0	3.919	4.04	-0.121
420.5	59.384	-0.6	-0.233	0	69.17	0	3.921	4.042	-0.121
420.6	59.422	-0.605	-0.844	0	69.2	0	3.923	4.044	-0.121
420.7	59.453	-0.605	-0.724	0	69.22	0	3.925	4.046	-0.121
420.8	59.496	-0.6	-0.614	0	69.27	0	3.927	4.048	-0.121
420.9	59.534	-0.585	-0.78	0	69.04	0	3.929	4.05	-0.121
421	59.571	-0.585	-1.19	0	69.02	0	3.931	4.052	-0.121
421.1	59.608	-0.59	-0.795	0	69.07	0	3.932	4.054	-0.121
421.2	59.639	-0.603	-0.547	0	69.14	0	3.934	4.056	-0.121
421.3	59.676	-0.603	-0.378	0	69.16	0	3.936	4.057	-0.121
421.4	59.714	-0.623	-0.12	0	69.23	0	3.938	4.059	-0.121
421.5	59.751	-0.623	-0.519	0	69	0	3.94	4.061	-0.121
421.6	59.782	-0.613	-0.685	0	68.1	0	3.942	4.063	-0.121
421.7	59.819	-0.613	-0.692	0	63.18	0	3.944	4.065	-0.121
421.8	59.85	-0.595	-0.692	0	57.07	0	3.945	4.067	-0.121
421.9	59.869	-0.595	-0.968	0	51.84	0	3.947	4.068	-0.121
422	59.875	-0.59	-1.215	0	48.48	0	3.948	4.069	-0.121
422.1	59.888	-0.598	-0.893	0	46.38	0	3.949	4.071	-0.121
422.2	59.888	-0.598	-0.562	0	45.69	0	3.951	4.072	-0.121
422.3	59.888	-0.605	-0.378	0	44.39	0	3.952	4.073	-0.121

422.4	59.894	-0.593	-0.519	0	41.47	0	3.953	4.074	-0.121
422.5	59.888	-0.593	-1.222	0	38.57	0	3.954	4.075	-0.121
422.6	59.882	-0.623	-0.48	0	37.31	0	3.955	4.076	-0.121
422.7	59.869	-0.623	-0.685	0	37.29	0	3.956	4.077	-0.121
422.8	59.863	-0.62	-0.71	0	37.24	0	3.957	4.078	-0.121
422.9	59.857	-0.588	-0.89	0	37.11	0	3.958	4.079	-0.121
423	59.844	-0.593	-1.19	0	36.45	0	3.959	4.08	-0.121
423.1	59.832	-0.593	-1.006	0	35.7	0	3.96	4.081	-0.121
423.2	59.819	-0.605	-0.71	0	34.66	0	3.961	4.082	-0.121
423.3	59.807	-0.605	-0.678	0	34.35	0	3.962	4.083	-0.121
423.4	59.795	-0.605	-0.802	0	34.35	0	3.963	4.084	-0.121
423.5	59.782	-0.595	-0.844	0	34.32	0	3.964	4.085	-0.121
423.6	59.77	-0.61	-1.225	0	34.34	0	3.965	4.086	-0.121
423.7	59.757	-0.61	-0.523	0	34.33	0	3.966	4.087	-0.121
423.8	59.745	-0.615	-0.346	0	34.64	0	3.967	4.088	-0.121
423.9	59.732	-0.6	-0.357	0	35.03	0	3.968	4.089	-0.121
424	59.72	-0.6	-1.487	0	35.03	0	3.969	4.09	-0.121
424.1	59.708	-0.595	-0.929	0	35	0	3.97	4.091	-0.121
424.2	59.695	-0.615	-0.738	0	34.99	0	3.971	4.092	-0.121
424.3	59.683	-0.615	-0.547	0	34.99	0	3.971	4.092	-0.121
424.4	59.67	-0.583	-0.646	0	34.36	0	3.973	4.094	-0.121
424.5	59.658	-0.583	-1.215	0	33.68	0	3.974	4.095	-0.121
424.6	59.645	-0.585	-0.876	0	33.22	0	3.975	4.096	-0.121
424.7	59.627	-0.585	-0.441	0	32.9	0	3.976	4.097	-0.121
424.8	59.608	-0.605	-0.357	0	32.92	0	3.977	4.098	-0.121
424.9	59.596	-0.605	-0.519	0	32.95	0	3.977	4.099	-0.121
425	59.583	-0.603	-0.724	0	32.89	0	3.978	4.099	-0.121
425.1	59.565	-0.628	-1.067	0	33.29	0	3.979	4.1	-0.121
425.2	59.552	-0.628	-0.417	0	33.7	0	3.98	4.101	-0.121
425.3	59.534	-0.633	0.078	0	33.62	0	3.981	4.102	-0.121
425.4	59.521	-0.655	-1.067	0	33.72	0	3.982	4.103	-0.121
425.5	59.509	-0.655	-0.763	0	33.61	0	3.983	4.104	-0.121
425.6	59.496	-0.648	-0.109	0	33.39	0	3.984	4.105	-0.121
425.7	59.478	-0.648	-1.402	0	32.75	0	3.985	4.106	-0.121
425.8	59.465	-0.623	-1.293	0	32.39	0	3.986	4.107	-0.121
425.9	59.453	-0.623	-0.494	0	32.37	0	3.987	4.108	-0.121
426	59.44	-0.598	-0.473	0	32.34	0	3.988	4.109	-0.121
426.1	59.422	-0.598	-1.377	0	32.39	0	3.988	4.11	-0.121
426.2	59.403	-0.583	-1.105	0	32.31	0	3.989	4.11	-0.121
426.3	59.391	-0.578	-0.724	0	32.37	0	3.99	4.111	-0.121
426.4	59.372	-0.578	-1.257	0	32.17	0	3.991	4.112	-0.121
426.5	59.36	-0.608	-0.766	0	31.55	0	3.992	4.113	-0.121
426.6	59.341	-0.6	-0.237	0	31.3	0	3.993	4.114	-0.121
426.7	59.329	-0.6	-0.844	0	30.81	0	3.994	4.115	-0.121
426.8	59.31	-0.6	-0.893	0	30.77	0	3.995	4.116	-0.121
426.9	59.291	-0.615	-0.59	0	30.79	0	3.995	4.117	-0.121
427	59.273	-0.615	-0.343	0	30.75	0	3.996	4.117	-0.121

427.1	59.254	-0.603	-0.562	0	31.34	0	3.997	4.118	-0.121
427.2	59.235	-0.595	-1.448	0	31.73	0	3.998	4.119	-0.121
427.3	59.223	-0.595	-0.929	0	32.36	0	3.999	4.12	-0.121
427.4	59.204	-0.61	-1.201	0	32.96	0	4	4.121	-0.121
427.5	59.192	-0.61	-0.321	0	33.03	0	4.001	4.122	-0.121
427.6	59.179	-0.578	-0.275	0	32.94	0	4.002	4.123	-0.121
427.7	59.161	-0.578	-1.367	0	33.02	0	4.003	4.124	-0.121
427.8	59.148	-0.608	-1.282	0	32.97	0	4.004	4.125	-0.121
427.9	59.136	-0.608	-0.576	0	32.96	0	4.004	4.126	-0.121
428	59.117	-0.618	0.109	0	32.97	0	4.005	4.126	-0.121
428.1	59.105	-0.61	-0.844	0	32.91	0	4.006	4.127	-0.121
428.2	59.092	-0.61	-1.134	0	32.97	0	4.007	4.128	-0.121
428.3	59.08	-0.62	-0.678	0	32.9	0	4.008	4.129	-0.121
428.4	59.061	-0.6	-0.533	0	32.92	0	4.009	4.13	-0.121
428.5	59.049	-0.6	-0.844	0	32.92	0	4.009	4.13	-0.121
428.6	59.036	-0.61	-1.176	0	32.19	0	4.011	4.132	-0.121
428.7	59.018	-0.61	-0.427	0	32.11	0	4.012	4.133	-0.121
428.8	59.005	-0.613	-0.343	0	32.16	0	4.013	4.134	-0.121
428.9	58.993	-0.605	-1.006	0	32.32	0	4.013	4.135	-0.121
429	58.974	-0.62	-0.678	0	32.37	0	4.014	4.136	-0.121
429.1	58.962	-0.62	-0.445	0	32.38	0	4.015	4.136	-0.121
429.2	58.943	-0.608	-0.537	0	32.32	0	4.016	4.137	-0.121
429.3	58.931	-0.605	-1.021	0	32.38	0	4.017	4.138	-0.121
429.4	58.918	-0.605	-0.519	0	32.3	0	4.018	4.139	-0.121
429.5	58.9	-0.585	-0.858	0	32.35	0	4.019	4.14	-0.121
429.6	58.887	-0.6	-0.971	0	32.26	0	4.02	4.141	-0.121
429.7	58.869	-0.6	0.078	0	32.36	0	4.021	4.142	-0.121
429.8	58.856	-0.61	-0.487	0	32.23	0	4.022	4.143	-0.121
429.9	58.844	-0.63	-1.006	0	32.36	0	4.022	4.144	-0.121
430	58.825	-0.63	-0.124	0	32.19	0	4.023	4.144	-0.121
430.1	58.813	-0.595	-0.212	0	32.34	0	4.024	4.145	-0.121
430.2	58.8	-0.59	-1.278	0	32.18	0	4.025	4.146	-0.121
430.3	58.782	-0.59	-1.006	0	32.32	0	4.026	4.147	-0.121
430.4	58.769	-0.615	-0.321	0	32.16	0	4.027	4.148	-0.121
430.5	58.757	-0.615	-0.346	0	32.28	0	4.028	4.149	-0.121
430.6	58.738	-0.613	-0.819	0	32.16	0	4.029	4.15	-0.121
430.7	58.726	-0.613	-0.434	0	32.51	0	4.03	4.151	-0.121
430.8	58.707	-0.608	-0.523	0	32.91	0	4.031	4.152	-0.121
430.9	58.695	-0.608	-0.657	0	32.95	0	4.031	4.153	-0.121
431	58.682	-0.605	-1.077	0	32.88	0	4.032	4.154	-0.121
431.1	58.67	-0.613	-0.494	0	32.91	0	4.033	4.154	-0.121
431.2	58.657	-0.613	-0.191	0	32.88	0	4.034	4.155	-0.121
431.3	58.645	-0.628	-0.929	0	32.9	0	4.035	4.156	-0.121
431.4	58.626	-0.635	-0.678	0	32.91	0	4.036	4.157	-0.121
431.5	58.62	-0.635	-0.597	0	32.86	0	4.037	4.158	-0.121
431.6	58.602	-0.595	-0.523	0	32.9	0	4.038	4.159	-0.121
431.7	58.589	-0.595	-1.006	0	32.83	0	4.039	4.16	-0.121

431.8	58.577	-0.595	-1.006	0	32.88	0	4.04	4.161	-0.121
431.9	58.564	-0.63	0.184	0	32.79	0	4.041	4.162	-0.121
432	58.552	-0.618	-0.205	0	32.89	0	4.042	4.163	-0.121
432.1	58.539	-0.618	-0.844	0	32.79	0	4.042	4.164	-0.121
432.2	58.527	-0.598	-0.996	0	32.87	0	4.043	4.164	-0.121
432.3	58.515	-0.593	-0.989	0	32.8	0	4.044	4.165	-0.121
432.4	58.502	-0.593	-0.865	0	32.86	0	4.045	4.166	-0.121
432.5	58.483	-0.6	-0.378	0	32.75	0	4.046	4.167	-0.121
432.6	58.471	-0.595	-0.685	0	32.98	0	4.047	4.168	-0.121
432.7	58.459	-0.595	-0.777	0	32.98	0	4.047	4.168	-0.121
432.8	58.446	-0.6	-0.547	0	33.13	0	4.049	4.17	-0.121
432.9	58.434	-0.613	-0.29	0	33.02	0	4.05	4.171	-0.121
433	58.421	-0.613	-0.403	0	33.1	0	4.051	4.172	-0.121
433.1	58.415	-0.6	-0.473	0	33.01	0	4.052	4.173	-0.121
433.2	58.403	-0.598	-0.569	0	33.08	0	4.053	4.174	-0.121
433.3	58.39	-0.598	-0.823	0	33.02	0	4.053	4.175	-0.121
433.4	58.372	-0.605	-0.823	0	33.04	0	4.054	4.175	-0.121
433.5	58.365	-0.605	-0.692	0	33.02	0	4.055	4.176	-0.121
433.6	58.353	-0.595	-0.844	0	33.02	0	4.056	4.177	-0.121
433.7	58.341	-0.595	-0.519	0	33.02	0	4.057	4.178	-0.121
433.8	58.328	-0.615	-0.519	0	33.01	0	4.058	4.179	-0.121
433.9	58.316	-0.615	-0.678	0	33.03	0	4.059	4.18	-0.121
434	58.303	-0.608	-0.752	0	33.24	0	4.06	4.181	-0.121
434.1	58.291	-0.588	-0.904	0	33.54	0	4.061	4.182	-0.121
434.2	58.278	-0.588	-0.519	0	33.77	0	4.062	4.183	-0.121
434.3	58.266	-0.59	-1.353	0	34.22	0	4.063	4.184	-0.121
434.4	58.254	-0.595	-0.403	0	34.22	0	4.064	4.185	-0.121
434.5	58.241	-0.595	-0.032	0	34.38	0	4.065	4.186	-0.121
434.6	58.235	-0.61	-0.89	0	35.02	0	4.066	4.187	-0.121
434.7	58.222	-0.61	-0.159	0	35.34	0	4.067	4.188	-0.121
434.8	58.21	-0.618	-0.159	0	35.37	0	4.068	4.189	-0.121
434.9	58.204	-0.59	-1.006	0	35.32	0	4.068	4.19	-0.121
435	58.198	-0.598	-1.021	0	35.9	0	4.069	4.191	-0.121
435.1	58.191	-0.598	-0.636	0	36.52	0	4.071	4.192	-0.121
435.2	58.179	-0.608	-0.519	0	36.66	0	4.072	4.193	-0.121
435.3	58.173	-0.59	-0.452	0	37.07	0	4.073	4.194	-0.121
435.4	58.167	-0.59	-0.943	0	37.37	0	4.074	4.195	-0.121
435.5	58.167	-0.618	-1.01	0	37.34	0	4.075	4.196	-0.121
435.6	58.154	-0.61	0.049	0	37.32	0	4.076	4.197	-0.121
435.7	58.154	-0.61	-0.724	0	37.15	0	4.077	4.198	-0.121
435.8	58.148	-0.6	-0.844	0	37.16	0	4.078	4.199	-0.121
435.9	58.142	-0.593	-0.682	0	37.14	0	4.079	4.2	-0.121
436	58.135	-0.593	-0.929	0	37.11	0	4.08	4.201	-0.121
436.1	58.129	-0.62	-0.622	0	37.15	0	4.081	4.202	-0.121
436.2	58.123	-0.593	0.452	0	37.1	0	4.082	4.203	-0.121
436.3	58.117	-0.593	-1.557	0	37.13	0	4.083	4.204	-0.121
436.4	58.111	-0.61	-1.063	0	37.12	0	4.084	4.205	-0.121

436.5	58.104	-0.61	-0.166	0	37.16	0	4.085	4.206	-0.121
436.6	58.098	-0.613	-0.572	0	37.07	0	4.086	4.207	-0.121
436.7	58.092	-0.613	-1.081	0	37.57	0	4.087	4.208	-0.121
436.8	58.092	-0.613	-1.081	0	39.02	0	4.088	4.209	-0.121
436.9	58.086	-0.613	-0.89	0	39.02	0	4.088	4.209	-0.121
437	58.086	-0.608	-0.83	0	40.74	0	4.09	4.211	-0.121
437.1	58.086	-0.6	-0.551	0	40.75	0	4.091	4.213	-0.121
437.2	58.086	-0.6	-0.562	0	40.71	0	4.093	4.214	-0.121
437.3	58.086	-0.61	-1.006	0	40.75	0	4.094	4.215	-0.121
437.4	58.086	-0.61	-0.18	0	40.73	0	4.095	4.216	-0.121
437.5	58.086	-0.61	-0.622	0	40.76	0	4.096	4.217	-0.121
437.6	58.086	-0.625	-0.879	0	40.74	0	4.097	4.218	-0.121
437.7	58.086	-0.625	-0.533	0	40.8	0	4.098	4.219	-0.121
437.8	58.086	-0.623	-0.533	0	40.71	0	4.099	4.221	-0.121
437.9	58.086	-0.598	-0.858	0	40.8	0	4.101	4.222	-0.121
438	58.086	-0.608	-1.187	0	40.74	0	4.102	4.223	-0.121
438.1	58.086	-0.608	-0.678	0	40.81	0	4.103	4.224	-0.121
438.2	58.086	-0.61	-0.724	0	40.71	0	4.104	4.225	-0.121
438.3	58.086	-0.615	-0.876	0	40.81	0	4.105	4.226	-0.121
438.4	58.086	-0.615	-0.547	0	40.75	0	4.106	4.227	-0.121
438.5	58.086	-0.59	-0.724	0	40.79	0	4.107	4.228	-0.121
438.6	58.086	-0.608	-1.215	0	40.76	0	4.108	4.23	-0.121
438.7	58.086	-0.608	-0.551	0	40.8	0	4.11	4.231	-0.121
438.8	58.086	-0.63	-0.032	0	40.74	0	4.111	4.232	-0.121
438.9	58.086	-0.623	-0.738	0	40.78	0	4.112	4.233	-0.121
439	58.086	-0.623	-0.968	0	40.73	0	4.113	4.234	-0.121
439.1	58.086	-0.613	-0.682	0	39.66	0	4.114	4.235	-0.121
439.2	58.08	-0.603	-0.533	0	38.52	0	4.115	4.236	-0.121
439.3	58.08	-0.603	-1.215	0	38.14	0	4.116	4.237	-0.121
439.4	58.073	-0.6	-0.858	0	38.17	0	4.117	4.238	-0.121
439.5	58.067	-0.6	-0.809	0	38.11	0	4.118	4.239	-0.121
439.6	58.067	-0.61	-0.929	0	38.22	0	4.119	4.241	-0.121
439.7	58.061	-0.61	-0.678	0	38.1	0	4.12	4.242	-0.121
439.8	58.061	-0.605	-0.678	0	38.16	0	4.122	4.243	-0.121
439.9	58.055	-0.605	-0.904	0	38.13	0	4.123	4.244	-0.121
440	58.055	-0.605	-0.562	0	38.17	0	4.124	4.245	-0.121
440.1	58.048	-0.61	-0.904	0	38.14	0	4.125	4.246	-0.121
440.2	58.042	-0.61	-0.904	0	38.17	0	4.126	4.247	-0.121
440.3	58.042	-0.628	-0.191	0	38.15	0	4.127	4.248	-0.121
440.4	58.042	-0.6	-0.328	0	38.11	0	4.128	4.249	-0.121
440.5	58.03	-0.6	-1.021	0	38.13	0	4.129	4.25	-0.121
440.6	58.03	-0.623	-0.989	0	38.13	0	4.13	4.251	-0.121
440.7	58.024	-0.623	-0.456	0	38.16	0	4.131	4.252	-0.121
440.8	58.017	-0.633	-0.371	0	38.11	0	4.132	4.253	-0.121
440.9	58.011	-0.628	-0.576	0	38.75	0	4.133	4.254	-0.121
441	58.011	-0.608	-0.576	0	38.89	0	4.134	4.255	-0.121
441.1	58.005	-0.608	-1.119	0	38.89	0	4.134	4.255	-0.121

441.2	58.005	-0.59	-0.95	0	38.87	0	4.136	4.258	-0.121
441.3	58.005	-0.608	-0.904	0	38.88	0	4.138	4.259	-0.121
441.4	57.999	-0.608	-0.724	0	38.85	0	4.139	4.26	-0.121
441.5	57.993	-0.623	-0.265	0	38.89	0	4.14	4.261	-0.121
441.6	57.993	-0.613	-0.54	0	38.85	0	4.141	4.262	-0.121
441.7	57.986	-0.613	-0.83	0	38.91	0	4.142	4.263	-0.121
441.8	57.98	-0.61	-1.049	0	39.66	0	4.143	4.264	-0.121
441.9	57.98	-0.6	-0.795	0	39.95	0	4.144	4.265	-0.121
442	57.974	-0.6	-1.035	0	39.89	0	4.145	4.266	-0.121
442.1	57.974	-0.615	-0.618	0	39.93	0	4.146	4.267	-0.121
442.2	57.974	-0.635	-0.692	0	39.88	0	4.147	4.269	-0.121
442.3	57.968	-0.635	-0.29	0	39.9	0	4.148	4.27	-0.121
442.4	57.974	-0.615	-0.371	0	39.9	0	4.15	4.271	-0.121
442.5	57.968	-0.615	-1.172	0	39.9	0	4.151	4.272	-0.121
442.6	57.968	-0.605	-1.063	0	40.25	0	4.152	4.273	-0.121
442.7	57.968	-0.605	-0.89	0	40.74	0	4.153	4.274	-0.121
442.8	57.968	-0.613	-0.89	0	40.69	0	4.154	4.275	-0.121
442.9	57.968	-0.613	-0.777	0	40.72	0	4.155	4.276	-0.121
443	57.968	-0.625	-0.371	0	40.73	0	4.156	4.277	-0.121
443.1	57.968	-0.613	-0.18	0	40.7	0	4.157	4.279	-0.121
443.2	57.968	-0.613	-0.844	0	40.71	0	4.159	4.28	-0.121
443.3	57.968	-0.6	-0.692	0	40.7	0	4.16	4.281	-0.121
443.4	57.968	-0.585	-0.653	0	40.7	0	4.161	4.282	-0.121
443.5	57.968	-0.585	-1.063	0	40.72	0	4.162	4.283	-0.121
443.6	57.968	-0.62	-0.844	0	40.69	0	4.163	4.284	-0.121
443.7	57.968	-0.62	-0.533	0	40.81	0	4.164	4.285	-0.121
443.8	57.968	-0.615	-0.618	0	41.7	0	4.165	4.287	-0.121
443.9	57.968	-0.613	-1.201	0	42.57	0	4.167	4.288	-0.121
444	57.974	-0.62	-0.632	0	42.46	0	4.168	4.289	-0.121
444.1	57.974	-0.62	-0.36	0	42.52	0	4.169	4.29	-0.121
444.2	57.974	-0.613	-0.646	0	42.45	0	4.17	4.291	-0.121
444.3	57.98	-0.613	-0.773	0	42.96	0	4.171	4.292	-0.121
444.4	57.986	-0.613	-0.738	0	43.21	0	4.173	4.294	-0.121
444.5	57.986	-0.61	-0.533	0	43.27	0	4.174	4.295	-0.121
444.6	57.986	-0.618	-0.738	0	43.25	0	4.175	4.296	-0.121
444.7	57.993	-0.618	-0.622	0	44.57	0	4.176	4.297	-0.121
444.8	57.999	-0.62	-0.664	0	45.67	0	4.177	4.299	-0.121
444.9	58.005	-0.608	-0.696	0	45.92	0	4.179	4.3	-0.121
445	58.011	-0.608	-1.021	0	45.86	0	4.18	4.301	-0.121
445.1	58.024	-0.62	-1.081	0	45.9	0	4.181	4.302	-0.121
445.2	58.036	-0.615	-0.35	0	45.87	0	4.183	4.304	-0.121
445.3	58.036	-0.615	-0.547	0	45.87	0	4.183	4.304	-0.121
445.4	58.042	-0.61	-0.865	0	45.94	0	4.185	4.306	-0.121
445.5	58.055	-0.61	-0.618	0	45.84	0	4.186	4.308	-0.121
445.6	58.061	-0.623	-0.777	0	45.93	0	4.188	4.309	-0.121
445.7	58.067	-0.623	-0.509	0	45.88	0	4.189	4.31	-0.121
445.8	58.073	-0.615	-0.505	0	46	0	4.19	4.311	-0.121

445.9	58.08	-0.615	-0.833	0	45.91	0	4.191	4.313	-0.121
446	58.092	-0.64	-1.119	0	45.95	0	4.193	4.314	-0.121
446.1	58.098	-0.648	-0.265	0	45.91	0	4.194	4.315	-0.121
446.2	58.104	-0.648	-0.441	0	45.95	0	4.195	4.316	-0.121
446.3	58.111	-0.62	-0.858	0	45.32	0	4.197	4.318	-0.121
446.4	58.123	-0.608	-0.636	0	45.16	0	4.198	4.319	-0.121
446.5	58.123	-0.608	-1.243	0	45.15	0	4.199	4.32	-0.121
446.6	58.135	-0.625	-0.89	0	45.18	0	4.2	4.321	-0.121
446.7	58.135	-0.625	-0.763	0	45.15	0	4.202	4.323	-0.121
446.8	58.142	-0.613	-0.929	0	45.21	0	4.203	4.324	-0.121
446.9	58.148	-0.623	-1.49	0	45.12	0	4.204	4.325	-0.121
447	58.148	-0.61	-0.632	0	44.9	0	4.205	4.326	-0.121
447.1	58.16	-0.61	-0.424	0	44.96	0	4.207	4.328	-0.121
447.2	58.173	-0.608	-1.345	0	44.92	0	4.208	4.329	-0.121
447.3	58.173	-0.625	-0.851	0	44.97	0	4.209	4.33	-0.121
447.4	58.179	-0.625	-0.046	0	44.9	0	4.21	4.331	-0.121
447.5	58.185	-0.618	-0.417	0	44.98	0	4.212	4.333	-0.121
447.6	58.185	-0.608	-0.858	0	44.9	0	4.213	4.334	-0.121
447.7	58.191	-0.608	-1.148	0	44.96	0	4.214	4.335	-0.121
447.8	58.198	-0.603	-0.763	0	44.94	0	4.215	4.336	-0.121
447.9	58.204	-0.6	-0.413	0	44.97	0	4.217	4.338	-0.121
448	58.21	-0.6	-0.858	0	44.96	0	4.218	4.339	-0.121
448.1	58.216	-0.593	-0.547	0	44.99	0	4.219	4.34	-0.121
448.2	58.222	-0.61	-1.123	0	45.02	0	4.22	4.341	-0.121
448.3	58.229	-0.61	-0.646	0	44.01	0	4.222	4.343	-0.121
448.4	58.229	-0.635	-0.516	0	43.46	0	4.223	4.344	-0.121
448.5	58.235	-0.635	-0.388	0	42.58	0	4.224	4.345	-0.121
448.6	58.235	-0.593	-1.148	0	42.47	0	4.225	4.346	-0.121
448.7	58.241	-0.593	-0.523	0	42.35	0	4.226	4.347	-0.121
448.8	58.241	-0.61	-0.547	0	41.63	0	4.227	4.349	-0.121
448.9	58.241	-0.61	-0.219	0	41.69	0	4.229	4.35	-0.121
449	58.241	-0.615	-1.176	0	41.64	0	4.23	4.351	-0.121
449.1	58.247	-0.61	0.138	0	41.7	0	4.231	4.352	-0.121
449.2	58.247	-0.61	-0.851	0	41.62	0	4.232	4.353	-0.121
449.3	58.241	-0.628	-0.749	0	41.58	0	4.233	4.354	-0.121
449.4	58.247	-0.613	-0.247	0	38.7	0	4.234	4.355	-0.121
449.5	58.241	-0.613	-0.547	0	38.7	0	4.234	4.355	-0.121
449.6	58.235	-0.628	-1.218	0	36.2	0	4.236	4.357	-0.121
449.7	58.229	-0.628	-0.162	0	36.01	0	4.237	4.358	-0.121
449.8	58.222	-0.628	-0.162	0	35.68	0	4.238	4.359	-0.121
449.9	58.21	-0.615	-1.021	0	35.22	0	4.239	4.36	-0.121
450	58.204	-0.61	-0.876	0	35.29	0	4.24	4.361	-0.121
450.1	58.191	-0.61	-0.509	0	35.34	0	4.241	4.362	-0.121
450.2	58.185	-0.598	-1.105	0	35.45	0	4.242	4.363	-0.121
450.3	58.179	-0.608	-0.996	0	35.35	0	4.243	4.364	-0.121
450.4	58.167	-0.608	-0.501	0	35.43	0	4.244	4.365	-0.121
450.5	58.16	-0.593	-0.819	0	35.35	0	4.245	4.366	-0.121

450.6	58.148	-0.615	-1.391	0	35.41	0	4.246	4.367	-0.121
450.7	58.142	-0.615	-0.021	0	35.37	0	4.247	4.368	-0.121
450.8	58.135	-0.608	-0.487	0	35.39	0	4.248	4.369	-0.121
450.9	58.123	-0.598	-0.858	0	35.4	0	4.249	4.37	-0.121
451	58.117	-0.598	-0.943	0	35.4	0	4.25	4.371	-0.121
451.1	58.111	-0.623	-0.816	0	35.36	0	4.251	4.372	-0.121
451.2	58.098	-0.61	-0.219	0	35.19	0	4.252	4.373	-0.121
451.3	58.086	-0.61	-0.388	0	35.23	0	4.253	4.374	-0.121
451.4	58.08	-0.61	-1.271	0	35.16	0	4.254	4.375	-0.121
451.5	58.073	-0.61	-0.448	0	35.2	0	4.255	4.376	-0.121
451.6	58.061	-0.618	-0.452	0	35.14	0	4.256	4.377	-0.121
451.7	58.055	-0.618	-1.187	0	35.2	0	4.257	4.378	-0.121
451.8	58.048	-0.603	-1.271	0	35.15	0	4.258	4.379	-0.121
451.9	58.042	-0.603	-0.692	0	35.97	0	4.259	4.38	-0.121
452	58.036	-0.615	-0.692	0	35.86	0	4.26	4.381	-0.121
452.1	58.024	-0.62	-0.547	0	35.92	0	4.261	4.382	-0.121
452.2	58.017	-0.62	-0.219	0	36.59	0	4.262	4.383	-0.121
452.3	58.017	-0.608	-1.01	0	37.24	0	4.263	4.384	-0.121
452.4	58.011	-0.613	-0.862	0	37.36	0	4.264	4.385	-0.121
452.5	58.005	-0.613	-0.692	0	37.47	0	4.265	4.386	-0.121
452.6	57.999	-0.603	-0.533	0	37.88	0	4.266	4.387	-0.121
452.7	57.999	-0.603	-0.65	0	38.23	0	4.267	4.388	-0.121
452.8	57.993	-0.615	-0.65	0	38.12	0	4.268	4.389	-0.121
452.9	57.986	-0.623	-0.388	0	38.22	0	4.269	4.39	-0.121
453	57.986	-0.618	-0.533	0	38.12	0	4.27	4.391	-0.121
453.1	57.986	-0.618	-0.533	0	38.19	0	4.271	4.393	-0.121
453.2	57.98	-0.613	-1.109	0	38.09	0	4.272	4.394	-0.121
453.3	57.974	-0.623	-0.724	0	37.61	0	4.274	4.395	-0.121
453.4	57.968	-0.623	-0.166	0	36.04	0	4.275	4.396	-0.121
453.5	57.962	-0.6	-0.664	0	35.89	0	4.276	4.397	-0.121
453.6	57.962	-0.6	-1.172	0	35.8	0	4.277	4.398	-0.121
453.7	57.949	-0.6	-0.607	0	35.8	0	4.277	4.398	-0.121
453.8	57.943	-0.603	-0.692	0	36.05	0	4.279	4.4	-0.121
453.9	57.937	-0.613	-0.985	0	36.69	0	4.28	4.401	-0.121
454	57.93	-0.613	-0.441	0	36.69	0	4.281	4.402	-0.121
454.1	57.924	-0.633	-0.456	0	37.43	0	4.282	4.403	-0.121
454.2	57.918	-0.64	-0.777	0	37.3	0	4.283	4.404	-0.121
454.3	57.912	-0.64	0.177	0	37.91	0	4.284	4.405	-0.121
454.4	57.912	-0.6	-1.187	0	38.09	0	4.285	4.406	-0.121
454.5	57.906	-0.6	-1.458	0	38.16	0	4.286	4.407	-0.121
454.6	57.906	-0.613	-0.918	0	38.08	0	4.287	4.408	-0.121
454.7	57.899	-0.613	-0.371	0	38.38	0	4.288	4.409	-0.121
454.8	57.899	-0.613	-0.371	0	40.43	0	4.289	4.41	-0.121
454.9	57.893	-0.613	-1.091	0	41.58	0	4.29	4.411	-0.121
455	57.893	-0.62	-0.795	0	42.54	0	4.291	4.413	-0.121
455.1	57.899	-0.628	-0.547	0	42.55	0	4.293	4.414	-0.121
455.2	57.899	-0.628	-0.886	0	42.49	0	4.294	4.415	-0.121

455.3	57.906	-0.6	-0.519	0	42.55	0	4.295	4.416	-0.121
455.4	57.906	-0.61	-1.285	0	42.5	0	4.296	4.417	-0.121
455.5	57.912	-0.61	-0.459	0	42.57	0	4.297	4.418	-0.121
455.6	57.912	-0.615	-0.431	0	42.5	0	4.298	4.42	-0.121
455.7	57.912	-0.615	-0.604	0	42.55	0	4.3	4.421	-0.121
455.8	57.918	-0.62	-0.519	0	42.55	0	4.301	4.422	-0.121
455.9	57.924	-0.623	-0.533	0	42.57	0	4.302	4.423	-0.121
456	57.924	-0.615	-0.752	0	42.54	0	4.303	4.424	-0.121
456.1	57.924	-0.615	-0.975	0	42.57	0	4.304	4.426	-0.121
456.2	57.93	-0.62	-1.045	0	42.53	0	4.306	4.427	-0.121
456.3	57.93	-0.628	-0.71	0	42.61	0	4.307	4.428	-0.121
456.4	57.937	-0.628	-0.431	0	42.56	0	4.308	4.429	-0.121
456.5	57.937	-0.623	-0.399	0	42.55	0	4.309	4.43	-0.121
456.6	57.937	-0.605	-0.692	0	42.54	0	4.31	4.431	-0.121
456.7	57.943	-0.605	-1.345	0	42.57	0	4.311	4.433	-0.121
456.8	57.949	-0.603	-0.343	0	42.58	0	4.313	4.434	-0.121
456.9	57.949	-0.61	-0.844	0	42.58	0	4.314	4.435	-0.121
457	57.949	-0.61	-0.459	0	42.59	0	4.315	4.436	-0.121
457.1	57.955	-0.615	-0.777	0	42.56	0	4.316	4.437	-0.121
457.2	57.955	-0.628	-0.678	0	42.62	0	4.317	4.439	-0.121
457.3	57.962	-0.628	-0.194	0	41.71	0	4.319	4.44	-0.121
457.4	57.962	-0.618	-0.343	0	41.77	0	4.32	4.441	-0.121
457.5	57.962	-0.618	-1.021	0	41.72	0	4.321	4.442	-0.121
457.6	57.968	-0.648	-0.357	0	41.8	0	4.322	4.443	-0.121
457.7	57.968	-0.648	-0.876	0	41.76	0	4.323	4.444	-0.121
457.8	57.968	-0.603	-0.876	0	41.79	0	4.324	4.445	-0.121
457.9	57.974	-0.603	-1.43	0	41.79	0	4.324	4.445	-0.121
458	57.974	-0.623	-0.862	0	41.75	0	4.327	4.448	-0.121
458.1	57.974	-0.625	-0.074	0	41.78	0	4.328	4.449	-0.121
458.2	57.98	-0.625	-0.763	0	41.75	0	4.329	4.45	-0.121
458.3	57.98	-0.623	-0.604	0	41.81	0	4.33	4.451	-0.121
458.4	57.98	-0.628	-1.119	0	41.69	0	4.331	4.452	-0.121
458.5	57.986	-0.628	-0.371	0	41.82	0	4.332	4.454	-0.121
458.6	57.986	-0.615	-0.837	0	41.73	0	4.334	4.455	-0.121
458.7	57.993	-0.615	-0.943	0	41.82	0	4.335	4.456	-0.121
458.8	57.993	-0.613	-0.943	0	41.72	0	4.336	4.457	-0.121
458.9	57.993	-0.62	-0.929	0	41.82	0	4.337	4.458	-0.121
459	57.993	-0.62	-0.763	0	41.73	0	4.338	4.459	-0.121
459.1	57.999	-0.62	-0.678	0	41.81	0	4.339	4.461	-0.121
459.2	57.999	-0.603	-1.105	0	41.76	0	4.341	4.462	-0.121
459.3	57.999	-0.6	-0.777	0	41.83	0	4.342	4.463	-0.121
459.4	57.999	-0.6	-0.879	0	41.76	0	4.343	4.464	-0.121
459.5	58.005	-0.623	-0.777	0	41.82	0	4.344	4.465	-0.121
459.6	58.005	-0.623	-0.233	0	41.75	0	4.345	4.466	-0.121
459.7	58.005	-0.623	-0.858	0	41.84	0	4.346	4.468	-0.121
459.8	58.005	-0.625	-0.763	0	41.73	0	4.348	4.469	-0.121
459.9	58.005	-0.633	-0.777	0	41.82	0	4.349	4.47	-0.121

460	58.011	-0.633	-0.191	0	41.74	0	4.35	4.471	-0.121
460.1	58.011	-0.643	-0.678	0	41.83	0	4.351	4.472	-0.121
460.2	58.011	-0.64	-0.519	0	41.75	0	4.352	4.473	-0.121
460.3	58.011	-0.64	-0.604	0	41.82	0	4.353	4.475	-0.121
460.4	58.011	-0.658	-0.406	0	41.75	0	4.355	4.476	-0.121
460.5	58.017	-0.658	-0.625	0	41.84	0	4.356	4.477	-0.121
460.6	58.017	-0.625	-1.275	0	41.76	0	4.357	4.478	-0.121
460.7	58.017	-0.625	-0.622	0	41.83	0	4.358	4.479	-0.121
460.8	58.017	-0.64	-0.622	0	41.78	0	4.359	4.48	-0.121
460.9	58.017	-0.64	-0.533	0	41.81	0	4.36	4.481	-0.121
461	58.017	-0.618	-0.692	0	41.79	0	4.362	4.483	-0.121
461.1	58.024	-0.623	-1.148	0	41.81	0	4.363	4.484	-0.121
461.2	58.024	-0.623	-1.024	0	41.79	0	4.364	4.485	-0.121
461.3	58.024	-0.618	-0.237	0	41.78	0	4.365	4.486	-0.121
461.4	58.03	-0.625	-0.929	0	41.8	0	4.366	4.487	-0.121
461.5	58.03	-0.625	-0.795	0	41.79	0	4.367	4.488	-0.121
461.6	58.03	-0.618	-0.692	0	41.81	0	4.368	4.49	-0.121
461.7	58.03	-0.618	-0.618	0	41.79	0	4.37	4.491	-0.121
461.8	58.036	-0.63	-0.618	0	41.83	0	4.371	4.492	-0.121
461.9	58.036	-0.635	-0.618	0	41.78	0	4.372	4.493	-0.121
462	58.036	-0.633	-0.692	0	41.86	0	4.373	4.494	-0.121
462.1	58.036	-0.633	-0.42	0	41.86	0	4.373	4.494	-0.121
462.2	58.042	-0.623	-1.243	0	41.86	0	4.375	4.497	-0.121
462.3	58.042	-0.618	-0.823	0	41.79	0	4.377	4.498	-0.121
462.4	58.048	-0.618	-0.604	0	41.89	0	4.378	4.499	-0.121
462.5	58.048	-0.62	-0.989	0	41.79	0	4.379	4.5	-0.121
462.6	58.048	-0.6	-0.456	0	41.87	0	4.38	4.501	-0.121
462.7	58.048	-0.6	-1.091	0	41.8	0	4.381	4.502	-0.121
462.8	58.048	-0.615	-1.176	0	41.89	0	4.382	4.504	-0.121
462.9	58.055	-0.615	-0.445	0	41.8	0	4.384	4.505	-0.121
463	58.055	-0.615	-0.607	0	41.89	0	4.385	4.506	-0.121
463.1	58.055	-0.615	-0.918	0	41.8	0	4.386	4.507	-0.121
463.2	58.055	-0.615	-0.929	0	41.88	0	4.387	4.508	-0.121
463.3	58.061	-0.615	-0.441	0	41.79	0	4.388	4.509	-0.121
463.4	58.061	-0.62	-0.749	0	41.89	0	4.389	4.511	-0.121
463.5	58.061	-0.62	-0.371	0	41.8	0	4.391	4.512	-0.121
463.6	58.061	-0.635	-0.618	0	41.89	0	4.392	4.513	-0.121
463.7	58.061	-0.635	-0.36	0	41.8	0	4.393	4.514	-0.121
463.8	58.067	-0.635	-0.279	0	41.87	0	4.394	4.515	-0.121
463.9	58.067	-0.635	-0.678	0	41.8	0	4.395	4.516	-0.121
464	58.067	-0.625	-1.028	0	41.88	0	4.396	4.517	-0.121
464.1	58.067	-0.635	-1.211	0	41.81	0	4.398	4.519	-0.121
464.2	58.067	-0.635	-0.247	0	41.87	0	4.399	4.52	-0.121
464.3	58.067	-0.605	-1.006	0	41.8	0	4.4	4.521	-0.121
464.4	58.073	-0.628	-1.416	0	41.91	0	4.401	4.522	-0.121
464.5	58.073	-0.628	-0.148	0	41.82	0	4.402	4.523	-0.121
464.6	58.073	-0.608	-0.06	0	41.87	0	4.403	4.524	-0.121

464.7	58.08	-0.608	-0.798	0	41.82	0	4.404	4.526	-0.121
464.8	58.08	-0.615	-0.798	0	41.89	0	4.406	4.527	-0.121
464.9	58.08	-0.628	-0.148	0	41.81	0	4.407	4.528	-0.121
465	58.08	-0.608	-0.646	0	41.93	0	4.408	4.529	-0.121
465.1	58.086	-0.608	-1.416	0	41.81	0	4.409	4.53	-0.121
465.2	58.086	-0.608	-0.968	0	41.92	0	4.41	4.531	-0.121
465.3	58.086	-0.603	-0.357	0	41.83	0	4.411	4.533	-0.121
465.4	58.086	-0.603	-0.71	0	41.91	0	4.413	4.534	-0.121
465.5	58.092	-0.625	-0.636	0	41.83	0	4.414	4.535	-0.121
465.6	58.092	-0.633	-0.456	0	42.02	0	4.415	4.536	-0.121
465.7	58.092	-0.633	-0.371	0	42	0	4.416	4.537	-0.121
465.8	58.092	-0.605	-1.006	0	42.07	0	4.417	4.538	-0.121
465.9	58.092	-0.6	-1.021	0	42.04	0	4.418	4.54	-0.121
466	58.098	-0.6	-0.713	0	42.08	0	4.42	4.541	-0.121
466.1	58.098	-0.59	-0.901	0	42.05	0	4.421	4.542	-0.121
466.2	58.098	-0.623	-0.929	0	42.08	0	4.422	4.543	-0.121
466.3	58.098	-0.623	-0.357	0	42.08	0	4.422	4.543	-0.121
466.4	58.098	-0.62	0.297	0	41.99	0	4.424	4.545	-0.121
466.5	58.098	-0.62	-1.172	0	41.9	0	4.425	4.547	-0.121
466.6	58.104	-0.613	-1.014	0	41.89	0	4.427	4.548	-0.121
466.7	58.104	-0.613	-1.052	0	41.72	0	4.428	4.549	-0.121
466.8	58.104	-0.628	-1.052	0	41.68	0	4.429	4.55	-0.121
466.9	58.104	-0.628	-0.519	0	41.57	0	4.43	4.551	-0.121
467	58.104	-0.598	-0.519	0	40.92	0	4.431	4.552	-0.121
467.1	58.104	-0.608	-1.331	0	39.69	0	4.432	4.553	-0.121
467.2	58.111	-0.608	-0.848	0	38.24	0	4.433	4.555	-0.121
467.3	58.104	-0.618	-0.275	0	37.27	0	4.434	4.556	-0.121
467.4	58.098	-0.618	-0.749	0	36.51	0	4.435	4.557	-0.121
467.5	58.092	-0.618	-0.678	0	36.61	0	4.436	4.558	-0.121
467.6	58.086	-0.61	-0.505	0	36.1	0	4.437	4.559	-0.121
467.7	58.08	-0.61	-0.992	0	35.14	0	4.438	4.56	-0.121
467.8	58.067	-0.605	-0.992	0	34.15	0	4.439	4.561	-0.121
467.9	58.061	-0.623	-0.682	0	33.73	0	4.44	4.561	-0.121
468	58.048	-0.615	-0.148	0	33.83	0	4.441	4.562	-0.121
468.1	58.036	-0.615	-0.664	0	33.72	0	4.442	4.563	-0.121
468.2	58.03	-0.618	-1.172	0	33.81	0	4.443	4.564	-0.121
468.3	58.017	-0.623	-0.558	0	33.71	0	4.444	4.565	-0.121
468.4	58.005	-0.623	-0.547	0	33.8	0	4.445	4.566	-0.121
468.5	57.999	-0.633	-0.929	0	33.69	0	4.446	4.567	-0.121
468.6	57.986	-0.623	-0.148	0	33.75	0	4.447	4.568	-0.121
468.7	57.974	-0.623	-0.459	0	33.69	0	4.448	4.569	-0.121
468.8	57.968	-0.59	-1.3	0	33.74	0	4.449	4.57	-0.121
468.9	57.955	-0.603	-1.3	0	33.69	0	4.45	4.571	-0.121
469	57.943	-0.603	-0.237	0	33.73	0	4.451	4.572	-0.121
469.1	57.937	-0.613	-0.357	0	33.68	0	4.452	4.573	-0.121
469.2	57.924	-0.635	-1.077	0	33.69	0	4.453	4.574	-0.121
469.3	57.918	-0.635	-0.032	0	33.68	0	4.453	4.575	-0.121

469.4	57.906	-0.618	-0.265	0	33.71	0	4.454	4.576	-0.121
469.5	57.893	-0.618	-1.261	0	33.71	0	4.455	4.576	-0.121
469.6	57.887	-0.633	-1.243	0	33.66	0	4.456	4.577	-0.121
469.7	57.875	-0.633	-0.59	0	33.21	0	4.457	4.578	-0.121
469.8	57.862	-0.63	-0.505	0	31.43	0	4.458	4.579	-0.121
469.9	57.85	-0.63	-0.491	0	30.3	0	4.459	4.58	-0.121
470	57.837	-0.603	-1.317	0	28.76	0	4.46	4.581	-0.121
470.1	57.819	-0.593	-0.844	0	28.39	0	4.46	4.582	-0.121
470.2	57.8	-0.593	-0.872	0	28.04	0	4.461	4.582	-0.121
470.3	57.781	-0.615	-0.604	0	28.12	0	4.462	4.583	-0.121
470.4	57.763	-0.625	-0.477	0	27.65	0	4.463	4.584	-0.121
470.5	57.744	-0.625	-0.749	0	27.65	0	4.463	4.584	-0.121
470.6	57.725	-0.605	-0.59	0	27.33	0	4.464	4.585	-0.121
470.7	57.707	-0.605	-0.929	0	27.32	0	4.465	4.586	-0.121
470.8	57.682	-0.628	-0.929	0	27.63	0	4.466	4.587	-0.121
470.9	57.663	-0.655	-0.018	0	28.02	0	4.467	4.588	-0.121
471	57.645	-0.615	-0.219	0	27.97	0	4.467	4.589	-0.121
471.1	57.632	-0.615	-1.829	0	28	0	4.468	4.589	-0.121
471.2	57.614	-0.62	-1.052	0	27.96	0	4.469	4.59	-0.121
471.3	57.595	-0.615	-0.261	0	26.84	0	4.47	4.591	-0.121
471.4	57.57	-0.615	-0.961	0	25.42	0	4.47	4.592	-0.121
471.5	57.558	-0.63	-0.664	0	24.19	0	4.471	4.592	-0.121
471.6	57.527	-0.625	-0.547	0	23.43	0	4.472	4.593	-0.121
471.7	57.502	-0.625	-0.763	0	23.03	0	4.472	4.594	-0.121
471.8	57.477	-0.6	-0.915	0	21.27	0	4.473	4.594	-0.121
471.9	57.446	-0.598	-1.021	0	19.14	0	4.474	4.595	-0.121
472	57.415	-0.598	-0.95	0	17.06	0	4.474	4.595	-0.121
472.1	57.377	-0.625	-0.858	0	16.53	0	4.474	4.596	-0.121
472.2	57.346	-0.62	-0.427	0	16.54	0	4.475	4.596	-0.121
472.3	57.309	-0.62	-0.618	0	16.6	0	4.475	4.596	-0.121
472.4	57.278	-0.615	-1.172	0	17.21	0	4.476	4.597	-0.121
472.5	57.241	-0.615	-0.65	0	17.23	0	4.476	4.597	-0.121
472.6	57.21	-0.643	-0.473	0	17.19	0	4.477	4.598	-0.121
472.7	57.179	-0.643	-0.752	0	17.17	0	4.477	4.598	-0.121
472.8	57.141	-0.61	-0.664	0	17.22	0	4.478	4.599	-0.121
472.9	57.104	-0.61	-1.158	0	17.15	0	4.478	4.599	-0.121
473	57.073	-0.598	-1.229	0	17.16	0	4.479	4.6	-0.121
473.1	57.036	-0.598	-0.632	0	16.24	0	4.479	4.6	-0.121
473.2	57.005	-0.598	-0.83	0	15.34	0	4.48	4.601	-0.121
473.3	56.967	-0.603	-0.579	0	15.03	0	4.48	4.601	-0.121
473.4	56.924	-0.6	-0.622	0	13.52	0	4.48	4.602	-0.121
473.5	56.887	-0.6	-1.081	0	11.83	0	4.481	4.602	-0.121
473.6	56.849	-0.633	-0.332	0	10.28	0	4.481	4.602	-0.121
473.7	56.8	-0.633	-0.816	0	9.94	0	4.481	4.602	-0.121
473.8	56.756	-0.625	-0.901	0	9.95	0	4.482	4.603	-0.121
473.9	56.713	-0.61	-0.667	0	9.95	0	4.482	4.603	-0.121
474	56.663	-0.603	-0.667	0	10.12	0	4.482	4.603	-0.121

474.1	56.619	-0.603	-1.197	0	10.45	0	4.482	4.604	-0.121
474.2	56.576	-0.603	-0.547	0	10.63	0	4.483	4.604	-0.121
474.3	56.532	-0.595	-0.607	0	10.82	0	4.483	4.604	-0.121
474.4	56.489	-0.595	-1.112	0	11.35	0	4.483	4.604	-0.121
474.5	56.445	-0.623	-0.505	0	12.63	0	4.484	4.605	-0.121
474.6	56.402	-0.61	-0.371	0	14.35	0	4.484	4.605	-0.121
474.7	56.365	-0.61	-0.872	0	14.35	0	4.484	4.605	-0.121
474.8	56.334	-0.595	-1.243	0	15.91	0	4.485	4.606	-0.121
474.9	56.296	-0.608	-0.664	0	16.53	0	4.485	4.606	-0.121
475	56.259	-0.608	-0.177	0	19.19	0	4.486	4.607	-0.121
475.1	56.234	-0.595	-0.547	0	21.77	0	4.487	4.608	-0.121
475.2	56.203	-0.595	-0.992	0	23.74	0	4.487	4.608	-0.121
475.3	56.184	-0.595	-0.89	0	24.43	0	4.488	4.609	-0.121
475.4	56.16	-0.593	-0.491	0	25.12	0	4.489	4.61	-0.121
475.5	56.141	-0.593	-0.735	0	25.01	0	4.489	4.61	-0.121
475.6	56.122	-0.62	-0.901	0	25.1	0	4.49	4.611	-0.121
475.7	56.104	-0.62	-0.399	0	25.01	0	4.491	4.612	-0.121
475.8	56.079	-0.638	-0.399	0	25.3	0	4.491	4.612	-0.121
475.9	56.066	-0.638	-0.332	0	25.22	0	4.492	4.613	-0.121
476	56.041	-0.623	-1.102	0	25.3	0	4.493	4.614	-0.121
476.1	56.023	-0.62	-1.102	0	25.2	0	4.493	4.615	-0.121
476.2	56.004	-0.62	-0.328	0	25.27	0	4.494	4.615	-0.121
476.3	55.979	-0.605	-1.006	0	25.23	0	4.495	4.616	-0.121
476.4	55.967	-0.625	-0.946	0	25.24	0	4.496	4.617	-0.121
476.5	55.942	-0.625	-0.427	0	25.25	0	4.496	4.617	-0.121
476.6	55.93	-0.633	-0.177	0	24.56	0	4.497	4.618	-0.121
476.7	55.905	-0.633	-0.823	0	23.25	0	4.498	4.619	-0.121
476.8	55.886	-0.633	-0.713	0	20.61	0	4.498	4.619	-0.121
476.9	55.855	-0.603	-0.844	0	19.18	0	4.499	4.62	-0.121
477	55.824	-0.625	-1.388	0	18.24	0	4.499	4.62	-0.121
477.1	55.799	-0.625	-0.59	0	17.52	0	4.5	4.621	-0.121
477.2	55.768	-0.628	-0.233	0	17.02	0	4.5	4.621	-0.121
477.3	55.731	-0.61	-0.72	0	16.29	0	4.501	4.622	-0.121
477.4	55.706	-0.61	-1.257	0	16.24	0	4.501	4.622	-0.121
477.5	55.669	-0.618	-1.063	0	16.24	0	4.501	4.623	-0.121
477.6	55.638	-0.623	-0.562	0	16.28	0	4.502	4.623	-0.121
477.7	55.6	-0.623	-0.403	0	16.22	0	4.502	4.624	-0.121
477.8	55.569	-0.615	-0.901	0	16.87	0	4.503	4.624	-0.121
477.9	55.538	-0.62	-0.59	0	17.18	0	4.503	4.624	-0.121
478	55.507	-0.62	-0.844	0	17.81	0	4.504	4.625	-0.121
478.1	55.476	-0.618	-0.328	0	19.09	0	4.504	4.625	-0.121
478.2	55.451	-0.62	-0.992	0	20.38	0	4.505	4.626	-0.121
478.3	55.42	-0.62	-0.328	0	21.3	0	4.506	4.627	-0.121
478.4	55.401	-0.605	-0.65	0	23.23	0	4.506	4.627	-0.121
478.5	55.377	-0.605	-0.904	0	24.2	0	4.507	4.628	-0.121
478.6	55.358	-0.615	-0.964	0	25.13	0	4.508	4.629	-0.121
478.7	55.339	-0.615	-0.65	0	25.76	0	4.508	4.629	-0.121

478.8	55.321	-0.613	-0.735	0	26.74	0	4.509	4.63	-0.121
478.9	55.308	-0.615	-0.809	0	26.74	0	4.509	4.63	-0.121
479	55.29	-0.623	-0.403	0	27.77	0	4.511	4.632	-0.121
479.1	55.283	-0.653	-0.664	0	27.84	0	4.511	4.632	-0.121
479.2	55.265	-0.653	-0.332	0	27.77	0	4.512	4.633	-0.121
479.3	55.252	-0.618	-0.448	0	27.84	0	4.513	4.634	-0.121
479.4	55.24	-0.62	-1.469	0	27.79	0	4.514	4.635	-0.121
479.5	55.221	-0.62	-0.65	0	27.82	0	4.514	4.636	-0.121
479.6	55.209	-0.613	-0.191	0	27.78	0	4.515	4.636	-0.121
479.7	55.196	-0.613	-1.105	0	27.82	0	4.516	4.637	-0.121
479.8	55.178	-0.618	-1.105	0	27.76	0	4.517	4.638	-0.121
479.9	55.165	-0.623	-0.032	0	27.8	0	4.517	4.639	-0.121
480	55.153	-0.62	-1.067	0	27.74	0	4.518	4.639	-0.121
480.1	55.14	-0.62	-0.494	0	27.82	0	4.519	4.64	-0.121
480.2	55.128	-0.628	-1.148	0	27.72	0	4.52	4.641	-0.121
480.3	55.116	-0.618	-0.477	0	27.81	0	4.521	4.642	-0.121
480.4	55.097	-0.618	-0.763	0	27.72	0	4.521	4.642	-0.121
480.5	55.091	-0.605	-1.388	0	27.81	0	4.522	4.643	-0.121
480.6	55.072	-0.613	-0.65	0	27.7	0	4.523	4.644	-0.121
480.7	55.06	-0.61	-0.565	0	27.77	0	4.524	4.645	-0.121
480.8	55.047	-0.615	-0.819	0	27.7	0	4.524	4.646	-0.121
480.9	55.035	-0.618	-0.65	0	27.73	0	4.525	4.646	-0.121
481	55.022	-0.618	-0.795	0	27.7	0	4.526	4.647	-0.121
481.1	55.01	-0.603	-0.607	0	27.83	0	4.527	4.648	-0.121
481.2	54.998	-0.603	-1.077	0	27.83	0	4.528	4.649	-0.121
481.3	54.979	-0.603	-0.562	0	27.89	0	4.528	4.649	-0.121
481.4	54.973	-0.618	-0.706	0	27.86	0	4.529	4.65	-0.121
481.5	54.954	-0.618	-0.622	0	27.9	0	4.53	4.651	-0.121
481.6	54.942	-0.605	-0.805	0	27.99	0	4.531	4.652	-0.121
481.7	54.929	-0.605	-0.403	0	28.16	0	4.531	4.653	-0.121
481.8	54.917	-0.615	-0.378	0	28.11	0	4.532	4.653	-0.121
481.9	54.904	-0.615	-0.622	0	28.82	0	4.533	4.654	-0.121
482	54.892	-0.613	-0.749	0	28.81	0	4.534	4.655	-0.121
482.1	54.88	-0.61	-0.749	0	28.89	0	4.535	4.656	-0.121
482.2	54.873	-0.61	-0.519	0	28.79	0	4.535	4.657	-0.121
482.3	54.861	-0.603	-0.706	0	28.69	0	4.536	4.657	-0.121
482.4	54.848	-0.605	-0.65	0	28.62	0	4.537	4.658	-0.121
482.5	54.836	-0.605	-0.664	0	28.72	0	4.538	4.659	-0.121
482.6	54.824	-0.605	-0.547	0	29.29	0	4.539	4.66	-0.121
482.7	54.811	-0.605	-0.72	0	29.37	0	4.539	4.661	-0.121
482.8	54.805	-0.61	-0.664	0	29.27	0	4.54	4.661	-0.121
482.9	54.793	-0.618	-0.816	0	29.35	0	4.541	4.662	-0.121
483	54.78	-0.603	-0.752	0	29.27	0	4.542	4.663	-0.121
483.1	54.774	-0.603	-0.413	0	29.27	0	4.542	4.663	-0.121
483.2	54.761	-0.613	-1.144	0	29.28	0	4.543	4.665	-0.121
483.3	54.755	-0.613	-0.148	0	29.28	0	4.543	4.665	-0.121
483.4	54.743	-0.613	-0.593	0	29.28	0	4.545	4.666	-0.121

483.5	54.73	-0.615	-0.622	0	29.31	0	4.546	4.667	-0.121
483.6	54.718	-0.608	-0.664	0	29.28	0	4.547	4.668	-0.121
483.7	54.712	-0.608	-0.844	0	29.34	0	4.548	4.669	-0.121
483.8	54.699	-0.598	-0.925	0	30.72	0	4.548	4.67	-0.121
483.9	54.693	-0.613	-0.505	0	31.43	0	4.549	4.67	-0.121
484	54.687	-0.613	-0.427	0	31.47	0	4.55	4.671	-0.121
484.1	54.681	-0.628	-0.463	0	31.41	0	4.551	4.672	-0.121
484.2	54.674	-0.613	-0.473	0	31.47	0	4.552	4.673	-0.121
484.3	54.662	-0.613	-0.816	0	31.38	0	4.553	4.674	-0.121
484.4	54.656	-0.603	-1.155	0	31.47	0	4.554	4.675	-0.121
484.5	54.65	-0.603	-1.119	0	31.37	0	4.555	4.676	-0.121
484.6	54.643	-0.63	-0.014	0	31.99	0	4.555	4.677	-0.121
484.7	54.637	-0.63	-1.155	0	32.1	0	4.556	4.677	-0.121
484.8	54.631	-0.623	-1.155	0	32.14	0	4.557	4.678	-0.121
484.9	54.625	-0.623	-0.992	0	32.06	0	4.558	4.679	-0.121
485	54.619	-0.613	-0.343	0	32.61	0	4.559	4.68	-0.121
485.1	54.619	-0.615	-0.992	0	33.58	0	4.56	4.681	-0.121
485.2	54.619	-0.615	-1.201	0	34.25	0	4.561	4.682	-0.121
485.3	54.612	-0.62	-0.004	0	34.45	0	4.562	4.683	-0.121
485.4	54.612	-0.615	-0.501	0	34.47	0	4.563	4.684	-0.121
485.5	54.612	-0.615	-0.735	0	34.45	0	4.564	4.685	-0.121
485.6	54.606	-0.62	-0.519	0	34.48	0	4.565	4.686	-0.121
485.7	54.606	-0.62	-0.622	0	34.44	0	4.566	4.687	-0.121
485.8	54.6	-0.605	-0.706	0	34.47	0	4.567	4.688	-0.121
485.9	54.6	-0.608	-1.285	0	35.06	0	4.568	4.689	-0.121
486	54.6	-0.608	-0.65	0	35.12	0	4.569	4.69	-0.121
486.1	54.6	-0.608	-0.357	0	35.13	0	4.57	4.691	-0.121
486.2	54.6	-0.618	-0.992	0	35.1	0	4.571	4.692	-0.121
486.3	54.6	-0.61	-0.328	0	35.14	0	4.571	4.693	-0.121
486.4	54.594	-0.61	-0.992	0	35.08	0	4.572	4.694	-0.121
486.5	54.594	-0.62	-0.837	0	35.85	0	4.573	4.695	-0.121
486.6	54.594	-0.6	-0.459	0	35.86	0	4.574	4.696	-0.121
486.7	54.594	-0.6	-1.155	0	35.92	0	4.575	4.697	-0.121
486.8	54.6	-0.613	-1.155	0	35.85	0	4.576	4.698	-0.121
486.9	54.594	-0.613	-0.533	0	35.93	0	4.577	4.699	-0.121
487	54.594	-0.613	-0.816	0	35.87	0	4.578	4.7	-0.121
487.1	54.594	-0.625	-0.696	0	35.92	0	4.579	4.701	-0.121
487.2	54.6	-0.628	-0.3	0	36.44	0	4.58	4.702	-0.121
487.3	54.6	-0.628	-0.915	0	36.44	0	4.58	4.702	-0.121
487.4	54.594	-0.628	-0.477	0	36.62	0	4.582	4.704	-0.121
487.5	54.594	-0.628	-0.491	0	36.59	0	4.583	4.705	-0.121
487.6	54.594	-0.595	-1.303	0	36.65	0	4.585	4.706	-0.121
487.7	54.6	-0.595	-0.473	0	36.56	0	4.586	4.707	-0.121
487.8	54.6	-0.613	-0.558	0	36.65	0	4.587	4.708	-0.121
487.9	54.6	-0.613	-0.413	0	36.56	0	4.588	4.709	-0.121
488	54.6	-0.625	-0.816	0	36.66	0	4.589	4.71	-0.121
488.1	54.606	-0.61	-0.65	0	36.57	0	4.59	4.711	-0.121

488.2	54.606	-0.61	-0.77	0	36.65	0	4.591	4.712	-0.121
488.3	54.606	-0.6	-1.155	0	36.57	0	4.592	4.713	-0.121
488.4	54.606	-0.615	-1.006	0	36.61	0	4.593	4.714	-0.121
488.5	54.606	-0.615	-0.328	0	36.58	0	4.594	4.715	-0.121
488.6	54.606	-0.608	-0.491	0	36.65	0	4.595	4.716	-0.121
488.7	54.606	-0.608	-0.862	0	36.59	0	4.596	4.717	-0.121
488.8	54.612	-0.61	-0.862	0	36.62	0	4.597	4.718	-0.121
488.9	54.612	-0.608	-0.618	0	36.6	0	4.598	4.719	-0.121
489	54.612	-0.615	-0.773	0	36.61	0	4.599	4.72	-0.121
489.1	54.619	-0.615	-0.823	0	36.62	0	4.6	4.721	-0.121
489.2	54.619	-0.613	-0.816	0	36.6	0	4.601	4.722	-0.121
489.3	54.619	-0.603	-0.65	0	36.65	0	4.602	4.723	-0.121
489.4	54.619	-0.603	-0.876	0	36.6	0	4.603	4.724	-0.121
489.5	54.625	-0.625	-0.735	0	36.65	0	4.604	4.725	-0.121
489.6	54.619	-0.623	-0.162	0	36.6	0	4.605	4.726	-0.121
489.7	54.625	-0.623	-0.328	0	36.66	0	4.606	4.727	-0.121
489.8	54.625	-0.618	-1.059	0	36.59	0	4.607	4.728	-0.121
489.9	54.625	-0.618	-0.664	0	36.66	0	4.608	4.729	-0.121
490	54.625	-0.618	-0.233	0	36.58	0	4.609	4.73	-0.121
490.1	54.625	-0.608	-0.816	0	37.1	0	4.61	4.731	-0.121
490.2	54.631	-0.603	-0.777	0	37.4	0	4.611	4.732	-0.121
490.3	54.631	-0.603	-0.65	0	37.43	0	4.612	4.733	-0.121
490.4	54.631	-0.613	-1.112	0	37.41	0	4.613	4.734	-0.121
490.5	54.637	-0.613	-0.735	0	37.42	0	4.614	4.735	-0.121
490.6	54.637	-0.633	-0.071	0	37.41	0	4.615	4.736	-0.121
490.7	54.643	-0.633	-1.388	0	37.4	0	4.616	4.737	-0.121
490.8	54.643	-0.615	-1.303	0	36.69	0	4.617	4.738	-0.121
490.9	54.65	-0.615	-1.225	0	36.62	0	4.618	4.739	-0.121
491	54.65	-0.598	-0.975	0	36.66	0	4.619	4.74	-0.121
491.1	54.65	-0.598	-0.816	0	36.62	0	4.62	4.741	-0.121
491.2	54.65	-0.598	-1.105	0	36.72	0	4.621	4.742	-0.121
491.3	54.656	-0.625	-0.576	0	36.63	0	4.622	4.743	-0.121
491.4	54.65	-0.628	-0.65	0	36.72	0	4.623	4.744	-0.121
491.5	54.656	-0.628	0	0	36.72	0	4.623	4.744	-0.121
491.6	54.656	-0.585	-1.469	0	36.69	0	4.625	4.746	-0.121
491.7	54.656	-0.585	-0.399	0	36.61	0	4.626	4.748	-0.121
491.8	54.656	-0.615	-0.399	0	36.69	0	4.627	4.749	-0.121
491.9	54.662	-0.613	-0.261	0	36.66	0	4.628	4.75	-0.121
492	54.668	-0.618	-1.225	0	36.66	0	4.629	4.751	-0.121
492.1	54.662	-0.618	-0.491	0	36.68	0	4.63	4.752	-0.121
492.2	54.662	-0.605	-0.816	0	37.41	0	4.631	4.753	-0.121
492.3	54.668	-0.593	-0.975	0	38.08	0	4.633	4.754	-0.121
492.4	54.674	-0.593	-0.862	0	38.54	0	4.634	4.755	-0.121
492.5	54.674	-0.615	-0.975	0	40.17	0	4.635	4.756	-0.121
492.6	54.681	-0.608	0.166	0	40.8	0	4.636	4.757	-0.121
492.7	54.687	-0.608	-1.151	0	40.89	0	4.637	4.758	-0.121
492.8	54.699	-0.628	-0.992	0	40.81	0	4.638	4.759	-0.121

492.9	54.706	-0.625	-0.042	0	40.88	0	4.639	4.76	-0.121
493	54.712	-0.625	-0.989	0	40.82	0	4.64	4.762	-0.121
493.1	54.724	-0.628	-0.604	0	40.88	0	4.642	4.763	-0.121
493.2	54.73	-0.623	-0.576	0	40.86	0	4.643	4.764	-0.121
493.3	54.737	-0.623	-1.067	0	40.89	0	4.644	4.765	-0.121
493.4	54.743	-0.595	-1.059	0	40.88	0	4.645	4.766	-0.121
493.5	54.755	-0.595	-1.127	0	40.88	0	4.646	4.767	-0.121
493.6	54.761	-0.62	-0.283	0	40.92	0	4.647	4.768	-0.121
493.7	54.768	-0.62	-0.901	0	40.33	0	4.648	4.769	-0.121
493.8	54.78	-0.608	-0.901	0	40.23	0	4.649	4.771	-0.121
493.9	54.786	-0.608	-1.059	0	39.49	0	4.651	4.772	-0.121
494	54.786	-0.62	-0.636	0	39.02	0	4.652	4.773	-0.121
494.1	54.793	-0.613	-0.328	0	38.99	0	4.653	4.774	-0.121
494.2	54.805	-0.613	-0.816	0	39.05	0	4.654	4.775	-0.121
494.3	54.805	-0.61	-0.576	0	39.02	0	4.655	4.776	-0.121
494.4	54.811	-0.618	-0.844	0	39.05	0	4.656	4.777	-0.121
494.5	54.817	-0.618	-0.491	0	38.53	0	4.657	4.778	-0.121
494.6	54.817	-0.61	-0.735	0	38.22	0	4.658	4.779	-0.121
494.7	54.824	-0.61	-0.205	0	38.26	0	4.659	4.78	-0.121
494.8	54.824	-0.618	-0.29	0	37.62	0	4.66	4.781	-0.121
494.9	54.83	-0.633	-0.78	0	37.37	0	4.661	4.782	-0.121
495	54.83	-0.635	-0.473	0	37.31	0	4.662	4.783	-0.121
495.1	54.83	-0.635	-0.53	0	37.38	0	4.663	4.784	-0.121
495.2	54.836	-0.613	-0.816	0	37.3	0	4.664	4.785	-0.121
495.3	54.836	-0.605	-1.225	0	37.4	0	4.665	4.787	-0.121
495.4	54.836	-0.605	-0.975	0	37.3	0	4.666	4.788	-0.121
495.5	54.842	-0.605	-0.636	0	37.39	0	4.667	4.789	-0.121
495.6	54.842	-0.625	-0.71	0	37.31	0	4.669	4.79	-0.121
495.7	54.842	-0.625	-0.148	0	37.31	0	4.669	4.79	-0.121
495.8	54.848	-0.618	-0.247	0	38.23	0	4.671	4.792	-0.121
495.9	54.848	-0.613	-0.901	0	38.78	0	4.672	4.793	-0.121
496	54.855	-0.613	-1.225	0	39.01	0	4.673	4.794	-0.121
496.1	54.861	-0.605	-0.576	0	39.1	0	4.674	4.795	-0.121
496.2	54.861	-0.598	-0.816	0	39.01	0	4.675	4.796	-0.121
496.3	54.867	-0.598	-1.197	0	39.1	0	4.676	4.797	-0.121
496.4	54.873	-0.61	-0.445	0	39	0	4.677	4.798	-0.121
496.5	54.88	-0.61	-0.314	0	39.12	0	4.678	4.799	-0.121
496.6	54.886	-0.605	-0.975	0	39.07	0	4.679	4.8	-0.121
496.7	54.886	-0.605	-0.23	0	39.26	0	4.68	4.802	-0.121
496.8	54.892	-0.605	-0.314	0	38.9	0	4.681	4.803	-0.121
496.9	54.898	-0.605	-0.855	0	38.51	0	4.683	4.804	-0.121
497	54.898	-0.613	-0.975	0	37.94	0	4.684	4.805	-0.121
497.1	54.904	-0.61	-0.516	0	37.59	0	4.685	4.806	-0.121
497.2	54.904	-0.61	-0.72	0	37.56	0	4.686	4.807	-0.121
497.3	54.904	-0.63	-0.72	0	37.01	0	4.687	4.808	-0.121
497.4	54.911	-0.635	-0.491	0	36.31	0	4.688	4.809	-0.121
497.5	54.904	-0.635	-0.399	0	36.11	0	4.689	4.81	-0.121

497.6	54.911	-0.615	-1.084	0	35.44	0	4.69	4.811	-0.121
497.7	54.911	-0.615	-0.491	0	35.25	0	4.691	4.812	-0.121
497.8	54.911	-0.613	-0.576	0	35.23	0	4.692	4.813	-0.121
497.9	54.904	-0.615	-0.816	0	35.19	0	4.693	4.814	-0.121
498	54.904	-0.605	-0.576	0	35.21	0	4.694	4.815	-0.121
498.1	54.898	-0.605	-0.961	0	35.21	0	4.695	4.816	-0.121
498.2	54.898	-0.605	-0.901	0	35.19	0	4.696	4.817	-0.121
498.3	54.898	-0.603	-0.565	0	35.18	0	4.697	4.818	-0.121
498.4	54.898	-0.603	-0.816	0	35.19	0	4.698	4.819	-0.121
498.5	54.898	-0.613	-0.886	0	35.17	0	4.699	4.82	-0.121
498.6	54.898	-0.615	-0.84	0	35.18	0	4.699	4.821	-0.121
498.7	54.892	-0.615	-0.247	0	35.17	0	4.7	4.822	-0.121
498.8	54.892	-0.603	-0.961	0	34.58	0	4.701	4.823	-0.121
498.9	54.892	-0.61	-0.915	0	34.48	0	4.702	4.824	-0.121
499	54.892	-0.61	-0.72	0	33.64	0	4.703	4.824	-0.121
499.1	54.886	-0.583	-0.353	0	32.67	0	4.704	4.825	-0.121
499.2	54.88	-0.585	-1.197	0	32.28	0	4.705	4.826	-0.121
499.3	54.873	-0.585	-1.67	0	32.36	0	4.706	4.827	-0.121
499.4	54.867	-0.628	-0.473	0	32.3	0	4.707	4.828	-0.121
499.5	54.861	-0.628	0.268	0	32.36	0	4.708	4.829	-0.121
499.6	54.855	-0.603	-0.664	0	32.33	0	4.709	4.83	-0.121
499.7	54.855	-0.603	-0.788	0	32.05	0	4.71	4.831	-0.121
499.8	54.848	-0.633	-0.788	0	31.3	0	4.71	4.832	-0.121
499.9	54.842	-0.615	-0.064	0	31.3	0	4.71	4.832	-0.121
500	54.83	-0.588	-0.636	0	27.83	0	4.712	4.833	-0.121
500.1	54.817	-0.583	-1.345	0	27.3	0	4.713	4.834	-0.121
500.2	54.805	-0.583	-1.006	0	27.29	0	4.714	4.835	-0.121
500.3	54.793	-0.603	-0.191	0	27.31	0	4.714	4.835	-0.121
500.4	54.774	-0.62	-0.473	0	27.22	0	4.715	4.836	-0.121
500.5	54.755	-0.62	-0.65	0	27.32	0	4.716	4.837	-0.121
500.6	54.743	-0.593	-0.328	0	27.23	0	4.717	4.838	-0.121
500.7	54.724	-0.593	-0.985	0	27.73	0	4.717	4.838	-0.121
500.8	54.712	-0.603	-0.961	0	27.91	0	4.718	4.839	-0.121
500.9	54.699	-0.63	-0.558	0	27.94	0	4.719	4.84	-0.121
501	54.681	-0.63	0.18	0	27.89	0	4.72	4.841	-0.121
501.1	54.668	-0.63	-0.014	0	27.96	0	4.72	4.842	-0.121
501.2	54.656	-0.61	-0.961	0	27.86	0	4.721	4.842	-0.121
501.3	54.643	-0.615	-0.802	0	27.93	0	4.722	4.843	-0.121
501.4	54.631	-0.615	-0.328	0	28.8	0	4.723	4.844	-0.121
501.5	54.619	-0.6	-0.961	0	29.94	0	4.724	4.845	-0.121
501.6	54.612	-0.608	-0.901	0	30.46	0	4.724	4.846	-0.121
501.7	54.606	-0.613	-0.816	0	31.16	0	4.725	4.846	-0.121
501.8	54.594	-0.613	-0.72	0	31.76	0	4.726	4.847	-0.121
501.9	54.587	-0.61	-0.459	0	32.43	0	4.727	4.848	-0.121
502	54.581	-0.61	-0.925	0	32.33	0	4.728	4.849	-0.121
502.1	54.581	-0.605	-0.388	0	32.39	0	4.729	4.85	-0.121
502.2	54.575	-0.608	-0.731	0	32.31	0	4.73	4.851	-0.121

502.3	54.569	-0.608	-0.678	0	32.84	0	4.731	4.852	-0.121
502.4	54.569	-0.61	-0.678	0	33.08	0	4.732	4.853	-0.121
502.5	54.556	-0.61	-0.802	0	33.16	0	4.733	4.854	-0.121
502.6	54.556	-0.608	-0.491	0	33.08	0	4.734	4.855	-0.121
502.7	54.55	-0.608	-0.551	0	33.15	0	4.734	4.856	-0.121
502.8	54.55	-0.608	-0.636	0	33.08	0	4.735	4.856	-0.121
502.9	54.544	-0.608	-0.678	0	33.15	0	4.736	4.857	-0.121
503	54.538	-0.605	-0.844	0	33.07	0	4.737	4.858	-0.121
503.1	54.538	-0.603	-0.678	0	33.14	0	4.738	4.859	-0.121
503.2	54.532	-0.603	-0.519	0	32.71	0	4.739	4.86	-0.121
503.3	54.532	-0.583	-1.172	0	32.36	0	4.74	4.861	-0.121
503.4	54.525	-0.615	-1.257	0	31.98	0	4.741	4.862	-0.121
503.5	54.519	-0.615	-0.191	0	31.69	0	4.742	4.863	-0.121
503.6	54.513	-0.605	0.081	0	31.57	0	4.743	4.864	-0.121
503.7	54.507	-0.605	-0.975	0	30.91	0	4.743	4.865	-0.121
503.8	54.5	-0.598	-1.059	0	30.87	0	4.744	4.865	-0.121
503.9	54.494	-0.615	-0.756	0	30.92	0	4.745	4.866	-0.121
504	54.488	-0.61	-0.148	0	30.89	0	4.746	4.867	-0.121
504.1	54.476	-0.61	-0.975	0	30.89	0	4.746	4.867	-0.121
504.2	54.469	-0.613	-0.802	0	30.88	0	4.748	4.869	-0.121
504.3	54.469	-0.605	-0.901	0	30.91	0	4.749	4.87	-0.121
504.4	54.457	-0.605	-0.901	0	30.88	0	4.749	4.871	-0.121
504.5	54.451	-0.62	-0.816	0	30.87	0	4.75	4.871	-0.121
504.6	54.445	-0.593	-0.491	0	30.86	0	4.751	4.872	-0.121
504.7	54.438	-0.593	-0.636	0	30.88	0	4.752	4.873	-0.121
504.8	54.432	-0.59	-1.826	0	30.87	0	4.753	4.874	-0.121
504.9	54.42	-0.608	-0.357	0	30.87	0	4.754	4.875	-0.121
505	54.413	-0.608	0.014	0	30.86	0	4.755	4.876	-0.121
505.1	54.407	-0.603	-0.992	0	30.86	0	4.755	4.877	-0.121
505.2	54.401	-0.618	-0.735	0	30.86	0	4.756	4.877	-0.121
505.3	54.395	-0.618	-0.65	0	30.84	0	4.757	4.878	-0.121
505.4	54.389	-0.628	0.18	0	30.86	0	4.758	4.879	-0.121
505.5	54.376	-0.628	-0.925	0	30.82	0	4.759	4.88	-0.121
505.6	54.37	-0.62	-1.127	0	30.83	0	4.76	4.881	-0.121
505.7	54.364	-0.62	-0.473	0	30.82	0	4.761	4.882	-0.121
505.8	54.358	-0.605	-0.473	0	30.19	0	4.761	4.883	-0.121
505.9	54.351	-0.605	-0.636	0	29.61	0	4.762	4.883	-0.121
506	54.339	-0.628	-1.225	0	29.19	0	4.763	4.884	-0.121
506.1	54.333	-0.62	-0.191	0	28.67	0	4.764	4.885	-0.121
506.2	54.32	-0.62	-0.491	0	28.56	0	4.765	4.886	-0.121
506.3	54.308	-0.615	-1.706	0	27.92	0	4.765	4.887	-0.121
506.4	54.295	-0.628	-0.618	0	28.03	0	4.766	4.887	-0.121
506.5	54.289	-0.628	-0.162	0	27.92	0	4.767	4.888	-0.121
506.6	54.271	-0.61	-0.65	0	28	0	4.768	4.889	-0.121
506.7	54.264	-0.61	-0.65	0	27.91	0	4.769	4.89	-0.121
506.8	54.246	-0.605	-0.565	0	27.98	0	4.769	4.89	-0.121
506.9	54.239	-0.595	-0.445	0	27.9	0	4.77	4.891	-0.121

507	54.227	-0.6	-0.72	0	27.99	0	4.771	4.892	-0.121
507.1	54.215	-0.6	-0.636	0	27.89	0	4.772	4.893	-0.121
507.2	54.202	-0.608	-0.678	0	28.22	0	4.772	4.894	-0.121
507.3	54.196	-0.58	-0.381	0	28.61	0	4.773	4.894	-0.121
507.4	54.184	-0.58	-1.289	0	28.69	0	4.774	4.895	-0.121
507.5	54.171	-0.593	-1.225	0	28.59	0	4.775	4.896	-0.121
507.6	54.165	-0.6	0.18	0	28.68	0	4.776	4.897	-0.121
507.7	54.152	-0.6	-0.862	0	28.59	0	4.776	4.898	-0.121
507.8	54.14	-0.598	-0.862	0	28.68	0	4.777	4.898	-0.121
507.9	54.134	-0.6	-0.586	0	28.58	0	4.778	4.899	-0.121
508	54.121	-0.6	-0.328	0	28.66	0	4.779	4.9	-0.121
508.1	54.109	-0.618	-0.735	0	28.58	0	4.78	4.901	-0.121
508.2	54.097	-0.623	0	0	28.65	0	4.78	4.901	-0.121
508.3	54.09	-0.623	-0.501	0	28.65	0	4.78	4.901	-0.121
508.4	54.078	-0.618	-0.533	0	28.63	0	4.782	4.903	-0.121
508.5	54.072	-0.618	-0.816	0	28.56	0	4.783	4.904	-0.121
508.6	54.059	-0.623	-0.328	0	28.6	0	4.784	4.905	-0.121
508.7	54.047	-0.623	-0.735	0	28.55	0	4.784	4.905	-0.121
508.8	54.034	-0.643	-0.735	0	28.58	0	4.785	4.906	-0.121
508.9	54.028	-0.643	-0.148	0	28.55	0	4.786	4.907	-0.121
509	54.022	-0.623	-0.901	0	28.57	0	4.787	4.908	-0.121
509.1	54.01	-0.603	-0.901	0	28.54	0	4.787	4.909	-0.121
509.2	54.003	-0.603	-1.289	0	28.78	0	4.788	4.909	-0.121
509.3	53.991	-0.615	-1.021	0	28.75	0	4.789	4.91	-0.121
509.4	53.985	-0.608	-0.162	0	28.76	0	4.79	4.911	-0.121
509.5	53.972	-0.608	-0.65	0	28.78	0	4.791	4.912	-0.121
509.6	53.966	-0.61	-0.72	0	29.81	0	4.792	4.913	-0.121
509.7	53.954	-0.61	-1.155	0	30.16	0	4.792	4.913	-0.121
509.8	53.954	-0.59	-1.127	0	30.17	0	4.793	4.914	-0.121
509.9	53.941	-0.6	-0.731	0	30.14	0	4.794	4.915	-0.121
510	53.935	-0.605	-0.459	0	30.16	0	4.795	4.916	-0.121
510.1	53.923	-0.605	-0.65	0	30.1	0	4.796	4.917	-0.121
510.2	53.916	-0.62	-0.65	0	30.15	0	4.797	4.918	-0.121
510.3	53.91	-0.613	-0.413	0	30.18	0	4.797	4.919	-0.121
510.4	53.91	-0.613	-0.72	0	30.85	0	4.798	4.919	-0.121
510.5	53.904	-0.633	-0.975	0	30.83	0	4.799	4.92	-0.121
510.6	53.892	-0.63	-0.459	0	30.82	0	4.8	4.921	-0.121
510.7	53.885	-0.63	-0.431	0	30.82	0	4.801	4.922	-0.121
510.8	53.885	-0.618	-0.975	0	30.81	0	4.802	4.923	-0.121
510.9	53.873	-0.628	-0.901	0	30.86	0	4.803	4.924	-0.121
511	53.867	-0.628	-0.448	0	30.76	0	4.803	4.925	-0.121
511.1	53.86	-0.61	-0.886	0	30.87	0	4.804	4.925	-0.121
511.2	53.854	-0.628	-1.349	0	30.75	0	4.805	4.926	-0.121
511.3	53.848	-0.628	-0.162	0	30.87	0	4.806	4.927	-0.121
511.4	53.842	-0.605	-0.576	0	31.22	0	4.807	4.928	-0.121
511.5	53.836	-0.605	-1.225	0	32.19	0	4.808	4.929	-0.121
511.6	53.836	-0.613	-0.735	0	32.15	0	4.809	4.93	-0.121

511.7	53.829	-0.605	-1.01	0	32.23	0	4.809	4.931	-0.121
511.8	53.823	-0.603	-0.925	0	32.13	0	4.81	4.932	-0.121
511.9	53.823	-0.603	-0.72	0	32.25	0	4.811	4.932	-0.121
512	53.817	-0.605	-0.735	0	32.13	0	4.812	4.933	-0.121
512.1	53.811	-0.595	-0.901	0	32.25	0	4.813	4.934	-0.121
512.2	53.811	-0.595	-0.929	0	32.29	0	4.814	4.935	-0.121
512.3	53.805	-0.613	-1.059	0	32.39	0	4.815	4.936	-0.121
512.4	53.805	-0.623	-0.491	0	32.3	0	4.816	4.937	-0.121
512.5	53.798	-0.623	-0.413	0	32.37	0	4.817	4.938	-0.121
512.6	53.792	-0.598	-0.491	0	32.31	0	4.818	4.939	-0.121
512.7	53.786	-0.598	-0.731	0	32.37	0	4.818	4.94	-0.121
512.8	53.78	-0.61	-0.901	0	32.46	0	4.819	4.94	-0.121
512.9	53.78	-0.638	-0.844	0	32.51	0	4.82	4.941	-0.121
513	53.773	-0.635	0.085	0	32.67	0	4.821	4.942	-0.121
513.1	53.773	-0.635	-0.473	0	32.63	0	4.822	4.943	-0.121
513.2	53.773	-0.588	-1.557	0	32.68	0	4.823	4.944	-0.121
513.3	53.767	-0.595	-1.303	0	32.61	0	4.824	4.945	-0.121
513.4	53.761	-0.595	-0.328	0	32.63	0	4.825	4.946	-0.121
513.5	53.761	-0.6	-0.519	0	32.44	0	4.826	4.947	-0.121
513.6	53.755	-0.6	-0.576	0	33.11	0	4.827	4.948	-0.121
513.7	53.755	-0.6	-0.579	0	33.11	0	4.828	4.949	-0.121
513.8	53.755	-0.615	-0.78	0	33.16	0	4.828	4.95	-0.121
513.9	53.749	-0.605	-0.618	0	33.08	0	4.829	4.951	-0.121
514	53.749	-0.605	-0.374	0	33.68	0	4.83	4.951	-0.121
514.1	53.749	-0.61	-0.731	0	34.47	0	4.831	4.952	-0.121
514.2	53.749	-0.615	-0.533	0	34.55	0	4.832	4.953	-0.121
514.3	53.749	-0.615	-0.406	0	34.46	0	4.833	4.954	-0.121
514.4	53.749	-0.603	-0.89	0	34.66	0	4.834	4.955	-0.121
514.5	53.749	-0.603	-0.735	0	35.4	0	4.835	4.956	-0.121
514.6	53.749	-0.613	-0.406	0	36.52	0	4.836	4.957	-0.121
514.7	53.749	-0.613	-0.89	0	36.68	0	4.837	4.958	-0.121
514.8	53.755	-0.598	-0.862	0	36.77	0	4.838	4.959	-0.121
514.9	53.761	-0.598	-0.975	0	37.32	0	4.839	4.96	-0.121
515	53.761	-0.608	-0.251	0	37.55	0	4.84	4.961	-0.121
515.1	53.767	-0.605	-0.374	0	38.4	0	4.841	4.962	-0.121
515.2	53.773	-0.605	-0.816	0	41.01	0	4.842	4.964	-0.121
515.3	53.786	-0.61	-0.611	0	41.99	0	4.844	4.965	-0.121
515.4	53.792	-0.595	-0.65	0	41.98	0	4.845	4.966	-0.121
515.5	53.805	-0.595	-0.611	0	41.94	0	4.846	4.967	-0.121
515.6	53.817	-0.595	-0.89	0	41.99	0	4.847	4.968	-0.121
515.7	53.829	-0.595	-0.046	0	41.99	0	4.848	4.969	-0.121
515.8	53.842	-0.603	0.039	0	41.99	0	4.849	4.971	-0.121
515.9	53.854	-0.59	-0.696	0	42.07	0	4.851	4.972	-0.121
516	53.867	-0.59	-0.876	0	41.17	0	4.852	4.973	-0.121
516.1	53.879	-0.59	-0.975	0	41.18	0	4.853	4.974	-0.121
516.2	53.885	-0.613	-0.459	0	41.06	0	4.854	4.975	-0.121
516.3	53.898	-0.625	-0.636	0	40.87	0	4.855	4.976	-0.121

516.4	53.91	-0.625	-0.343	0	40.85	0	4.856	4.977	-0.121
516.5	53.916	-0.618	-0.491	0	40.86	0	4.857	4.979	-0.121
516.6	53.929	-0.6	-0.918	0	40.92	0	4.859	4.98	-0.121
516.7	53.935	-0.6	-0.766	0	40.92	0	4.859	4.98	-0.121
516.8	53.947	-0.62	-0.901	0	42	0	4.861	4.982	-0.121
516.9	53.96	-0.605	-0.328	0	41.91	0	4.862	4.983	-0.121
517	53.966	-0.605	-0.65	0	42.02	0	4.863	4.984	-0.121
517.1	53.979	-0.593	-1.391	0	41.9	0	4.864	4.986	-0.121
517.2	53.991	-0.588	-0.533	0	42.01	0	4.866	4.987	-0.121
517.3	54.003	-0.588	-0.664	0	41.95	0	4.867	4.988	-0.121
517.4	54.016	-0.593	-0.664	0	42.01	0	4.868	4.989	-0.121
517.5	54.028	-0.593	-0.162	0	41.98	0	4.869	4.99	-0.121
517.6	54.034	-0.625	-0.749	0	42.01	0	4.87	4.991	-0.121
517.7	54.047	-0.63	-0.134	0	42.02	0	4.871	4.993	-0.121
517.8	54.059	-0.613	-0.134	0	42.01	0	4.873	4.994	-0.121
517.9	54.072	-0.613	-1.059	0	42.06	0	4.874	4.995	-0.121
518	54.084	-0.618	-1.059	0	42.05	0	4.875	4.996	-0.121
518.1	54.097	-0.613	-0.445	0	42.11	0	4.876	4.997	-0.121
518.2	54.109	-0.613	-0.59	0	42.04	0	4.877	4.998	-0.121
518.3	54.115	-0.598	-0.975	0	42.1	0	4.878	5	-0.121
518.4	54.121	-0.61	-0.622	0	42.06	0	4.88	5.001	-0.121
518.5	54.134	-0.61	-0.244	0	42.7	0	4.881	5.002	-0.121
518.6	54.152	-0.613	-0.459	0	44.58	0	4.882	5.003	-0.121
518.7	54.165	-0.613	-0.459	0	45.66	0	4.883	5.004	-0.121
518.8	54.177	-0.628	-0.544	0	45.55	0	4.885	5.006	-0.121
518.9	54.196	-0.625	-0.735	0	45.6	0	4.886	5.007	-0.121
519	54.215	-0.618	-0.307	0	45.56	0	4.887	5.008	-0.121
519.1	54.227	-0.618	-0.901	0	46.01	0	4.888	5.01	-0.121
519.2	54.246	-0.6	-0.915	0	46.37	0	4.89	5.011	-0.121
519.3	54.258	-0.61	-0.749	0	46.66	0	4.891	5.012	-0.121
519.4	54.271	-0.61	-0.795	0	47.46	0	4.892	5.013	-0.121
519.5	54.295	-0.625	-0.057	0	47.44	0	4.894	5.015	-0.121
519.6	54.314	-0.61	-0.618	0	47.47	0	4.895	5.016	-0.121
519.7	54.333	-0.61	-1.402	0	47.47	0	4.896	5.017	-0.121
519.8	54.345	-0.615	-0.632	0	47.53	0	4.898	5.019	-0.121
519.9	54.364	-0.6	-0.576	0	47.24	0	4.899	5.02	-0.121
520	54.382	-0.6	-1.229	0	47.25	0	4.9	5.021	-0.121
520.1	54.401	-0.61	-0.749	0	47.27	0	4.901	5.023	-0.121
520.2	54.42	-0.598	-0.247	0	47.29	0	4.903	5.024	-0.121
520.3	54.438	-0.598	-1.197	0	47.33	0	4.904	5.025	-0.121
520.4	54.457	-0.63	-1.112	0	47.28	0	4.905	5.027	-0.121
520.5	54.476	-0.63	-0.247	0	47.38	0	4.907	5.028	-0.121
520.6	54.494	-0.613	-0.328	0	47.34	0	4.908	5.029	-0.121
520.7	54.513	-0.615	-0.788	0	47.38	0	4.909	5.031	-0.121
520.8	54.532	-0.615	-0.788	0	47.37	0	4.911	5.032	-0.121
520.9	54.55	-0.615	-0.618	0	47.37	0	4.911	5.032	-0.121
521	54.569	-0.62	-0.915	0	47.42	0	4.913	5.034	-0.121

521.1	54.587	-0.618	-0.399	0	47.4	0	4.915	5.036	-0.121
521.2	54.606	-0.618	-0.579	0	47.46	0	4.916	5.037	-0.121
521.3	54.625	-0.608	-0.664	0	47.42	0	4.917	5.038	-0.121
521.4	54.643	-0.61	-0.636	0	47.23	0	4.919	5.04	-0.121
521.5	54.656	-0.61	-0.83	0	47.26	0	4.92	5.041	-0.121
521.6	54.674	-0.615	-0.099	0	47.18	0	4.921	5.042	-0.121
521.7	54.693	-0.615	-0.915	0	46.33	0	4.923	5.044	-0.121
521.8	54.712	-0.59	-0.83	0	46.32	0	4.924	5.045	-0.121
521.9	54.724	-0.593	-0.992	0	46.35	0	4.925	5.046	-0.121
522	54.737	-0.605	-0.632	0	46.42	0	4.926	5.048	-0.121
522.1	54.761	-0.605	-0.3	0	46.39	0	4.928	5.049	-0.121
522.2	54.774	-0.6	-0.505	0	46.3	0	4.929	5.05	-0.121
522.3	54.793	-0.62	-0.83	0	45.13	0	4.93	5.051	-0.121
522.4	54.805	-0.62	-0.59	0	44.56	0	4.931	5.053	-0.121
522.5	54.817	-0.598	-0.261	0	44.47	0	4.933	5.054	-0.121
522.6	54.83	-0.603	-1.247	0	43.83	0	4.934	5.055	-0.121
522.7	54.848	-0.603	-0.752	0	43.23	0	4.935	5.056	-0.121
522.8	54.855	-0.603	-0.664	0	42.64	0	4.936	5.057	-0.121
522.9	54.867	-0.6	-0.749	0	42.69	0	4.937	5.059	-0.121
523	54.88	-0.6	-1.077	0	42.68	0	4.939	5.06	-0.121
523.1	54.886	-0.593	-0.473	0	42.67	0	4.94	5.061	-0.121
523.2	54.898	-0.598	-1.035	0	42.75	0	4.941	5.062	-0.121
523.3	54.911	-0.598	-0.749	0	42.65	0	4.942	5.063	-0.121
523.4	54.917	-0.613	-0.434	0	42.72	0	4.943	5.065	-0.121
523.5	54.929	-0.613	-0.53	0	42.64	0	4.945	5.066	-0.121
523.6	54.942	-0.605	-1.225	0	41.96	0	4.946	5.067	-0.121
523.7	54.948	-0.605	-0.247	0	41.73	0	4.947	5.068	-0.121
523.8	54.96	-0.62	-0.162	0	40.37	0	4.948	5.069	-0.121
523.9	54.966	-0.62	-0.65	0	40.21	0	4.949	5.07	-0.121
524	54.973	-0.58	-1.155	0	40.16	0	4.95	5.071	-0.121
524.1	54.979	-0.613	-1.317	0	40.23	0	4.951	5.073	-0.121
524.2	54.985	-0.613	-0.057	0	40.22	0	4.952	5.074	-0.121
524.3	54.991	-0.603	0.152	0	40.25	0	4.954	5.075	-0.121
524.4	54.998	-0.603	-1.197	0	40.22	0	4.955	5.076	-0.121
524.5	55.004	-0.603	-1.201	0	40.22	0	4.956	5.077	-0.121
524.6	55.01	-0.605	-0.275	0	40.28	0	4.957	5.078	-0.121
524.7	55.016	-0.605	-1.056	0	40.21	0	4.958	5.079	-0.121
524.8	55.022	-0.605	-1.141	0	40.29	0	4.959	5.08	-0.121
524.9	55.022	-0.608	-0.664	0	40.21	0	4.96	5.081	-0.121
525	55.035	-0.61	-0.491	0	40.29	0	4.961	5.083	-0.121
525.1	55.035	-0.61	-0.929	0	40.29	0	4.961	5.083	-0.121
525.2	55.041	-0.613	-0.191	0	39.34	0	4.964	5.085	-0.121
525.3	55.047	-0.615	-0.89	0	39.28	0	4.965	5.086	-0.121
525.4	55.053	-0.615	-0.83	0	39.36	0	4.966	5.087	-0.121
525.5	55.06	-0.605	-0.788	0	39.92	0	4.967	5.088	-0.121
525.6	55.066	-0.593	-0.664	0	40.81	0	4.968	5.089	-0.121
525.7	55.072	-0.593	-0.915	0	41.03	0	4.969	5.09	-0.121

525.8	55.078	-0.608	-0.886	0	41.04	0	4.97	5.091	-0.121
525.9	55.091	-0.618	-0.473	0	41.03	0	4.971	5.093	-0.121
526	55.097	-0.618	-0.3	0	41.05	0	4.973	5.094	-0.121
526.1	55.103	-0.603	-0.904	0	41.06	0	4.974	5.095	-0.121
526.2	55.109	-0.608	-0.738	0	41.04	0	4.975	5.096	-0.121
526.3	55.116	-0.608	-0.505	0	41.07	0	4.976	5.097	-0.121
526.4	55.122	-0.618	-0.505	0	41.02	0	4.977	5.098	-0.121
526.5	55.128	-0.618	-0.473	0	40.98	0	4.978	5.099	-0.121
526.6	55.134	-0.628	-0.844	0	40.82	0	4.979	5.101	-0.121
526.7	55.14	-0.628	-0.678	0	40.84	0	4.981	5.102	-0.121
526.8	55.147	-0.598	-0.678	0	40.83	0	4.982	5.103	-0.121
526.9	55.153	-0.598	-1.155	0	40.84	0	4.983	5.104	-0.121
527	55.159	-0.608	-0.724	0	41.05	0	4.984	5.105	-0.121
527.1	55.165	-0.613	-0.261	0	41.85	0	4.985	5.106	-0.121
527.2	55.172	-0.613	-0.678	0	41.86	0	4.986	5.107	-0.121
527.3	55.178	-0.588	-0.678	0	42.17	0	4.987	5.109	-0.121
527.4	55.196	-0.585	-1.155	0	42.62	0	4.989	5.11	-0.121
527.5	55.203	-0.585	-1.035	0	42.66	0	4.99	5.111	-0.121
527.6	55.209	-0.598	-0.65	0	42.65	0	4.991	5.112	-0.121
527.7	55.221	-0.598	0.053	0	42.8	0	4.992	5.113	-0.121
527.8	55.227	-0.605	0.138	0	42.84	0	4.993	5.115	-0.121
527.9	55.24	-0.6	-0.558	0	42.82	0	4.995	5.116	-0.121
528	55.252	-0.61	-0.886	0	42.88	0	4.996	5.117	-0.121
528.1	55.259	-0.61	-0.929	0	42.82	0	4.997	5.118	-0.121
528.2	55.265	-0.628	-0.357	0	42.88	0	4.998	5.119	-0.121
528.3	55.277	-0.608	-0.441	0	42.86	0	4.999	5.12	-0.121
528.4	55.29	-0.608	-1.077	0	42.89	0	5.001	5.122	-0.121
528.5	55.296	-0.605	-0.929	0	42.93	0	5.002	5.123	-0.121
528.6	55.308	-0.615	-0.59	0	42.92	0	5.003	5.124	-0.121
528.7	55.314	-0.615	-0.678	0	42.86	0	5.004	5.125	-0.121
528.8	55.327	-0.618	-0.975	0	42.73	0	5.005	5.126	-0.121
528.9	55.333	-0.615	-0.802	0	42.79	0	5.007	5.128	-0.121
529	55.339	-0.615	-0.357	0	42.48	0	5.008	5.129	-0.121
529.1	55.352	-0.608	-0.766	0	41.35	0	5.009	5.13	-0.121
529.2	55.364	-0.598	-0.664	0	40.5	0	5.01	5.131	-0.121
529.3	55.364	-0.598	-0.692	0	40.5	0	5.01	5.131	-0.121
529.4	55.37	-0.6	-1.176	0	38.48	0	5.012	5.133	-0.121
529.5	55.37	-0.6	-0.562	0	36.8	0	5.013	5.134	-0.121
529.6	55.37	-0.595	-0.191	0	35.94	0	5.014	5.135	-0.121
529.7	55.37	-0.593	-1.18	0	34.98	0	5.015	5.136	-0.121
529.8	55.37	-0.608	-1.18	0	34.62	0	5.016	5.137	-0.121
529.9	55.364	-0.62	-0.59	0	34.65	0	5.017	5.138	-0.121
530	55.364	-0.623	-0.427	0	34.59	0	5.018	5.139	-0.121
530.1	55.358	-0.615	-0.749	0	34.64	0	5.019	5.14	-0.121
530.2	55.358	-0.615	-0.724	0	34.64	0	5.02	5.141	-0.121
530.3	55.352	-0.608	-0.763	0	34.59	0	5.021	5.142	-0.121
530.4	55.352	-0.618	-0.763	0	34.64	0	5.022	5.143	-0.121

530.5	55.346	-0.618	-0.809	0	34.57	0	5.023	5.144	-0.121
530.6	55.346	-0.61	-0.777	0	34.6	0	5.024	5.145	-0.121
530.7	55.339	-0.61	-0.763	0	34.6	0	5.025	5.146	-0.121
530.8	55.333	-0.628	-0.763	0	34.59	0	5.026	5.147	-0.121
530.9	55.333	-0.635	-0.604	0	34.61	0	5.027	5.148	-0.121
531	55.333	-0.61	-0.162	0	34.55	0	5.028	5.149	-0.121
531.1	55.327	-0.61	-1.105	0	34.64	0	5.029	5.15	-0.121
531.2	55.327	-0.618	-1.497	0	34.56	0	5.03	5.151	-0.121
531.3	55.321	-0.62	-0.456	0	34.63	0	5.031	5.152	-0.121
531.4	55.321	-0.62	-0.148	0	34.72	0	5.031	5.153	-0.121
531.5	55.314	-0.605	-0.968	0	36.14	0	5.032	5.154	-0.121
531.6	55.314	-0.615	-0.886	0	37.38	0	5.034	5.155	-0.121
531.7	55.314	-0.615	-0.678	0	40.78	0	5.035	5.156	-0.121
531.8	55.321	-0.603	-0.191	0	42.11	0	5.036	5.157	-0.121
531.9	55.327	-0.605	-1.006	0	44.09	0	5.037	5.158	-0.121
532	55.339	-0.605	-1.215	0	45.83	0	5.038	5.159	-0.121
532.1	55.352	-0.608	-0.427	0	46.39	0	5.04	5.161	-0.121
532.2	55.364	-0.608	-0.858	0	47.82	0	5.041	5.162	-0.121
532.3	55.383	-0.608	-0.805	0	48.58	0	5.042	5.163	-0.121
532.4	55.401	-0.588	-0.505	0	49.16	0	5.044	5.165	-0.121
532.5	55.42	-0.588	-1.215	0	49.09	0	5.045	5.166	-0.121
532.6	55.445	-0.608	-1.006	0	48.92	0	5.046	5.167	-0.121
532.7	55.457	-0.605	-0.639	0	48.94	0	5.048	5.169	-0.121
532.8	55.476	-0.595	-0.724	0	48.96	0	5.049	5.17	-0.121
532.9	55.495	-0.595	-0.678	0	49	0	5.05	5.172	-0.121
533	55.513	-0.615	-0.975	0	48.98	0	5.052	5.173	-0.121
533.1	55.532	-0.613	-0.357	0	49.05	0	5.053	5.174	-0.121
533.2	55.551	-0.613	-0.441	0	49.02	0	5.055	5.176	-0.121
533.3	55.569	-0.59	-0.886	0	49.07	0	5.056	5.177	-0.121
533.4	55.588	-0.6	-1.006	0	49.05	0	5.057	5.178	-0.121
533.5	55.607	-0.6	-0.943	0	49.08	0	5.059	5.18	-0.121
533.6	55.625	-0.628	-0.261	0	49.11	0	5.06	5.181	-0.121
533.7	55.644	-0.628	-0.357	0	49.1	0	5.061	5.182	-0.121
533.8	55.662	-0.62	-0.357	0	48.56	0	5.063	5.184	-0.121
533.9	55.681	-0.62	-0.802	0	48.1	0	5.064	5.185	-0.121
534	55.7	-0.628	-0.604	0	48.2	0	5.065	5.186	-0.121
534.1	55.712	-0.628	-0.558	0	48.14	0	5.067	5.188	-0.121
534.2	55.725	-0.623	-0.763	0	48.07	0	5.068	5.189	-0.121
534.3	55.749	-0.618	-0.943	0	47.36	0	5.069	5.19	-0.121
534.4	55.762	-0.618	-1.052	0	45.89	0	5.071	5.192	-0.121
534.5	55.774	-0.615	-0.487	0	43.17	0	5.072	5.193	-0.121
534.6	55.787	-0.615	-0.844	0	39.15	0	5.073	5.194	-0.121
534.7	55.787	-0.615	-0.763	0	38.65	0	5.074	5.195	-0.121
534.8	55.793	-0.61	-0.487	0	38.61	0	5.075	5.196	-0.121
534.9	55.793	-0.61	-0.763	0	38.57	0	5.076	5.197	-0.121
535	55.793	-0.61	-0.844	0	38.65	0	5.077	5.198	-0.121
535.1	55.793	-0.595	-0.777	0	38.57	0	5.078	5.199	-0.121

535.2	55.793	-0.608	-0.692	0	38.65	0	5.079	5.2	-0.121
535.3	55.799	-0.608	-0.809	0	40.17	0	5.08	5.202	-0.121
535.4	55.799	-0.613	0.138	0	41.13	0	5.082	5.203	-0.121
535.5	55.805	-0.613	-0.72	0	41.24	0	5.083	5.204	-0.121
535.6	55.812	-0.615	-0.519	0	41.88	0	5.084	5.205	-0.121
535.7	55.818	-0.615	-1.006	0	42.41	0	5.085	5.206	-0.121
535.8	55.818	-0.61	-1.091	0	42.66	0	5.086	5.207	-0.121
535.9	55.83	-0.61	-0.618	0	42.67	0	5.087	5.209	-0.121
536	55.836	-0.59	-0.519	0	42.7	0	5.089	5.21	-0.121
536.1	55.843	-0.598	-1.105	0	42.39	0	5.09	5.211	-0.121
536.2	55.849	-0.598	-0.989	0	41.29	0	5.091	5.212	-0.121
536.3	55.861	-0.625	-0.071	0	39.75	0	5.092	5.213	-0.121
536.4	55.861	-0.61	-0.191	0	38.52	0	5.093	5.214	-0.121
536.5	55.861	-0.61	-1.331	0	37.4	0	5.094	5.215	-0.121
536.6	55.861	-0.613	-0.844	0	36.28	0	5.095	5.216	-0.121
536.7	55.861	-0.613	-1.021	0	36.15	0	5.096	5.217	-0.121
536.8	55.861	-0.62	-1.021	0	36.15	0	5.097	5.218	-0.121
536.9	55.861	-0.618	-0.519	0	36.13	0	5.098	5.219	-0.121
537	55.855	-0.608	-0.533	0	36.15	0	5.099	5.22	-0.121
537.1	55.855	-0.608	-0.816	0	36.12	0	5.1	5.221	-0.121
537.2	55.855	-0.61	-0.844	0	36.1	0	5.101	5.222	-0.121
537.3	55.849	-0.603	-0.191	0	36.15	0	5.102	5.223	-0.121
537.4	55.849	-0.603	-0.678	0	36.09	0	5.103	5.224	-0.121
537.5	55.849	-0.635	-0.738	0	36.13	0	5.104	5.225	-0.121
537.6	55.849	-0.628	0.011	0	36.11	0	5.105	5.226	-0.121
537.7	55.843	-0.628	-0.664	0	36.11	0	5.105	5.226	-0.121
537.8	55.843	-0.61	-1.006	0	36.14	0	5.107	5.228	-0.121
537.9	55.843	-0.625	-0.763	0	36.84	0	5.108	5.229	-0.121
538	55.836	-0.625	-0.441	0	36.95	0	5.109	5.23	-0.121
538.1	55.836	-0.625	0.039	0	36.85	0	5.11	5.231	-0.121
538.2	55.836	-0.608	-0.678	0	36.92	0	5.111	5.232	-0.121
538.3	55.836	-0.608	-1.225	0	36.85	0	5.112	5.233	-0.121
538.4	55.836	-0.603	-1.194	0	36.91	0	5.113	5.235	-0.121
538.5	55.836	-0.603	-0.763	0	36.86	0	5.114	5.236	-0.121
538.6	55.836	-0.615	-0.226	0	36.91	0	5.115	5.237	-0.121
538.7	55.83	-0.61	-0.929	0	36.94	0	5.116	5.238	-0.121
538.8	55.83	-0.603	-0.844	0	36.92	0	5.117	5.239	-0.121
538.9	55.83	-0.603	-0.678	0	36.95	0	5.119	5.24	-0.121
539	55.83	-0.6	-0.929	0	36.89	0	5.12	5.241	-0.121
539.1	55.83	-0.605	-0.858	0	36.96	0	5.121	5.242	-0.121
539.2	55.83	-0.605	-0.385	0	36.89	0	5.122	5.243	-0.121
539.3	55.83	-0.598	-0.773	0	36.95	0	5.123	5.244	-0.121
539.4	55.83	-0.623	-1.021	0	36.9	0	5.124	5.245	-0.121
539.5	55.824	-0.623	-0.046	0	36.97	0	5.125	5.246	-0.121
539.6	55.83	-0.585	-0.275	0	36.88	0	5.126	5.247	-0.121
539.7	55.824	-0.585	-1.257	0	36.98	0	5.127	5.248	-0.121
539.8	55.824	-0.62	-1.172	0	36.89	0	5.128	5.249	-0.121

539.9	55.824	-0.618	0.353	0	36.95	0	5.129	5.25	-0.121
540	55.824	-0.615	-0.763	0	36.89	0	5.13	5.251	-0.121
540.1	55.818	-0.615	-0.604	0	36.95	0	5.131	5.252	-0.121
540.2	55.818	-0.63	-0.975	0	36.88	0	5.132	5.253	-0.121
540.3	55.824	-0.628	-0.692	0	36.94	0	5.133	5.254	-0.121
540.4	55.818	-0.628	-0.314	0	36.89	0	5.134	5.255	-0.121
540.5	55.818	-0.605	-0.89	0	36.93	0	5.135	5.256	-0.121
540.6	55.818	-0.613	-0.904	0	36.88	0	5.136	5.257	-0.121
540.7	55.818	-0.613	-0.36	0	36.93	0	5.137	5.258	-0.121
540.8	55.818	-0.628	-0.777	0	36.88	0	5.138	5.259	-0.121
540.9	55.818	-0.633	-0.65	0	36.93	0	5.139	5.26	-0.121
541	55.818	-0.633	-0.519	0	36.88	0	5.14	5.261	-0.121
541.1	55.812	-0.61	-1.187	0	36.93	0	5.141	5.262	-0.121
541.2	55.818	-0.618	-0.858	0	36.89	0	5.142	5.263	-0.121
541.3	55.818	-0.618	-0.901	0	36.91	0	5.143	5.264	-0.121
541.4	55.812	-0.608	-0.558	0	36.92	0	5.144	5.265	-0.121
541.5	55.818	-0.608	-1.515	0	36.9	0	5.145	5.266	-0.121
541.6	55.818	-0.633	-0.441	0	36.94	0	5.146	5.267	-0.121
541.7	55.812	-0.61	-1.006	0	36.89	0	5.147	5.268	-0.121
541.8	55.812	-0.6	-1.091	0	36.98	0	5.148	5.269	-0.121
541.9	55.812	-0.605	-1.006	0	36.98	0	5.148	5.269	-0.121
542	55.812	-0.613	-0.692	0	36.95	0	5.15	5.271	-0.121
542.1	55.805	-0.62	-0.519	0	36.88	0	5.151	5.272	-0.121
542.2	55.805	-0.62	-0.519	0	36.95	0	5.152	5.273	-0.121
542.3	55.805	-0.608	-0.692	0	36.9	0	5.153	5.275	-0.121
542.4	55.805	-0.6	-0.858	0	36.95	0	5.154	5.276	-0.121
542.5	55.805	-0.6	-1.067	0	36.91	0	5.155	5.277	-0.121
542.6	55.805	-0.633	-0.777	0	36.92	0	5.156	5.278	-0.121
542.7	55.799	-0.633	-0.275	0	36.91	0	5.157	5.279	-0.121
542.8	55.799	-0.605	-0.191	0	36.93	0	5.159	5.28	-0.121
542.9	55.805	-0.62	-1.515	0	36.92	0	5.16	5.281	-0.121
543	55.799	-0.628	-0.618	0	36.94	0	5.161	5.282	-0.121
543.1	55.799	-0.628	-0.032	0	36.9	0	5.162	5.283	-0.121
543.2	55.799	-0.625	-0.886	0	37.06	0	5.163	5.284	-0.121
543.3	55.799	-0.63	-0.777	0	37.08	0	5.164	5.285	-0.121
543.4	55.799	-0.63	-0.749	0	37.08	0	5.165	5.286	-0.121
543.5	55.799	-0.63	-0.533	0	37.1	0	5.166	5.287	-0.121
543.6	55.799	-0.62	-0.678	0	37.11	0	5.167	5.288	-0.121
543.7	55.799	-0.62	-0.519	0	37.11	0	5.168	5.289	-0.121
543.8	55.799	-0.603	-0.992	0	37.12	0	5.169	5.29	-0.121
543.9	55.799	-0.618	-0.763	0	37.12	0	5.17	5.291	-0.121
544	55.793	-0.618	-0.29	0	37.11	0	5.171	5.292	-0.121
544.1	55.793	-0.608	-0.357	0	37.14	0	5.172	5.293	-0.121
544.2	55.793	-0.605	-0.844	0	37.06	0	5.173	5.294	-0.121
544.3	55.793	-0.605	-1.134	0	36.94	0	5.174	5.295	-0.121
544.4	55.793	-0.62	-0.533	0	36.95	0	5.175	5.296	-0.121
544.5	55.793	-0.62	-0.65	0	36.93	0	5.176	5.297	-0.121

544.6	55.793	-0.608	-0.618	0	36.91	0	5.177	5.298	-0.121
544.7	55.787	-0.608	-0.689	0	36.94	0	5.178	5.299	-0.121
544.8	55.787	-0.63	-0.749	0	36.94	0	5.179	5.3	-0.121
544.9	55.787	-0.63	-0.558	0	36.92	0	5.18	5.301	-0.121
545	55.793	-0.605	-0.519	0	36.92	0	5.181	5.302	-0.121
545.1	55.787	-0.62	-1.155	0	36.92	0	5.182	5.303	-0.121
545.2	55.787	-0.62	-0.858	0	36.92	0	5.183	5.304	-0.121
545.3	55.787	-0.623	0.328	0	36.93	0	5.184	5.305	-0.121
545.4	55.787	-0.613	-0.929	0	36.94	0	5.185	5.306	-0.121
545.5	55.787	-0.613	-0.788	0	36.93	0	5.186	5.307	-0.121
545.6	55.787	-0.63	-0.441	0	36.91	0	5.187	5.308	-0.121
545.7	55.787	-0.63	-0.607	0	36.92	0	5.188	5.309	-0.121
545.8	55.787	-0.61	-0.607	0	36.93	0	5.189	5.31	-0.121
545.9	55.78	-0.608	-1.021	0	36.92	0	5.19	5.311	-0.121
546	55.78	-0.61	-0.678	0	36.94	0	5.191	5.313	-0.121
546.1	55.78	-0.61	-0.929	0	36.91	0	5.192	5.314	-0.121
546.2	55.78	-0.623	-0.72	0	36.96	0	5.193	5.315	-0.121
546.3	55.78	-0.61	-0.604	0	36.91	0	5.194	5.316	-0.121
546.4	55.78	-0.6	-0.858	0	36.97	0	5.195	5.317	-0.121
546.5	55.78	-0.603	-1.3	0	36.88	0	5.197	5.318	-0.121
546.6	55.78	-0.625	-0.929	0	36.96	0	5.198	5.319	-0.121
546.7	55.774	-0.625	-0.646	0	36.88	0	5.199	5.32	-0.121
546.8	55.774	-0.64	0.138	0	36.94	0	5.2	5.321	-0.121
546.9	55.774	-0.605	-0.519	0	36.88	0	5.201	5.322	-0.121
547	55.774	-0.605	-1.172	0	36.96	0	5.202	5.323	-0.121
547.1	55.774	-0.623	-0.992	0	36.91	0	5.203	5.324	-0.121
547.2	55.774	-0.623	-0.219	0	36.94	0	5.204	5.325	-0.121
547.3	55.774	-0.623	-0.275	0	36.89	0	5.205	5.326	-0.121
547.4	55.774	-0.618	-1.568	0	36.93	0	5.206	5.327	-0.121
547.5	55.774	-0.618	-0.809	0	36.89	0	5.207	5.328	-0.121
547.6	55.768	-0.625	-0.441	0	36.92	0	5.208	5.329	-0.121
547.7	55.768	-0.625	-0.618	0	36.89	0	5.209	5.33	-0.121
547.8	55.768	-0.623	-0.646	0	36.92	0	5.21	5.331	-0.121
547.9	55.774	-0.623	-0.604	0	36.88	0	5.211	5.332	-0.121
548	55.768	-0.633	-1.257	0	36.96	0	5.212	5.333	-0.121
548.1	55.768	-0.618	-0.191	0	36.87	0	5.213	5.334	-0.121
548.2	55.768	-0.59	-0.261	0	36.94	0	5.214	5.335	-0.121
548.3	55.768	-0.598	-1.748	0	36.87	0	5.215	5.336	-0.121
548.4	55.768	-0.603	-0.975	0	36.97	0	5.216	5.337	-0.121
548.5	55.768	-0.603	-0.533	0	36.9	0	5.217	5.338	-0.121
548.6	55.768	-0.64	-0.71	0	36.93	0	5.218	5.339	-0.121
548.7	55.762	-0.64	-0.763	0	36.9	0	5.219	5.34	-0.121
548.8	55.762	-0.613	-0.678	0	36.92	0	5.22	5.341	-0.121
548.9	55.762	-0.6	-1.035	0	36.92	0	5.221	5.342	-0.121
549	55.762	-0.62	-1.416	0	36.89	0	5.222	5.343	-0.121
549.1	55.762	-0.62	-0.357	0	36.92	0	5.223	5.344	-0.121
549.2	55.762	-0.62	-0.014	0	36.89	0	5.224	5.345	-0.121

549.3	55.762	-0.613	-1.091	0	36.57	0	5.225	5.346	-0.121
549.4	55.762	-0.613	-1.006	0	36.07	0	5.226	5.347	-0.121
549.5	55.762	-0.613	-0.632	0	35.96	0	5.227	5.348	-0.121
549.6	55.756	-0.623	-0.664	0	35.38	0	5.228	5.349	-0.121
549.7	55.749	-0.615	-0.646	0	34.83	0	5.229	5.35	-0.121
549.8	55.749	-0.6	-0.473	0	33.08	0	5.23	5.351	-0.121
549.9	55.743	-0.615	-1.427	0	31.99	0	5.231	5.352	-0.121
550	55.731	-0.618	-0.519	0	31.1	0	5.232	5.353	-0.121
550.1	55.725	-0.613	-0.357	0	30.51	0	5.233	5.354	-0.121
550.2	55.712	-0.6	-0.678	0	30.23	0	5.234	5.355	-0.121
550.3	55.706	-0.6	-0.678	0	30.23	0	5.234	5.355	-0.121
550.4	55.694	-0.608	-0.992	0	30.21	0	5.235	5.356	-0.121
550.5	55.681	-0.608	-0.501	0	30.27	0	5.236	5.357	-0.121
550.6	55.675	-0.623	-0.275	0	30.19	0	5.237	5.358	-0.121
550.7	55.662	-0.63	-0.59	0	30.28	0	5.238	5.359	-0.121
550.8	55.65	-0.64	-0.505	0	30.17	0	5.239	5.36	-0.121
550.9	55.644	-0.65	0.014	0	30.25	0	5.239	5.361	-0.121
551	55.631	-0.658	-0.233	0	30.18	0	5.24	5.361	-0.121
551.1	55.619	-0.64	-0.427	0	30.26	0	5.241	5.362	-0.121
551.2	55.613	-0.628	-0.763	0	29.91	0	5.242	5.363	-0.121
551.3	55.6	-0.643	-1.052	0	29.21	0	5.243	5.364	-0.121
551.4	55.588	-0.648	-0.692	0	28.12	0	5.244	5.365	-0.121
551.5	55.575	-0.648	0.099	0	26.99	0	5.244	5.365	-0.121
551.6	55.557	-0.635	-1.293	0	26.55	0	5.245	5.366	-0.121
551.7	55.538	-0.635	0.138	0	26.48	0	5.246	5.367	-0.121
551.8	55.526	-0.63	0.053	0	26.57	0	5.246	5.368	-0.121
551.9	55.507	-0.62	-1.112	0	26.48	0	5.247	5.368	-0.121
552	55.495	-0.615	-0.59	0	26.52	0	5.248	5.369	-0.121
552.1	55.476	-0.615	-0.929	0	26.51	0	5.249	5.37	-0.121
552.2	55.464	-0.63	-0.773	0	26.47	0	5.249	5.371	-0.121
552.3	55.445	-0.628	-0.519	0	26.54	0	5.25	5.371	-0.121
552.4	55.433	-0.628	-0.473	0	26.43	0	5.251	5.372	-0.121
552.5	55.414	-0.643	-1.052	0	26.61	0	5.252	5.373	-0.121
552.6	55.395	-0.63	-0.293	0	26.65	0	5.252	5.373	-0.121
552.7	55.383	-0.635	-0.59	0	26.74	0	5.253	5.374	-0.121
552.8	55.364	-0.65	-1.052	0	26.63	0	5.254	5.375	-0.121
552.9	55.352	-0.643	-0.117	0	26.71	0	5.255	5.376	-0.121
553	55.333	-0.63	-0.487	0	26.6	0	5.255	5.376	-0.121
553.1	55.321	-0.618	-0.664	0	26.7	0	5.256	5.377	-0.121
553.2	55.302	-0.62	-1.155	0	26.78	0	5.257	5.378	-0.121
553.3	55.29	-0.625	-1.24	0	27.43	0	5.258	5.379	-0.121
553.4	55.271	-0.623	-0.664	0	27.34	0	5.258	5.379	-0.121
553.5	55.259	-0.623	-0.459	0	27.34	0	5.259	5.38	-0.121
553.6	55.246	-0.608	-0.961	0	27.37	0	5.26	5.381	-0.121
553.7	55.227	-0.618	-0.343	0	27.31	0	5.261	5.382	-0.121
553.8	55.215	-0.605	-0.343	0	27.39	0	5.261	5.383	-0.121
553.9	55.203	-0.605	-0.343	0	27.3	0	5.262	5.383	-0.121

554	55.19	-0.61	-1.059	0	27.35	0	5.263	5.384	-0.121
554.1	55.172	-0.61	-0.632	0	27.29	0	5.264	5.385	-0.121
554.2	55.159	-0.61	-0.505	0	27.36	0	5.264	5.386	-0.121
554.3	55.147	-0.61	-0.678	0	27.26	0	5.265	5.386	-0.121
554.4	55.134	-0.633	-0.505	0	27.36	0	5.266	5.387	-0.121
554.5	55.116	-0.633	-0.83	0	27.25	0	5.267	5.388	-0.121
554.6	55.103	-0.623	-0.085	0	27.33	0	5.267	5.389	-0.121
554.7	55.091	-0.623	-0.71	0	27.26	0	5.268	5.389	-0.121
554.8	55.072	-0.62	-0.795	0	27.3	0	5.269	5.39	-0.121
554.9	55.06	-0.62	-0.706	0	27.33	0	5.27	5.391	-0.121
555	55.041	-0.625	-0.777	0	27.46	0	5.27	5.392	-0.121
555.1	55.029	-0.633	-0.749	0	27.39	0	5.271	5.392	-0.121
555.2	55.016	-0.643	-0.72	0	27.46	0	5.272	5.393	-0.121
555.3	55.004	-0.64	-0.456	0	27.4	0	5.273	5.394	-0.121
555.4	54.985	-0.638	-0.749	0	27.46	0	5.274	5.395	-0.121
555.5	54.973	-0.64	-0.886	0	27.38	0	5.274	5.395	-0.121
555.6	54.96	-0.628	-0.53	0	27.46	0	5.275	5.396	-0.121
555.7	54.948	-0.628	-0.65	0	27.64	0	5.276	5.397	-0.121
555.8	54.935	-0.63	-0.992	0	27.63	0	5.277	5.398	-0.121
555.9	54.917	-0.618	-0.487	0	27.51	0	5.277	5.398	-0.121
556	54.904	-0.61	-0.872	0	27.54	0	5.278	5.399	-0.121
556.1	54.892	-0.615	-1.059	0	27.36	0	5.279	5.4	-0.121
556.2	54.88	-0.613	-0.427	0	26.75	0	5.28	5.401	-0.121
556.3	54.867	-0.6	-0.689	0	24.95	0	5.28	5.401	-0.121
556.4	54.848	-0.61	-1.257	0	23.81	0	5.281	5.402	-0.121
556.5	54.83	-0.61	-1.183	0	22.94	0	5.282	5.403	-0.121
556.6	54.811	-0.623	-0.014	0	21.56	0	5.282	5.403	-0.121
556.7	54.786	-0.623	-0.915	0	21.16	0	5.283	5.404	-0.121
556.8	54.768	-0.635	-0.999	0	21.12	0	5.283	5.405	-0.121
556.9	54.743	-0.635	-0.554	0	21.12	0	5.284	5.405	-0.121
557	54.718	-0.663	0.152	0	21.16	0	5.285	5.406	-0.121
557.1	54.693	-0.638	-0.544	0	21.06	0	5.285	5.406	-0.121
557.2	54.668	-0.638	-1.24	0	21.11	0	5.286	5.407	-0.121
557.3	54.643	-0.628	-0.943	0	21.55	0	5.286	5.407	-0.121
557.4	54.625	-0.61	-0.65	0	21.89	0	5.287	5.408	-0.121
557.5	54.606	-0.61	-1.388	0	21.8	0	5.288	5.409	-0.121
557.6	54.581	-0.625	-0.901	0	21.85	0	5.288	5.409	-0.121
557.7	54.556	-0.625	-0.261	0	21.79	0	5.289	5.41	-0.121
557.8	54.532	-0.608	-0.205	0	21.85	0	5.289	5.41	-0.121
557.9	54.513	-0.605	-0.992	0	21.78	0	5.29	5.411	-0.121
558	54.488	-0.628	-1.285	0	21.82	0	5.291	5.412	-0.121
558.1	54.469	-0.628	-0.367	0	21.77	0	5.291	5.412	-0.121
558.2	54.451	-0.618	-0.427	0	21.8	0	5.292	5.413	-0.121
558.3	54.426	-0.623	-0.858	0	21.76	0	5.292	5.414	-0.121
558.4	54.401	-0.62	-0.749	0	21.78	0	5.293	5.414	-0.121
558.5	54.382	-0.613	-0.586	0	21.73	0	5.294	5.415	-0.121
558.6	54.364	-0.628	-1.155	0	21.76	0	5.294	5.415	-0.121

558.7	54.339	-0.625	-0.572	0	22.24	0	5.295	5.416	-0.121
558.8	54.314	-0.623	-0.59	0	22.69	0	5.295	5.417	-0.121
558.9	54.295	-0.623	-1.021	0	22.7	0	5.296	5.417	-0.121
559	54.277	-0.623	-0.456	0	22.64	0	5.297	5.418	-0.121
559.1	54.258	-0.62	-0.749	0	22.69	0	5.297	5.418	-0.121
559.2	54.239	-0.62	-0.901	0	22.61	0	5.298	5.419	-0.121
559.3	54.215	-0.623	-0.544	0	22.69	0	5.299	5.42	-0.121
559.4	54.196	-0.628	-0.795	0	22.78	0	5.299	5.42	-0.121
559.5	54.177	-0.628	-0.636	0	22.93	0	5.3	5.421	-0.121
559.6	54.159	-0.658	-0.456	0	22.85	0	5.301	5.422	-0.121
559.7	54.134	-0.635	-0.901	0	22.9	0	5.301	5.422	-0.121
559.8	54.115	-0.61	-0.816	0	22.73	0	5.302	5.423	-0.121
559.9	54.103	-0.61	-1.469	0	21.86	0	5.302	5.424	-0.121
560	54.078	-0.625	-0.858	0	21.89	0	5.303	5.424	-0.121
560.1	54.059	-0.633	-0.099	0	21.83	0	5.304	5.425	-0.121
560.2	54.041	-0.633	-0.576	0	21.88	0	5.304	5.425	-0.121
560.3	54.016	-0.618	-0.576	0	21.81	0	5.305	5.426	-0.121
560.4	53.997	-0.62	-1.059	0	21.87	0	5.305	5.427	-0.121
560.5	53.972	-0.62	-0.862	0	21.16	0	5.306	5.427	-0.121
560.6	53.954	-0.618	-0.533	0	21.12	0	5.307	5.428	-0.121
560.7	53.929	-0.63	-0.441	0	20.88	0	5.307	5.428	-0.121
560.8	53.91	-0.625	-0.441	0	20.62	0	5.308	5.429	-0.121
560.9	53.892	-0.628	-0.763	0	20.51	0	5.308	5.429	-0.121
561	53.873	-0.628	-0.59	0	20.61	0	5.309	5.43	-0.121
561.1	53.842	-0.608	-0.53	0	20.5	0	5.309	5.431	-0.121
561.2	53.823	-0.608	-1.021	0	20.57	0	5.31	5.431	-0.121
561.3	53.798	-0.6	-1.24	0	20.47	0	5.311	5.432	-0.121
561.4	53.773	-0.61	-0.763	0	20.56	0	5.311	5.432	-0.121
561.5	53.755	-0.635	-0.886	0	20.47	0	5.312	5.433	-0.121
561.6	53.73	-0.635	-0.113	0	20.52	0	5.312	5.433	-0.121
561.7	53.711	-0.625	-0.763	0	20.45	0	5.313	5.434	-0.121
561.8	53.693	-0.62	-0.901	0	20.68	0	5.313	5.435	-0.121
561.9	53.668	-0.613	-1.169	0	20.93	0	5.314	5.435	-0.121
562	53.643	-0.613	-0.777	0	21.38	0	5.315	5.436	-0.121
562.1	53.624	-0.625	-1.225	0	21.66	0	5.315	5.436	-0.121
562.2	53.599	-0.63	-0.346	0	22.23	0	5.316	5.437	-0.121
562.3	53.581	-0.62	-0.085	0	22.68	0	5.316	5.438	-0.121
562.4	53.568	-0.623	-1.172	0	22.88	0	5.317	5.438	-0.121
562.5	53.544	-0.623	-0.763	0	22.81	0	5.318	5.439	-0.121
562.6	53.525	-0.613	-0.576	0	22.86	0	5.318	5.44	-0.121
562.7	53.506	-0.62	-0.759	0	22.82	0	5.319	5.44	-0.121
562.8	53.481	-0.633	-0.735	0	22.84	0	5.32	5.441	-0.121
562.9	53.463	-0.633	-0.576	0	22.84	0	5.32	5.441	-0.121
563	53.444	-0.62	-0.473	0	22.79	0	5.321	5.442	-0.121
563.1	53.425	-0.605	-1.074	0	22.85	0	5.322	5.443	-0.121
563.2	53.407	-0.623	-1.225	0	22.8	0	5.322	5.443	-0.121
563.3	53.388	-0.64	-0.89	0	22.84	0	5.323	5.444	-0.121

563.4	53.37	-0.628	-0.427	0	22.76	0	5.323	5.445	-0.121
563.5	53.351	-0.628	-0.519	0	22.83	0	5.324	5.445	-0.121
563.6	53.332	-0.598	-1.331	0	22.74	0	5.325	5.446	-0.121
563.7	53.32	-0.598	-0.519	0	22.8	0	5.325	5.446	-0.121
563.8	53.295	-0.62	-0.519	0	22.75	0	5.326	5.447	-0.121
563.9	53.283	-0.605	-0.237	0	22.77	0	5.327	5.448	-0.121
564	53.258	-0.61	-1.317	0	22.76	0	5.327	5.448	-0.121
564.1	53.245	-0.618	-0.89	0	22.73	0	5.328	5.449	-0.121
564.2	53.227	-0.613	-0.328	0	22.76	0	5.329	5.45	-0.121
564.3	53.208	-0.613	-0.844	0	22.7	0	5.329	5.45	-0.121
564.4	53.196	-0.615	-0.501	0	22.4	0	5.33	5.451	-0.121
564.5	53.177	-0.615	-1.003	0	21.72	0	5.33	5.451	-0.121
564.6	53.158	-0.61	-0.014	0	21.82	0	5.331	5.452	-0.121
564.7	53.14	-0.613	-0.989	0	20.97	0	5.332	5.453	-0.121
564.8	53.115	-0.608	-0.805	0	20.55	0	5.332	5.453	-0.121
564.9	53.096	-0.598	-0.706	0	19.2	0	5.333	5.454	-0.121
565	53.071	-0.603	-0.643	0	17.29	0	5.333	5.454	-0.121
565.1	53.046	-0.62	-0.749	0	16.06	0	5.334	5.455	-0.121
565.2	53.015	-0.623	-0.586	0	15.24	0	5.334	5.455	-0.121
565.3	52.984	-0.615	-0.427	0	14.91	0	5.334	5.456	-0.121
565.4	52.953	-0.628	-1.088	0	14.71	0	5.335	5.456	-0.121
565.5	52.922	-0.628	-0.929	0	14.69	0	5.335	5.456	-0.121
565.6	52.891	-0.61	-0.258	0	14.7	0	5.336	5.457	-0.121
565.7	52.86	-0.61	-0.731	0	14.69	0	5.336	5.457	-0.121
565.8	52.835	-0.628	-0.735	0	14.72	0	5.336	5.458	-0.121
565.9	52.798	-0.628	-0.261	0	15.24	0	5.337	5.458	-0.121
566	52.767	-0.628	-1.074	0	15.31	0	5.337	5.458	-0.121
566.1	52.742	-0.638	-0.678	0	15.7	0	5.338	5.459	-0.121
566.2	52.717	-0.623	-0.427	0	16.1	0	5.338	5.459	-0.121
566.3	52.686	-0.613	-0.915	0	16.06	0	5.339	5.46	-0.121
566.4	52.649	-0.618	-1.038	0	16.09	0	5.339	5.46	-0.121
566.5	52.624	-0.618	-0.66	0	16.38	0	5.34	5.461	-0.121
566.6	52.599	-0.618	-0.247	0	16.64	0	5.34	5.461	-0.121
566.7	52.568	-0.618	-0.833	0	16.56	0	5.34	5.462	-0.121
566.8	52.543	-0.625	-0.749	0	16.61	0	5.341	5.462	-0.121
566.9	52.518	-0.615	-0.604	0	16.55	0	5.341	5.463	-0.121
567	52.493	-0.628	-1.074	0	16.8	0	5.342	5.463	-0.121
567.1	52.462	-0.625	-0.501	0	17.23	0	5.342	5.463	-0.121
567.2	52.438	-0.598	-0.314	0	18.21	0	5.343	5.464	-0.121
567.3	52.413	-0.598	-1.07	0	19.79	0	5.343	5.465	-0.121
567.4	52.394	-0.63	-1.374	0	19.95	0	5.344	5.465	-0.121
567.5	52.369	-0.628	0.198	0	20.51	0	5.345	5.466	-0.121
567.6	52.351	-0.623	-0.343	0	20.47	0	5.345	5.466	-0.121
567.7	52.326	-0.638	-1.169	0	20.49	0	5.346	5.467	-0.121
567.8	52.301	-0.635	-0.572	0	20.46	0	5.346	5.467	-0.121
567.9	52.282	-0.61	-0.261	0	20.51	0	5.347	5.468	-0.121
568	52.264	-0.605	-1.137	0	20.43	0	5.347	5.468	-0.121

568.1	52.245	-0.623	-1.074	0	20.5	0	5.348	5.469	-0.121
568.2	52.226	-0.635	-0.343	0	20.43	0	5.348	5.47	-0.121
568.3	52.208	-0.625	-0.343	0	20.48	0	5.349	5.47	-0.121
568.4	52.189	-0.615	-0.664	0	20.42	0	5.35	5.471	-0.121
568.5	52.164	-0.615	-1.349	0	20.45	0	5.35	5.471	-0.121
568.6	52.145	-0.625	-0.473	0	20.42	0	5.351	5.472	-0.121
568.7	52.121	-0.625	-0.445	0	20.4	0	5.351	5.472	-0.121
568.8	52.108	-0.608	-0.441	0	20.92	0	5.352	5.473	-0.121
568.9	52.083	-0.608	-1.01	0	21.28	0	5.353	5.474	-0.121
569	52.065	-0.62	-0.65	0	22.38	0	5.353	5.474	-0.121
569.1	52.046	-0.615	-0.328	0	23.2	0	5.354	5.475	-0.121
569.2	52.034	-0.613	-0.487	0	23.91	0	5.354	5.476	-0.121
569.3	52.021	-0.625	-0.696	0	24.68	0	5.355	5.476	-0.121
569.4	52.009	-0.628	-0.516	0	25.45	0	5.356	5.477	-0.121
569.5	51.996	-0.628	-0.417	0	26.03	0	5.357	5.478	-0.121
569.6	51.984	-0.605	-0.975	0	26.73	0	5.357	5.478	-0.121
569.7	51.978	-0.605	-0.572	0	28.13	0	5.358	5.479	-0.121
569.8	51.971	-0.64	-0.487	0	28.87	0	5.359	5.48	-0.121
569.9	51.965	-0.625	-0.085	0	28.84	0	5.36	5.481	-0.121
570	51.959	-0.615	-0.844	0	28.84	0	5.36	5.482	-0.121
570.1	51.953	-0.61	-1.141	0	28.87	0	5.361	5.482	-0.121
570.2	51.953	-0.613	-0.915	0	28.81	0	5.362	5.483	-0.121
570.3	51.947	-0.613	-0.915	0	28.9	0	5.363	5.484	-0.121
570.4	51.94	-0.618	-0.731	0	28.83	0	5.364	5.485	-0.121
570.5	51.934	-0.63	-0.901	0	28.89	0	5.364	5.486	-0.121
570.6	51.934	-0.635	-0.572	0	28.81	0	5.365	5.486	-0.121
570.7	51.922	-0.628	-0.572	0	28.89	0	5.366	5.487	-0.121
570.8	51.916	-0.61	-0.586	0	28.8	0	5.367	5.488	-0.121
570.9	51.909	-0.61	-1.183	0	28.89	0	5.368	5.489	-0.121
571	51.903	-0.625	-0.975	0	28.81	0	5.368	5.49	-0.121
571.1	51.903	-0.625	-0.431	0	28.89	0	5.369	5.49	-0.121
571.2	51.897	-0.618	-0.65	0	28.82	0	5.37	5.491	-0.121
571.3	51.891	-0.61	-0.939	0	28.86	0	5.371	5.492	-0.121
571.4	51.884	-0.61	-1.01	0	28.83	0	5.372	5.493	-0.121
571.5	51.878	-0.61	-0.901	0	28.86	0	5.372	5.494	-0.121
571.6	51.878	-0.62	-0.473	0	28.84	0	5.373	5.494	-0.121
571.7	51.866	-0.62	-0.901	0	28.85	0	5.374	5.495	-0.121
571.8	51.866	-0.628	-0.901	0	28.82	0	5.375	5.496	-0.121
571.9	51.86	-0.65	-0.689	0	28.83	0	5.376	5.497	-0.121
572	51.853	-0.65	-0.367	0	28.83	0	5.377	5.498	-0.121
572.1	51.847	-0.633	-0.516	0	28.82	0	5.377	5.498	-0.121
572.2	51.841	-0.633	-1.059	0	28.85	0	5.378	5.499	-0.121
572.3	51.835	-0.63	-0.812	0	28.79	0	5.379	5.5	-0.121
572.4	51.829	-0.615	-0.53	0	28.84	0	5.38	5.501	-0.121
572.5	51.829	-0.615	-1.059	0	28.79	0	5.381	5.502	-0.121
572.6	51.822	-0.628	-0.72	0	28.85	0	5.381	5.502	-0.121
572.7	51.816	-0.628	-1.271	0	28.76	0	5.382	5.503	-0.121

572.8	51.81	-0.61	-1.271	0	28.86	0	5.383	5.504	-0.121
572.9	51.804	-0.62	-1.225	0	28.78	0	5.384	5.505	-0.121
573	51.804	-0.625	-0.332	0	28.85	0	5.385	5.506	-0.121
573.1	51.798	-0.615	-0.65	0	29	0	5.385	5.506	-0.121
573.2	51.791	-0.593	-0.65	0	29.89	0	5.386	5.507	-0.121
573.3	51.791	-0.59	-1.469	0	32.23	0	5.387	5.508	-0.121
573.4	51.785	-0.595	-1.074	0	33.42	0	5.388	5.509	-0.121
573.5	51.791	-0.6	-0.678	0	33.67	0	5.389	5.51	-0.121
573.6	51.791	-0.613	-0.533	0	34.03	0	5.39	5.511	-0.121
573.7	51.791	-0.61	-0.473	0	33.95	0	5.391	5.512	-0.121
573.8	51.798	-0.61	-0.314	0	34.03	0	5.392	5.513	-0.121
573.9	51.804	-0.625	-0.735	0	33.98	0	5.393	5.514	-0.121
574	51.804	-0.623	-0.117	0	34.05	0	5.394	5.515	-0.121
574.1	51.81	-0.603	-0.357	0	33.98	0	5.395	5.516	-0.121
574.2	51.81	-0.603	-0.975	0	34.13	0	5.396	5.517	-0.121
574.3	51.816	-0.62	-0.925	0	34.13	0	5.396	5.518	-0.121
574.4	51.816	-0.633	-0.328	0	34.23	0	5.397	5.519	-0.121
574.5	51.822	-0.633	-0.102	0	34.18	0	5.398	5.519	-0.121
574.6	51.822	-0.61	-0.975	0	33.63	0	5.399	5.52	-0.121
574.7	51.829	-0.603	-0.826	0	33.51	0	5.4	5.521	-0.121
574.8	51.829	-0.605	-0.886	0	33.54	0	5.401	5.522	-0.121
574.9	51.835	-0.605	-0.572	0	33.54	0	5.402	5.523	-0.121
575	51.835	-0.628	-0.802	0	33.52	0	5.403	5.524	-0.121
575.1	51.841	-0.638	-0.558	0	33.59	0	5.404	5.525	-0.121
575.2	51.841	-0.61	0.042	0	33.54	0	5.405	5.526	-0.121
575.3	51.841	-0.61	-1.225	0	33.27	0	5.406	5.527	-0.121
575.4	51.847	-0.63	-1.374	0	32.05	0	5.407	5.528	-0.121
575.5	51.841	-0.63	0	0	32.05	0	5.407	5.528	-0.121
575.6	51.841	-0.603	-0.459	0	27.8	0	5.408	5.529	-0.121
575.7	51.835	-0.603	-0.756	0	27.55	0	5.409	5.53	-0.121
575.8	51.829	-0.59	-0.84	0	27.51	0	5.41	5.531	-0.121
575.9	51.822	-0.61	-0.992	0	27.46	0	5.411	5.532	-0.121
576	51.816	-0.628	-0.459	0	27.52	0	5.411	5.532	-0.121
576.1	51.81	-0.625	-0.233	0	27.44	0	5.412	5.533	-0.121
576.2	51.798	-0.613	-0.314	0	27.5	0	5.413	5.534	-0.121
576.3	51.791	-0.608	-1.045	0	27.42	0	5.414	5.535	-0.121
576.4	51.785	-0.61	-0.77	0	27.48	0	5.414	5.536	-0.121
576.5	51.779	-0.613	-0.802	0	26.89	0	5.415	5.536	-0.121
576.6	51.766	-0.608	-0.519	0	26.31	0	5.416	5.537	-0.121
576.7	51.76	-0.613	-0.763	0	24.46	0	5.417	5.538	-0.121
576.8	51.748	-0.618	-0.604	0	23.6	0	5.417	5.538	-0.121
576.9	51.735	-0.625	-0.83	0	22.76	0	5.418	5.539	-0.121
577	51.723	-0.623	-0.558	0	21.24	0	5.418	5.54	-0.121
577.1	51.704	-0.615	-0.72	0	20.86	0	5.419	5.54	-0.121
577.2	51.686	-0.61	-0.929	0	20.55	0	5.42	5.541	-0.121
577.3	51.661	-0.623	-0.84	0	20.6	0	5.42	5.541	-0.121
577.4	51.648	-0.63	-0.646	0	20.61	0	5.421	5.542	-0.121

577.5	51.624	-0.63	-0.445	0	20.55	0	5.421	5.542	-0.121
577.6	51.611	-0.663	-0.685	0	20.59	0	5.422	5.543	-0.121
577.7	51.586	-0.663	-0.946	0	20.54	0	5.422	5.544	-0.121
577.8	51.568	-0.618	-0.946	0	20.55	0	5.423	5.544	-0.121
577.9	51.555	-0.618	-1.07	0	20.56	0	5.424	5.545	-0.121
578	51.537	-0.615	-1.257	0	20.46	0	5.424	5.545	-0.121
578.1	51.512	-0.618	-0.72	0	21.2	0	5.425	5.546	-0.121
578.2	51.499	-0.615	-0.413	0	21.12	0	5.425	5.546	-0.121
578.3	51.481	-0.613	-0.826	0	21.46	0	5.426	5.547	-0.121
578.4	51.462	-0.615	-0.788	0	21.85	0	5.427	5.548	-0.121
578.5	51.45	-0.615	-0.886	0	21.88	0	5.427	5.548	-0.121
578.6	51.431	-0.603	-0.89	0	21.84	0	5.428	5.549	-0.121
578.7	51.412	-0.603	-0.876	0	21.84	0	5.428	5.549	-0.121
578.8	51.394	-0.6	-0.961	0	21.2	0	5.429	5.55	-0.121
578.9	51.381	-0.605	-0.83	0	21.1	0	5.43	5.551	-0.121
579	51.356	-0.62	-0.636	0	20.5	0	5.43	5.551	-0.121
579.1	51.344	-0.61	-0.399	0	19.98	0	5.431	5.552	-0.121
579.2	51.325	-0.588	-0.473	0	17.95	0	5.431	5.552	-0.121
579.3	51.3	-0.6	-1.483	0	16.52	0	5.432	5.553	-0.121
579.4	51.282	-0.615	-0.826	0	15.98	0	5.432	5.553	-0.121
579.5	51.251	-0.6	-0.3	0	15.94	0	5.433	5.554	-0.121
579.6	51.226	-0.6	-0.622	0	15.92	0	5.433	5.554	-0.121
579.7	51.201	-0.625	-1.356	0	15.92	0	5.433	5.554	-0.121
579.8	51.17	-0.635	-0.244	0	15.94	0	5.434	5.555	-0.121
579.9	51.145	-0.65	-0.54	0	15.88	0	5.434	5.555	-0.121
580	51.12	-0.665	-1.006	0	15.87	0	5.435	5.556	-0.121
580.1	51.089	-0.67	0.018	0	15.92	0	5.435	5.556	-0.121
580.2	51.07	-0.708	-1.031	0	15.87	0	5.436	5.557	-0.121
580.3	51.039	-0.685	-0.042	0	15.86	0	5.436	5.557	-0.121
580.4	51.015	-0.61	0.099	0	16.07	0	5.436	5.558	-0.121
580.5	50.99	-0.61	-2.483	0	16.1	0	5.437	5.558	-0.121
580.6	50.965	-0.608	-1.773	0	15.8	0	5.437	5.558	-0.121
580.7	50.94	-0.603	-0.897	0	14.22	0	5.438	5.559	-0.121
580.8	50.909	-0.608	-0.812	0	11.09	0	5.438	5.559	-0.121
580.9	50.878	-0.608	-0.632	0	7.25	0	5.438	5.559	-0.121
581	50.841	-0.598	-0.554	0	4.24	0	5.438	5.56	-0.121
581.1	50.797	-0.605	-0.872	0	2.27	0	5.438	5.56	-0.121
581.2	50.747	-0.623	-0.886	0	0.89	0	5.438	5.56	-0.121
581.3	50.698	-0.625	-0.385	0	0	0	5.438	5.56	-0.121
581.4	50.642	-0.615	-0.459	0	0	0	5.439	5.56	-0.121
581.5	50.592	-0.615	-0.872	0	0	0	5.439	5.56	-0.121
581.6	50.536	-0.6	-1.381	0	0	0	5.439	5.56	-0.121
581.7	50.48	-0.6	-0.544	0	0	0	5.439	5.56	-0.121
581.8	50.43	-0.625	-0.459	0	0	0	5.439	5.56	-0.121
581.9	50.375	-0.615	-0.3	0	0	0	5.439	5.56	-0.121
582	50.325	-0.61	-0.996	0	0	0	5.439	5.56	-0.121
582.1	50.269	-0.605	-0.717	0	0	0	5.439	5.56	-0.121

582.2	50.219	-0.615	-0.911	0	0	0	5.439	5.56	-0.121
582.3	50.163	-0.618	-0.745	0	0	0	5.439	5.56	-0.121
582.4	50.114	-0.61	-0.516	0	0	0	5.439	5.56	-0.121
582.5	50.058	-0.608	-0.826	0	0	0	5.439	5.56	-0.121
582.6	50.008	-0.605	-0.569	0	0	0	5.439	5.56	-0.121
582.7	49.952	-0.615	-1.031	0	0	0	5.439	5.56	-0.121
582.8	49.896	-0.62	-0.636	0	0	0	5.439	5.56	-0.121
582.9	49.846	-0.623	-0.47	0	0	0	5.439	5.56	-0.121
583	49.797	-0.625	-1.222	0	0	0	5.439	5.56	-0.121
583.1	49.741	-0.62	-0.618	0	0	0	5.439	5.56	-0.121
583.2	49.691	-0.61	-0.685	0	0	0	5.439	5.56	-0.121
583.3	49.641	-0.61	-1.028	0	0	0	5.439	5.56	-0.121
583.4	49.585	-0.623	-0.897	0	0	0	5.439	5.56	-0.121
583.5	49.536	-0.623	-0.632	0	0	0	5.439	5.56	-0.121
583.6	49.48	-0.615	-0.459	0	0	0	5.439	5.56	-0.121
583.7	49.43	-0.615	-0.872	0	0	0	5.439	5.56	-0.121
583.8	49.38	-0.608	-0.872	0	0	0	5.439	5.56	-0.121
583.9	49.324	-0.608	-0.339	0	0	0	5.439	5.56	-0.121
584	49.275	-0.61	-1.427	0	0	0	5.439	5.56	-0.121
584.1	49.219	-0.618	-0.717	0	0	0	5.439	5.56	-0.121
584.2	49.169	-0.608	0.004	0	0	0	5.439	5.56	-0.121
584.3	49.119	-0.595	-0.897	0	0	0	5.439	5.56	-0.121
584.4	49.07	-0.598	-0.953	0	0	0	5.439	5.56	-0.121
584.5	49.014	-0.598	-0.897	0	0	0	5.439	5.56	-0.121
584.6	48.964	-0.613	-0.459	0	0	0	5.439	5.56	-0.121
584.7	48.914	-0.613	-1.268	0	0	0	5.439	5.56	-0.121
584.8	48.858	-0.625	-1.243	0	0	0	5.439	5.56	-0.121
584.9	48.809	-0.628	-0.205	0	0	0	5.439	5.56	-0.121
585	48.759	-0.623	-0.622	0	0	0	5.439	5.56	-0.121
585.1	48.703	-0.62	-0.812	0	0	0	5.439	5.56	-0.121
585.2	48.653	-0.618	-0.872	0	0	0	5.439	5.56	-0.121
585.3	48.604	-0.608	-0.636	0	0	0	5.439	5.56	-0.121
585.4	48.554	-0.608	-1.042	0	0	0	5.439	5.56	-0.121
585.5	48.498	-0.615	-1.017	0	0	0	5.439	5.56	-0.121
585.6	48.448	-0.615	-0.554	0	0	0	5.439	5.56	-0.121
585.7	48.399	-0.605	-0.622	0	0	0	5.439	5.56	-0.121
585.8	48.349	-0.608	-1.014	0	0	0	5.439	5.56	-0.121
585.9	48.293	-0.618	-0.675	0	0	0	5.439	5.56	-0.121
586	48.249	-0.625	-0.583	0	1.1	0	5.439	5.56	-0.121
586.1	48.2	-0.618	-0.569	0	2.9	0	5.439	5.56	-0.121
586.2	48.15	-0.628	-0.717	0	5.34	0	5.439	5.56	-0.121
586.3	48.113	-0.63	-0.632	0	10.47	0	5.439	5.561	-0.121
586.4	48.075	-0.61	-0.099	0	15.37	0	5.44	5.561	-0.121
586.5	48.057	-0.61	-1.197	0	17.58	0	5.44	5.562	-0.121
586.6	48.038	-0.618	-1.55	0	19.52	0	5.441	5.562	-0.121
586.7	48.026	-0.618	-0.632	0	24.12	0	5.442	5.563	-0.121
586.8	48.013	-0.618	-0.636	0	24.89	0	5.442	5.563	-0.121

586.9	48.013	-0.618	-1.045	0	26.21	0	5.443	5.564	-0.121
587	48.013	-0.618	-0.473	0	26.92	0	5.444	5.565	-0.121
587.1	48.007	-0.608	-0.6	0	27.02	0	5.445	5.566	-0.121
587.2	48.007	-0.618	-1.042	0	27.52	0	5.445	5.566	-0.121
587.3	48.007	-0.618	-0.47	0	27.58	0	5.446	5.567	-0.121
587.4	48.007	-0.613	-0.265	0	27.52	0	5.447	5.568	-0.121
587.5	48.007	-0.613	-1.208	0	27.31	0	5.448	5.569	-0.121
587.6	48.007	-0.623	-0.837	0	26.93	0	5.448	5.569	-0.121
587.7	48.007	-0.623	-0.646	0	27	0	5.449	5.57	-0.121
587.8	48.007	-0.608	-0.731	0	26.94	0	5.45	5.571	-0.121
587.9	48.007	-0.615	-0.883	0	27	0	5.451	5.572	-0.121
588	48.007	-0.628	-1.056	0	26.1	0	5.451	5.572	-0.121
588.1	48.007	-0.61	-0.159	0	25.69	0	5.452	5.573	-0.121
588.2	48.001	-0.603	-0.855	0	25.69	0	5.453	5.574	-0.121
588.3	48.001	-0.628	-1.43	0	25.7	0	5.453	5.575	-0.121
588.4	48.001	-0.668	-0.512	0	26.69	0	5.454	5.575	-0.121
588.5	47.995	-0.64	0.226	0	26.97	0	5.455	5.576	-0.121
588.6	47.995	-0.593	-0.23	0	27	0	5.456	5.577	-0.121
588.7	47.995	-0.603	-2.56	0	26.96	0	5.456	5.578	-0.121
588.8	47.995	-0.613	-1.042	0	27.23	0	5.457	5.578	-0.121
588.9	47.995	-0.61	-0.396	0	29.63	0	5.458	5.579	-0.121
589	47.995	-0.61	-0.569	0	31.28	0	5.459	5.58	-0.121
589.1	48.001	-0.608	-0.738	0	31.2	0	5.46	5.581	-0.121
589.2	48.013	-0.615	-0.858	0	31.2	0	5.461	5.582	-0.121
589.3	48.02	-0.608	-0.431	0	31.22	0	5.461	5.583	-0.121
589.4	48.02	-0.598	-0.339	0	31.21	0	5.462	5.583	-0.121
589.5	48.026	-0.598	-0.957	0	31.97	0	5.463	5.584	-0.121
589.6	48.038	-0.598	-0.957	0	34.64	0	5.464	5.585	-0.121
589.7	48.051	-0.598	-0.569	0	37.07	0	5.465	5.586	-0.121
589.8	48.063	-0.648	-0.484	0	37.98	0	5.466	5.587	-0.121
589.9	48.082	-0.648	0.159	0	39.34	0	5.467	5.589	-0.121
590	48.107	-0.62	-0.622	0	41.44	0	5.469	5.59	-0.121
590.1	48.125	-0.615	-1.222	0	41.8	0	5.47	5.591	-0.121
590.2	48.15	-0.623	-0.996	0	41.83	0	5.471	5.592	-0.121
590.3	48.175	-0.63	-0.607	0	41.83	0	5.472	5.593	-0.121
590.4	48.2	-0.623	-0.643	0	41.84	0	5.473	5.594	-0.121
590.5	48.225	-0.623	-1.042	0	41.87	0	5.474	5.595	-0.121
590.6	48.249	-0.603	-1.137	0	41.95	0	5.476	5.597	-0.121
590.7	48.268	-0.603	-0.798	0	41.94	0	5.477	5.598	-0.121
590.8	48.293	-0.62	-0.689	0	42	0	5.478	5.599	-0.121
590.9	48.318	-0.613	-0.102	0	41.91	0	5.479	5.6	-0.121
591	48.343	-0.615	-0.798	0	42.69	0	5.48	5.601	-0.121
591.1	48.368	-0.625	-0.957	0	45.69	0	5.481	5.603	-0.121
591.2	48.399	-0.613	0.201	0	48.41	0	5.483	5.604	-0.121
591.3	48.43	-0.608	-1.021	0	49.01	0	5.484	5.605	-0.121
591.4	48.467	-0.613	-0.855	0	49.67	0	5.486	5.607	-0.121
591.5	48.504	-0.61	-0.646	0	49.85	0	5.487	5.608	-0.121

591.6	48.542	-0.603	-0.586	0	49.76	0	5.488	5.609	-0.121
591.7	48.579	-0.603	-0.883	0	50.15	0	5.49	5.611	-0.121
591.8	48.616	-0.615	-0.837	0	50.74	0	5.491	5.612	-0.121
591.9	48.666	-0.62	-0.456	0	50.76	0	5.493	5.614	-0.121
592	48.697	-0.62	-0.427	0	50.82	0	5.494	5.615	-0.121
592.1	48.734	-0.613	-0.526	0	50.54	0	5.495	5.616	-0.121
592.2	48.771	-0.61	-1.151	0	49.41	0	5.497	5.618	-0.121
592.3	48.815	-0.6	-0.745	0	49.41	0	5.497	5.618	-0.121
592.4	48.846	-0.608	-0.936	0	40.96	0	5.499	5.62	-0.121
592.5	48.871	-0.608	-0.989	0	35.58	0	5.5	5.621	-0.121
592.6	48.883	-0.613	-0.396	0	35.19	0	5.501	5.622	-0.121
592.7	48.896	-0.613	-1.367	0	35.17	0	5.502	5.623	-0.121
592.8	48.902	-0.628	-1.367	0	35.14	0	5.503	5.624	-0.121
592.9	48.914	-0.62	-0.23	0	34.27	0	5.504	5.625	-0.121
593	48.927	-0.608	-0.703	0	34.25	0	5.505	5.626	-0.121
593.1	48.939	-0.613	-1.123	0	34.3	0	5.506	5.627	-0.121
593.2	48.945	-0.618	-0.858	0	34.23	0	5.507	5.628	-0.121
593.3	48.958	-0.61	-0.396	0	34.32	0	5.508	5.629	-0.121
593.4	48.97	-0.618	-0.717	0	34.86	0	5.509	5.63	-0.121
593.5	48.976	-0.618	-0.47	0	35.22	0	5.51	5.631	-0.121
593.6	48.989	-0.61	-0.113	0	35.23	0	5.511	5.632	-0.121
593.7	49.001	-0.61	-1.222	0	35.19	0	5.512	5.633	-0.121
593.8	49.014	-0.61	-1.137	0	34.98	0	5.513	5.634	-0.121
593.9	49.026	-0.62	-0.646	0	34.95	0	5.514	5.635	-0.121
594	49.032	-0.618	-0.325	0	34.99	0	5.515	5.636	-0.121
594.1	49.045	-0.595	-0.6	0	34.84	0	5.516	5.637	-0.121
594.2	49.057	-0.585	-1.084	0	34.03	0	5.517	5.638	-0.121
594.3	49.063	-0.605	-1.268	0	32.13	0	5.517	5.639	-0.121
594.4	49.076	-0.615	-0.54	0	30.09	0	5.518	5.639	-0.121
594.5	49.076	-0.608	-0.219	0	29.79	0	5.519	5.64	-0.121
594.6	49.082	-0.603	-0.685	0	29.76	0	5.52	5.641	-0.121
594.7	49.082	-0.605	-1.081	0	29.81	0	5.521	5.642	-0.121
594.8	49.082	-0.61	-0.632	0	29.81	0	5.522	5.643	-0.121
594.9	49.082	-0.623	-0.671	0	29.74	0	5.522	5.644	-0.121
595	49.088	-0.613	-0.484	0	29.84	0	5.523	5.644	-0.121
595.1	49.095	-0.603	-0.47	0	29	0	5.524	5.645	-0.121
595.2	49.095	-0.615	-1.381	0	28.41	0	5.525	5.646	-0.121
595.3	49.095	-0.62	-0.554	0	27.45	0	5.526	5.647	-0.121
595.4	49.095	-0.615	-0.484	0	26.93	0	5.526	5.648	-0.121
595.5	49.088	-0.615	-0.6	0	26.51	0	5.527	5.648	-0.121
595.6	49.082	-0.613	-0.703	0	26.3	0	5.528	5.649	-0.121
595.7	49.082	-0.603	-0.939	0	26.36	0	5.529	5.65	-0.121
595.8	49.076	-0.605	-0.939	0	26.3	0	5.529	5.65	-0.121
595.9	49.07	-0.605	-1.07	0	26.35	0	5.53	5.651	-0.121
596	49.07	-0.615	-0.607	0	26.26	0	5.531	5.652	-0.121
596.1	49.063	-0.633	-0.159	0	26.33	0	5.531	5.653	-0.121
596.2	49.063	-0.62	-0.484	0	26.26	0	5.532	5.653	-0.121

596.3	49.057	-0.603	-0.311	0	26.35	0	5.533	5.654	-0.121
596.4	49.051	-0.603	-1.427	0	26.24	0	5.534	5.655	-0.121
596.5	49.045	-0.603	-0.897	0	26.36	0	5.534	5.656	-0.121
596.6	49.045	-0.603	-0.367	0	25.61	0	5.535	5.656	-0.121
596.7	49.039	-0.603	-0.646	0	24.98	0	5.536	5.657	-0.121
596.8	49.032	-0.603	-0.731	0	23.37	0	5.536	5.658	-0.121
596.9	49.02	-0.593	-0.812	0	21.54	0	5.537	5.658	-0.121
597	49.014	-0.593	-0.826	0	20.33	0	5.538	5.659	-0.121
597.1	49.001	-0.6	-1.042	0	19.67	0	5.538	5.659	-0.121
597.2	48.983	-0.608	-0.47	0	18.38	0	5.539	5.66	-0.121
597.3	48.964	-0.608	-0.569	0	17.58	0	5.539	5.66	-0.121
597.4	48.945	-0.598	-0.773	0	17.3	0	5.54	5.661	-0.121
597.5	48.927	-0.598	-1.042	0	16.48	0	5.54	5.661	-0.121
597.6	48.902	-0.61	-0.957	0	15.91	0	5.541	5.662	-0.121
597.7	48.883	-0.618	-0.731	0	16	0	5.541	5.662	-0.121
597.8	48.858	-0.615	-0.47	0	15.9	0	5.541	5.663	-0.121
597.9	48.84	-0.598	-0.745	0	15.93	0	5.542	5.663	-0.121
598	48.815	-0.598	-0.826	0	16.79	0	5.542	5.663	-0.121
598.1	48.796	-0.603	-0.957	0	16.81	0	5.543	5.664	-0.121
598.2	48.778	-0.595	-0.145	0	16.84	0	5.543	5.664	-0.121
598.3	48.753	-0.603	-0.985	0	16.77	0	5.544	5.665	-0.121
598.4	48.734	-0.615	-0.311	0	16.83	0	5.544	5.665	-0.121
598.5	48.716	-0.615	-0.717	0	16.75	0	5.545	5.666	-0.121
598.6	48.697	-0.638	-0.325	0	16.83	0	5.545	5.666	-0.121
598.7	48.672	-0.638	-0.936	0	16.23	0	5.546	5.667	-0.121
598.8	48.653	-0.603	-0.939	0	15.82	0	5.546	5.667	-0.121
598.9	48.629	-0.603	-0.957	0	15.62	0	5.546	5.668	-0.121
599	48.61	-0.6	-0.646	0	15.64	0	5.547	5.668	-0.121
599.1	48.585	-0.613	-0.731	0	15.65	0	5.547	5.668	-0.121
599.2	48.566	-0.62	-0.66	0	15.61	0	5.548	5.669	-0.121
599.3	48.542	-0.61	-0.311	0	15.45	0	5.548	5.669	-0.121
599.4	48.523	-0.608	-0.812	0	12.12	0	5.549	5.67	-0.121
599.5	48.492	-0.608	-0.812	0	9	0	5.549	5.67	-0.121
599.6	48.461	-0.6	-0.569	0	8.24	0	5.549	5.67	-0.121
599.7	48.423	-0.6	-0.731	0	8.1	0	5.549	5.67	-0.121
599.8	48.386	-0.613	-0.646	0	8.09	0	5.549	5.671	-0.121
599.9	48.355	-0.62	-0.41	0	8.29	0	5.55	5.671	-0.121
600	48.312	-0.608	-0.297	0	8.96	0	5.55	5.671	-0.121
600.1	48.281	-0.613	-1.056	0	9.58	0	5.55	5.671	-0.121
600.2	48.249	-0.62	-1.07	0	10	0	5.551	5.672	-0.121
600.3	48.218	-0.6	-0.293	0	10.18	0	5.551	5.672	-0.121
600.4	48.187	-0.598	-0.975	0	10.44	0	5.551	5.672	-0.121
600.5	48.156	-0.63	-1.427	0	11.3	0	5.551	5.673	-0.121
600.6	48.125	-0.618	-0.042	0	12.79	0	5.552	5.673	-0.121
600.7	48.1	-0.608	-0.279	0	14.09	0	5.552	5.673	-0.121
600.8	48.075	-0.62	-1.79	0	16.31	0	5.553	5.674	-0.121
600.9	48.057	-0.623	-0.41	0	18.31	0	5.553	5.674	-0.121

601	48.032	-0.62	-0.544	0	19.66	0	5.554	5.675	-0.121
601.1	48.02	-0.6	-0.731	0	20.02	0	5.554	5.675	-0.121
601.2	48.007	-0.593	-0.971	0	19.99	0	5.555	5.676	-0.121
601.3	47.995	-0.608	-1.088	0	20.02	0	5.555	5.676	-0.121
601.4	47.982	-0.603	-0.385	0	19.96	0	5.556	5.677	-0.121
601.5	47.97	-0.603	-0.41	0	20.02	0	5.556	5.678	-0.121
601.6	47.957	-0.615	-1.137	0	19.96	0	5.557	5.678	-0.121
601.7	47.945	-0.613	-0.484	0	20	0	5.558	5.679	-0.121
601.8	47.933	-0.605	-0.569	0	19.95	0	5.558	5.679	-0.121
601.9	47.914	-0.605	-1.017	0	19.97	0	5.559	5.68	-0.121
602	47.902	-0.605	-0.66	0	19.98	0	5.559	5.68	-0.121
602.1	47.889	-0.603	-0.689	0	19.95	0	5.56	5.681	-0.121
602.2	47.877	-0.608	-0.971	0	19.99	0	5.56	5.681	-0.121
602.3	47.864	-0.618	-0.911	0	19.92	0	5.561	5.682	-0.121
602.4	47.852	-0.618	-0.498	0	19.95	0	5.561	5.683	-0.121
602.5	47.839	-0.618	-0.311	0	19.92	0	5.562	5.683	-0.121
602.6	47.827	-0.603	-1.137	0	19.97	0	5.563	5.684	-0.121
602.7	47.808	-0.615	-0.162	0	19.9	0	5.563	5.684	-0.121
602.8	47.796	-0.598	-0.244	0	19.97	0	5.564	5.685	-0.121
602.9	47.783	-0.59	-0.618	0	19.91	0	5.564	5.685	-0.121
603	47.771	-0.603	-0.946	0	19.93	0	5.565	5.686	-0.121
603.1	47.759	-0.613	-0.339	0	19.93	0	5.565	5.686	-0.121
603.2	47.746	-0.605	0.046	0	19.9	0	5.566	5.687	-0.121
603.3	47.728	-0.595	-0.826	0	20.15	0	5.566	5.688	-0.121
603.4	47.721	-0.578	-0.784	0	20.13	0	5.567	5.688	-0.121
603.5	47.703	-0.585	-1.155	0	20.19	0	5.568	5.689	-0.121
603.6	47.696	-0.59	-0.876	0	20.49	0	5.568	5.689	-0.121
603.7	47.684	-0.593	-0.484	0	22.79	0	5.569	5.69	-0.121
603.8	47.678	-0.598	-0.597	0	24.48	0	5.569	5.691	-0.121
603.9	47.672	-0.61	-0.745	0	25.97	0	5.57	5.691	-0.121
604	47.672	-0.61	-0.353	0	27.25	0	5.571	5.692	-0.121
604.1	47.672	-0.603	-0.569	0	28.24	0	5.572	5.693	-0.121
604.2	47.672	-0.605	-0.985	0	28.27	0	5.572	5.694	-0.121
604.3	47.678	-0.62	-0.569	0	28.57	0	5.573	5.694	-0.121
604.4	47.678	-0.623	-0.731	0	29.76	0	5.574	5.695	-0.121
604.5	47.684	-0.623	-0.095	0	32.91	0	5.575	5.696	-0.121
604.6	47.696	-0.61	-1.056	0	34.79	0	5.576	5.697	-0.121
604.7	47.709	-0.605	-0.971	0	36.8	0	5.577	5.698	-0.121
604.8	47.721	-0.613	-1.028	0	39.52	0	5.578	5.699	-0.121
604.9	47.746	-0.613	-0.41	0	39.52	0	5.578	5.699	-0.121
605	47.771	-0.62	-0.745	0	43.52	0	5.58	5.702	-0.121
605.1	47.802	-0.635	-0.911	0	43.61	0	5.582	5.703	-0.121
605.2	47.833	-0.605	-0.159	0	44.18	0	5.583	5.704	-0.121
605.3	47.858	-0.583	-0.946	0	44.61	0	5.584	5.705	-0.121
605.4	47.889	-0.595	-1.815	0	44.71	0	5.585	5.706	-0.121
605.5	47.92	-0.595	-0.826	0	44.7	0	5.587	5.708	-0.121
605.6	47.951	-0.588	0.173	0	45.08	0	5.588	5.709	-0.121

605.7	47.976	-0.588	-0.939	0	46	0	5.589	5.71	-0.121
605.8	48.013	-0.603	-0.939	0	47.97	0	5.59	5.712	-0.121
605.9	48.051	-0.595	-0.258	0	50.93	0	5.592	5.713	-0.121
606	48.094	-0.603	-0.851	0	51.55	0	5.593	5.714	-0.121
606.1	48.131	-0.615	-0.911	0	53.3	0	5.595	5.716	-0.121
606.2	48.169	-0.6	-0.173	0	54.89	0	5.596	5.717	-0.121
606.3	48.218	-0.593	-1.056	0	57.64	0	5.598	5.719	-0.121
606.4	48.268	-0.618	-1.222	0	58.93	0	5.6	5.721	-0.121
606.5	48.324	-0.633	-0.367	0	60.26	0	5.601	5.722	-0.121
606.6	48.38	-0.618	-0.014	0	61.17	0	5.603	5.724	-0.121
606.7	48.436	-0.613	-1.222	0	62.31	0	5.605	5.726	-0.121
606.8	48.498	-0.615	-1.268	0	63.48	0	5.606	5.728	-0.121
606.9	48.56	-0.615	-0.371	0	63.4	0	5.608	5.729	-0.121
607	48.616	-0.615	-1.056	0	63.46	0	5.61	5.731	-0.121
607.1	48.678	-0.608	-0.498	0	63.46	0	5.612	5.733	-0.121
607.2	48.74	-0.6	-0.953	0	61.98	0	5.613	5.735	-0.121
607.3	48.796	-0.623	-1.236	0	58.81	0	5.615	5.736	-0.121
607.4	48.846	-0.625	-0.54	0	49.55	0	5.616	5.738	-0.121
607.5	48.889	-0.625	-0.198	0	41.26	0	5.618	5.739	-0.121
607.6	48.914	-0.608	-1.398	0	36.07	0	5.619	5.74	-0.121
607.7	48.927	-0.608	-0.339	0	32.35	0	5.619	5.741	-0.121
607.8	48.933	-0.61	-0.339	0	30.32	0	5.62	5.741	-0.121
607.9	48.939	-0.603	-0.498	0	30.14	0	5.621	5.742	-0.121
608	48.939	-0.598	-0.985	0	30.11	0	5.622	5.743	-0.121
608.1	48.939	-0.608	-0.883	0	30.01	0	5.623	5.744	-0.121
608.2	48.945	-0.623	-1.158	0	30.05	0	5.624	5.745	-0.121
608.3	48.945	-0.62	-0.325	0	29.93	0	5.624	5.746	-0.121
608.4	48.945	-0.6	-0.583	0	29.68	0	5.625	5.746	-0.121
608.5	48.952	-0.6	-1.36	0	29.78	0	5.626	5.747	-0.121
608.6	48.952	-0.618	-0.985	0	29.69	0	5.627	5.748	-0.121
608.7	48.958	-0.618	-0.413	0	29.72	0	5.628	5.749	-0.121
608.8	48.958	-0.618	-0.47	0	29.74	0	5.629	5.75	-0.121
608.9	48.958	-0.61	-0.713	0	29.09	0	5.629	5.751	-0.121
609	48.964	-0.623	-0.989	0	28.27	0	5.63	5.751	-0.121
609.1	48.964	-0.61	-0.66	0	26.83	0	5.631	5.752	-0.121
609.2	48.958	-0.585	-0.583	0	22.94	0	5.632	5.753	-0.121
609.3	48.952	-0.605	-1.716	0	12.57	0	5.632	5.753	-0.121
609.4	48.927	-0.615	-0.865	0	6.23	0	5.632	5.753	-0.121
609.5	48.889	-0.6	0.053	0	3.53	0	5.632	5.753	-0.121
609.6	48.846	-0.6	-1.236	0	1.81	0	5.632	5.753	-0.121
609.7	48.796	-0.6	-0.731	0	0.7	0	5.632	5.753	-0.121
609.8	48.747	-0.6	-0.745	0	0	0	5.632	5.753	-0.121
609.9	48.691	-0.605	-0.802	0	0	0	5.632	5.753	-0.121
610	48.635	-0.605	-0.802	0	0	0	5.632	5.753	-0.121
610.1	48.585	-0.608	-0.583	0	0	0	5.632	5.753	-0.121
610.2	48.535	-0.608	-0.929	0	0	0	5.632	5.753	-0.121
610.3	48.492	-0.608	-0.293	0	0	0	5.632	5.753	-0.121

610.4	48.436	-0.608	-0.742	0	0	0	5.632	5.753	-0.121
610.5	48.386	-0.608	-0.544	0	0	0	5.632	5.753	-0.121
610.6	48.336	-0.613	-1.25	0	0	0	5.632	5.754	-0.121
610.7	48.287	-0.613	-0.353	0	0	0	5.632	5.754	-0.121
610.8	48.231	-0.613	-0.413	0	0	0	5.632	5.754	-0.121
610.9	48.181	-0.618	-0.731	0	0	0	5.632	5.754	-0.121
611	48.131	-0.603	-0.441	0	0	0	5.632	5.754	-0.121
611.1	48.082	-0.595	-0.544	0	0	0	5.632	5.754	-0.121
611.2	48.032	-0.605	-1.024	0	0	0	5.632	5.754	-0.121
611.3	47.976	-0.61	-0.381	0	0	0	5.632	5.754	-0.121
611.4	47.914	-0.595	-0.424	0	-5.65	0	5.632	5.754	-0.121
611.5	47.839	-0.595	-1.236	0	-9.05	0	5.632	5.754	-0.122
611.6	47.752	-0.618	-0.66	0	-12.13	0	5.632	5.754	-0.122
611.7	47.665	-0.618	-1.056	0	-17.29	0	5.631	5.754	-0.122
611.8	47.56	-0.61	-0.946	0	-18.67	0	5.631	5.754	-0.123
611.9	47.454	-0.63	-0.999	0	-18.47	0	5.63	5.754	-0.123
612	47.355	-0.64	-0.773	0	-18.29	0	5.63	5.754	-0.124
612.1	47.261	-0.625	-0.025	0	-18.25	0	5.629	5.754	-0.124
612.2	47.162	-0.633	-0.795	0	-17.82	0	5.629	5.754	-0.125
612.3	47.063	-0.633	-0.66	0	-17.17	0	5.628	5.754	-0.125
612.4	46.969	-0.6	-0.258	0	-16.9	0	5.628	5.754	-0.126
612.5	46.882	-0.593	-1.314	0	-16.74	0	5.627	5.754	-0.126
612.6	46.789	-0.605	-1.745	0	-16.6	0	5.627	5.754	-0.127
612.7	46.696	-0.603	-0.011	0	-15.82	0	5.626	5.754	-0.127
612.8	46.609	-0.595	-0.47	0	-15.67	0	5.626	5.754	-0.128
612.9	46.516	-0.615	-0.975	0	-15.08	0	5.626	5.754	-0.128
613	46.423	-0.613	-0.66	0	-6.52	0	5.625	5.754	-0.128
613.1	46.361	-0.59	-0.025	0	-0.72	0	5.625	5.754	-0.128
613.2	46.305	-0.603	-1.165	0	0	0	5.625	5.754	-0.128
613.3	46.255	-0.623	-0.883	0	0	0	5.625	5.754	-0.128
613.4	46.205	-0.613	-0.035	0	0	0	5.625	5.754	-0.128
613.5	46.155	-0.613	-0.353	0	0	0	5.625	5.754	-0.128
613.6	46.112	-0.603	-0.826	0	0	0	5.625	5.754	-0.128
613.7	46.062	-0.61	-0.689	0	0	0	5.625	5.754	-0.128
613.8	46.013	-0.615	-0.689	0	0	0	5.625	5.754	-0.128
613.9	45.963	-0.615	-0.572	0	1.55	0	5.625	5.754	-0.128
614	45.913	-0.62	-0.675	0	3.61	0	5.626	5.754	-0.128
614.1	45.876	-0.613	-0.484	0	6.6	0	5.626	5.754	-0.128
614.2	45.839	-0.6	-0.632	0	9.58	0	5.626	5.754	-0.128
614.3	45.814	-0.598	-0.826	0	13.56	0	5.626	5.754	-0.128
614.4	45.789	-0.588	-0.675	0	14.15	0	5.627	5.755	-0.128
614.5	45.764	-0.588	-0.696	0	17	0	5.627	5.755	-0.128
614.6	45.752	-0.613	-0.689	0	17.76	0	5.628	5.756	-0.128
614.7	45.739	-0.613	-0.452	0	18.1	0	5.628	5.756	-0.128
614.8	45.727	-0.623	-0.396	0	21.58	0	5.629	5.757	-0.128
614.9	45.72	-0.615	-0.802	0	27.59	0	5.63	5.758	-0.128
615	45.72	-0.613	-0.759	0	28.96	0	5.63	5.759	-0.128

615.1	45.727	-0.618	-0.968	0	29.56	0	5.631	5.759	-0.128
615.2	45.739	-0.613	-0.53	0	30.11	0	5.632	5.76	-0.128
615.3	45.752	-0.598	-0.749	0	32.56	0	5.633	5.761	-0.128
615.4	45.764	-0.585	-1.211	0	35.68	0	5.634	5.762	-0.128
615.5	45.783	-0.583	-1.31	0	39.76	0	5.635	5.763	-0.128
615.6	45.807	-0.575	-0.943	0	41.68	0	5.636	5.764	-0.128
615.7	45.839	-0.583	-1.084	0	42.89	0	5.637	5.766	-0.128
615.8	45.87	-0.598	-0.367	0	43.73	0	5.639	5.767	-0.128
615.9	45.907	-0.603	-0.438	0	43.59	0	5.64	5.768	-0.128
616	45.938	-0.61	-0.413	0	43.63	0	5.641	5.769	-0.128
616.1	45.969	-0.628	-1.024	0	43.65	0	5.642	5.77	-0.128
616.2	46.006	-0.603	-0.353	0	43.71	0	5.643	5.772	-0.128
616.3	46.044	-0.578	-0.438	0	44.94	0	5.645	5.773	-0.128
616.4	46.075	-0.603	-1.819	0	47.63	0	5.646	5.774	-0.128
616.5	46.118	-0.603	-0.385	0	48.06	0	5.647	5.776	-0.128
616.6	46.155	-0.603	0.215	0	48.1	0	5.649	5.777	-0.128
616.7	46.199	-0.603	-0.936	0	48.57	0	5.65	5.778	-0.128
616.8	46.242	-0.598	-1.017	0	55.51	0	5.652	5.78	-0.128
616.9	46.298	-0.598	-0.558	0	66.19	0	5.653	5.782	-0.128
617	46.367	-0.623	-0.678	0	74.51	0	5.655	5.784	-0.128
617.1	46.447	-0.598	-0.011	0	76.71	0	5.658	5.786	-0.128
617.2	46.541	-0.588	-1.017	0	76.86	0	5.66	5.788	-0.128
617.3	46.64	-0.6	-1.211	0	78.62	0	5.662	5.79	-0.128
617.4	46.721	-0.595	-0.547	0	81.54	0	5.664	5.792	-0.128
617.5	46.82	-0.595	-0.773	0	83.13	0	5.667	5.795	-0.128
617.6	46.926	-0.605	-1.014	0	83.04	0	5.669	5.797	-0.128
617.7	47.019	-0.605	-0.487	0	83.02	0	5.671	5.799	-0.128
617.8	47.119	-0.623	-0.597	0	84.39	0	5.673	5.802	-0.128
617.9	47.218	-0.63	-0.749	0	84.58	0	5.676	5.804	-0.128
618	47.317	-0.62	0.042	0	86.57	0	5.678	5.806	-0.128
618.1	47.423	-0.598	-0.526	0	89.35	0	5.681	5.809	-0.128
618.2	47.529	-0.595	-1.342	0	91.29	0	5.683	5.812	-0.128
618.3	47.641	-0.608	-0.855	0	93.36	0	5.686	5.814	-0.128
618.4	47.752	-0.605	-0.325	0	93.53	0	5.688	5.817	-0.128
618.5	47.864	-0.595	-0.339	0	93.66	0	5.691	5.819	-0.128
618.6	47.976	-0.615	-0.869	0	94.73	0	5.694	5.822	-0.128
618.7	48.094	-0.623	-0.604	0	94.68	0	5.696	5.825	-0.128
618.8	48.206	-0.603	0.24	0	94.66	0	5.699	5.827	-0.128
618.9	48.318	-0.603	-0.915	0	94.62	0	5.702	5.83	-0.128
619	48.43	-0.6	-0.84	0	94.73	0	5.704	5.832	-0.128
619.1	48.542	-0.59	-0.367	0	94.78	0	5.707	5.835	-0.128
619.2	48.653	-0.588	-0.788	0	94.74	0	5.709	5.838	-0.128
619.3	48.765	-0.588	-0.607	0	94.66	0	5.712	5.84	-0.128
619.4	48.877	-0.588	-0.618	0	94.68	0	5.715	5.843	-0.128
619.5	48.983	-0.588	-0.664	0	94.72	0	5.717	5.846	-0.128
619.6	49.095	-0.6	-0.367	0	94.62	0	5.72	5.848	-0.128
619.7	49.2	-0.6	-0.643	0	94.65	0	5.723	5.851	-0.128

619.8	49.306	-0.618	-0.614	0	94.47	0	5.725	5.853	-0.128
619.9	49.411	-0.613	-0.177	0	93.44	0	5.728	5.856	-0.128
620	49.529	-0.603	-0.632	0	93.37	0	5.73	5.859	-0.128
620.1	49.629	-0.6	-0.773	0	92.6	0	5.733	5.861	-0.128
620.2	49.728	-0.603	-1.264	0	91.8	0	5.736	5.864	-0.128
620.3	49.828	-0.608	-0.773	0	91.02	0	5.738	5.866	-0.128
620.4	49.927	-0.613	-0.597	0	90.59	0	5.741	5.869	-0.128
620.5	50.027	-0.613	-0.66	0	90.63	0	5.743	5.871	-0.128
620.6	50.126	-0.59	-0.456	0	90.66	0	5.746	5.874	-0.128
620.7	50.225	-0.59	-1.024	0	90.6	0	5.748	5.876	-0.128
620.8	50.337	-0.618	-0.855	0	90.68	0	5.751	5.879	-0.128
620.9	50.418	-0.625	-0.201	0	90.67	0	5.753	5.881	-0.128
621	50.517	-0.615	-0.788	0	90.62	0	5.756	5.884	-0.128
621.1	50.617	-0.608	-0.855	0	90.56	0	5.758	5.886	-0.128
621.2	50.71	-0.59	-1.098	0	90.62	0	5.761	5.889	-0.128
621.3	50.81	-0.58	-1.035	0	90.6	0	5.763	5.891	-0.128
621.4	50.909	-0.583	-0.982	0	90.54	0	5.766	5.894	-0.128
621.5	50.996	-0.6	-0.501	0	90.49	0	5.768	5.897	-0.128
621.6	51.095	-0.6	-0.498	0	88.27	0	5.771	5.899	-0.128
621.7	51.189	-0.608	-0.501	0	84.95	0	5.773	5.899	-0.128
621.8	51.269	-0.603	-0.763	0	81.4	0	5.775	5.904	-0.128
621.9	51.35	-0.608	-0.526	0	79.23	0	5.778	5.906	-0.128
622	51.431	-0.61	-0.855	0	77.92	0	5.78	5.908	-0.128
622.1	51.505	-0.598	-0.498	0	77.75	0	5.782	5.91	-0.128
622.2	51.574	-0.598	-0.869	0	77.76	0	5.784	5.912	-0.128
622.3	51.648	-0.613	-0.915	0	77.67	0	5.786	5.914	-0.128
622.4	51.723	-0.618	-0.47	0	77.72	0	5.788	5.917	-0.128
622.5	51.798	-0.618	-0.381	0	76.78	0	5.79	5.919	-0.128
622.6	51.866	-0.613	-0.844	0	75.88	0	5.793	5.921	-0.128
622.7	51.934	-0.608	-0.83	0	69.6	0	5.795	5.923	-0.128
622.8	51.996	-0.61	-0.855	0	63.24	0	5.796	5.925	-0.128
622.9	52.046	-0.603	-0.321	0	61.98	0	5.798	5.926	-0.128
623	52.096	-0.608	-0.763	0	61.26	0	5.8	5.928	-0.128
623.1	52.139	-0.63	-0.939	0	61.41	0	5.801	5.93	-0.128
623.2	52.183	-0.63	-0.215	0	61.43	0	5.803	5.931	-0.128
623.3	52.232	-0.615	-0.155	0	61.47	0	5.805	5.933	-0.128
623.4	52.276	-0.605	-0.929	0	61.68	0	5.807	5.935	-0.128
623.5	52.326	-0.605	-1.169	0	62.29	0	5.808	5.937	-0.128
623.6	52.369	-0.603	-0.381	0	62.33	0	5.81	5.938	-0.128
623.7	52.413	-0.59	-0.84	0	63.38	0	5.812	5.94	-0.128
623.8	52.462	-0.58	-0.756	0	63.39	0	5.814	5.942	-0.128
623.9	52.512	-0.59	-0.675	0	63.42	0	5.815	5.944	-0.128
624	52.562	-0.605	-0.678	0	63.46	0	5.817	5.945	-0.128
624.1	52.605	-0.593	-0.219	0	63.26	0	5.819	5.947	-0.128
624.2	52.655	-0.598	-0.65	0	63.34	0	5.821	5.949	-0.128
624.3	52.705	-0.593	-0.869	0	63.4	0	5.822	5.951	-0.128
624.4	52.748	-0.583	-0.562	0	63.43	0	5.824	5.952	-0.128

624.5	52.798	-0.585	-0.84	0	63.16	0	5.826	5.954	-0.128
624.6	52.841	-0.588	-0.89	0	62.26	0	5.828	5.956	-0.128
624.7	52.885	-0.595	-0.244	0	62.35	0	5.829	5.958	-0.128
624.8	52.935	-0.613	-0.664	0	62.15	0	5.831	5.959	-0.128
624.9	52.978	-0.62	-0.219	0	62.24	0	5.833	5.961	-0.128
625	53.022	-0.62	-0.261	0	62.24	0	5.834	5.963	-0.128
625.1	53.065	-0.608	-0.763	0	62.31	0	5.836	5.964	-0.128
625.2	53.109	-0.603	-0.664	0	62.32	0	5.838	5.966	-0.128
625.3	53.158	-0.615	-1.112	0	62.21	0	5.84	5.968	-0.128
625.4	53.202	-0.64	-0.48	0	62.24	0	5.841	5.97	-0.128
625.5	53.245	-0.64	-0.127	0	62.26	0	5.843	5.971	-0.128
625.6	53.289	-0.603	-0.374	0	62.35	0	5.845	5.973	-0.128
625.7	53.332	-0.6	-0.844	0	62.25	0	5.847	5.975	-0.128
625.8	53.376	-0.598	-0.784	0	62.2	0	5.848	5.977	-0.128
625.9	53.419	-0.593	-0.586	0	62.25	0	5.85	5.978	-0.128
626	53.469	-0.6	-1.003	0	62.3	0	5.852	5.98	-0.128
626.1	53.506	-0.6	-0.357	0	62.33	0	5.853	5.982	-0.128
626.2	53.55	-0.595	-0.558	0	62.17	0	5.855	5.983	-0.128
626.3	53.593	-0.605	-0.844	0	62.12	0	5.857	5.985	-0.128
626.4	53.637	-0.61	-0.526	0	62.15	0	5.859	5.987	-0.128
626.5	53.68	-0.61	-0.357	0	62.17	0	5.86	5.989	-0.128
626.6	53.724	-0.61	-0.763	0	62.24	0	5.862	5.99	-0.128
626.7	53.761	-0.61	-0.357	0	62.1	0	5.864	5.992	-0.128
626.8	53.805	-0.603	-0.441	0	62.09	0	5.866	5.994	-0.128
626.9	53.848	-0.598	-0.869	0	62.14	0	5.867	5.996	-0.128
627	53.892	-0.613	-1.088	0	62.19	0	5.869	5.997	-0.128
627.1	53.935	-0.625	-0.519	0	62.27	0	5.871	5.999	-0.128
627.2	53.972	-0.625	-0.215	0	62.15	0	5.872	6.001	-0.128
627.3	54.016	-0.618	-1.003	0	62.13	0	5.874	6.002	-0.128
627.4	54.066	-0.61	-0.473	0	62.16	0	5.876	6.004	-0.128
627.5	54.103	-0.598	-0.678	0	62.23	0	5.878	6.006	-0.128
627.6	54.14	-0.593	-0.632	0	61.83	0	5.879	6.008	-0.128
627.7	54.184	-0.608	-1.169	0	60.85	0	5.881	6.009	-0.128
627.8	54.221	-0.61	-0.544	0	56.36	0	5.883	6.011	-0.128
627.9	54.258	-0.625	-0.29	0	54.23	0	5.884	6.012	-0.128
628	54.289	-0.66	-1.3	0	54.22	0	5.886	6.014	-0.128
628.1	54.314	-0.658	0.198	0	54.28	0	5.887	6.015	-0.128
628.2	54.345	-0.628	-0.275	0	54.3	0	5.889	6.017	-0.128
628.3	54.37	-0.608	-1.127	0	54.33	0	5.89	6.018	-0.128
628.4	54.395	-0.603	-1.416	0	54.34	0	5.892	6.02	-0.128
628.5	54.426	-0.603	-1.144	0	54.38	0	5.893	6.021	-0.128
628.6	54.457	-0.6	-0.519	0	54.39	0	5.895	6.023	-0.128
628.7	54.488	-0.6	-0.84	0	54.4	0	5.896	6.024	-0.128
628.8	54.519	-0.59	-0.84	0	54.17	0	5.898	6.026	-0.128
628.9	54.544	-0.6	-0.844	0	54.2	0	5.899	6.028	-0.128
629	54.575	-0.59	-0.286	0	54.22	0	5.901	6.029	-0.128
629.1	54.6	-0.598	-0.724	0	54.23	0	5.902	6.031	-0.128

629.2	54.631	-0.598	-1.028	0	54.28	0	5.904	6.032	-0.128
629.3	54.656	-0.585	-0.219	0	54.3	0	5.905	6.034	-0.128
629.4	54.687	-0.603	-1.201	0	54.33	0	5.907	6.035	-0.128
629.5	54.712	-0.603	-0.487	0	54.36	0	5.908	6.037	-0.128
629.6	54.737	-0.595	-0.039	0	54.18	0	5.91	6.038	-0.128
629.7	54.768	-0.595	-0.858	0	54.12	0	5.911	6.04	-0.128
629.8	54.793	-0.605	-0.858	0	54.16	0	5.913	6.041	-0.128
629.9	54.824	-0.605	-0.653	0	54.2	0	5.914	6.043	-0.128
630	54.848	-0.6	-0.371	0	54.23	0	5.916	6.044	-0.128
630.1	54.88	-0.603	-0.999	0	54.25	0	5.917	6.046	-0.128
630.2	54.904	-0.61	-0.717	0	54.26	0	5.919	6.047	-0.128
630.3	54.935	-0.605	-0.618	0	54.27	0	5.92	6.049	-0.128
630.4	54.96	-0.608	-0.943	0	54.25	0	5.922	6.05	-0.128
630.5	54.985	-0.61	-0.929	0	54.07	0	5.923	6.052	-0.128
630.6	55.016	-0.59	-0.544	0	54.08	0	5.925	6.053	-0.128
630.7	55.041	-0.58	-0.858	0	54.11	0	5.926	6.055	-0.128
630.8	55.066	-0.585	-1.43	0	54.17	0	5.928	6.056	-0.128
630.9	55.097	-0.595	-0.533	0	54.18	0	5.929	6.058	-0.128
631	55.122	-0.6	-0.576	0	54.25	0	5.931	6.059	-0.128
631.1	55.147	-0.593	-0.385	0	54.27	0	5.932	6.061	-0.128
631.2	55.172	-0.595	-0.692	0	54.27	0	5.934	6.062	-0.128
631.3	55.196	-0.615	-0.985	0	54.29	0	5.935	6.064	-0.128
631.4	55.227	-0.623	-0.12	0	54.11	0	5.937	6.065	-0.128
631.5	55.252	-0.623	-0.159	0	54.15	0	5.938	6.067	-0.128
631.6	55.277	-0.613	-0.858	0	54.17	0	5.94	6.068	-0.128
631.7	55.302	-0.613	-0.735	0	54.18	0	5.941	6.07	-0.128
631.8	55.333	-0.605	-0.738	0	54.23	0	5.943	6.071	-0.128
631.9	55.358	-0.6	-0.943	0	53	0	5.944	6.073	-0.128
632	55.383	-0.608	-1.035	0	49.14	0	5.946	6.074	-0.128
632.1	55.401	-0.6	-0.396	0	46.3	0	5.947	6.075	-0.128
632.2	55.42	-0.618	-0.777	0	42.4	0	5.948	6.076	-0.128
632.3	55.426	-0.623	-0.519	0	38.64	0	5.949	6.078	-0.128
632.4	55.433	-0.598	-0.335	0	37.31	0	5.95	6.079	-0.128
632.5	55.433	-0.598	-1.119	0	37.07	0	5.951	6.08	-0.128
632.6	55.426	-0.613	-0.844	0	36.82	0	5.952	6.081	-0.128
632.7	55.433	-0.613	-0.547	0	35.5	0	5.953	6.082	-0.128
632.8	55.426	-0.578	-0.632	0	35.07	0	5.954	6.083	-0.128
632.9	55.426	-0.605	-1.473	0	31.87	0	5.955	6.083	-0.128
633	55.42	-0.623	-0.385	0	27.59	0	5.956	6.084	-0.128
633.1	55.408	-0.605	0.23	0	25.18	0	5.957	6.085	-0.128
633.2	55.389	-0.608	-0.943	0	21.17	0	5.957	6.086	-0.128
633.3	55.364	-0.63	-1.162	0	17.81	0	5.958	6.086	-0.128
633.4	55.339	-0.62	-0.265	0	15.57	0	5.958	6.086	-0.128
633.5	55.302	-0.603	-0.205	0	13.95	0	5.959	6.087	-0.128
633.6	55.271	-0.6	-1.43	0	11.22	0	5.959	6.087	-0.128
633.7	55.227	-0.608	-0.763	0	10.71	0	5.959	6.087	-0.128
633.8	55.184	-0.62	-0.692	0	10.73	0	5.959	6.088	-0.128

633.9	55.147	-0.625	-0.275	0	10.71	0	5.96	6.088	-0.128
634	55.103	-0.615	-0.371	0	10.72	0	5.96	6.088	-0.128
634.1	55.066	-0.608	-0.65	0	10.72	0	5.96	6.089	-0.128
634.2	55.022	-0.605	-0.66	0	9.27	0	5.961	6.089	-0.128
634.3	54.979	-0.61	-0.823	0	5.33	0	5.961	6.089	-0.128
634.4	54.935	-0.615	-0.558	0	2.68	0	5.961	6.089	-0.128
634.5	54.886	-0.615	-0.533	0	1	0	5.961	6.089	-0.128
634.6	54.824	-0.6	-0.858	0	0	0	5.961	6.089	-0.128
634.7	54.768	-0.62	0.124	0	0	0	5.961	6.089	-0.128
634.8	54.712	-0.623	0.039	0	0	0	5.961	6.089	-0.128
634.9	54.65	-0.625	-0.456	0	0	0	5.961	6.089	-0.128
635	54.594	-0.63	-0.547	0	0	0	5.961	6.089	-0.128
635.1	54.532	-0.623	-0.47	0	0	0	5.961	6.089	-0.128
635.2	54.476	-0.615	-0.618	0	0	0	5.961	6.089	-0.128
635.3	54.413	-0.623	-0.858	0	0	0	5.961	6.089	-0.128
635.4	54.358	-0.62	-0.396	0	0	0	5.961	6.089	-0.128
635.5	54.302	-0.62	-0.692	0	0	0	5.961	6.089	-0.128
635.6	54.227	-0.613	-0.689	0	-10.56	0	5.961	6.089	-0.129
635.7	54.128	-0.613	-0.569	0	-20.66	0	5.96	6.089	-0.129
635.8	54.003	-0.635	-0.484	0	-25.8	0	5.959	6.089	-0.13
635.9	53.873	-0.618	-0.205	0	-28.19	0	5.959	6.089	-0.131
636	53.749	-0.605	-0.886	0	-29.27	0	5.958	6.089	-0.131
636.1	53.624	-0.615	-1.183	0	-34.58	0	5.957	6.089	-0.132
636.2	53.488	-0.613	-0.06	0	-36.85	0	5.956	6.089	-0.133
636.3	53.351	-0.618	-0.777	0	-35.77	0	5.955	6.089	-0.134
636.4	53.227	-0.613	-0.833	0	-35.51	0	5.954	6.089	-0.135
636.5	53.09	-0.62	-0.735	0	-35.49	0	5.953	6.089	-0.136
636.6	52.953	-0.613	-0.692	0	-38.59	0	5.952	6.089	-0.137
636.7	52.817	-0.608	-0.487	0	-45.18	0	5.95	6.089	-0.139
636.8	52.655	-0.608	-0.915	0	-53.01	0	5.949	6.089	-0.14
636.9	52.475	-0.605	-0.706	0	-56.35	0	5.947	6.089	-0.142
637	52.288	-0.603	-1.003	0	-56.94	0	5.946	6.089	-0.143
637.1	52.108	-0.615	-0.943	0	-58.46	0	5.944	6.089	-0.145
637.2	51.922	-0.63	-0.763	0	-60.8	0	5.943	6.089	-0.147
637.3	51.729	-0.633	-0.29	0	-63.31	0	5.941	6.089	-0.148
637.4	51.524	-0.608	-0.632	0	-70.19	0	5.939	6.089	-0.15
637.5	51.307	-0.608	-1.197	0	-79.59	0	5.937	6.089	-0.153
637.6	51.064	-0.593	-1.141	0	-87.57	0	5.934	6.089	-0.155
637.7	50.797	-0.593	-0.59	0	-90.14	0	5.932	6.089	-0.158
637.8	50.524	-0.615	-0.59	0	-89.72	0	5.929	6.089	-0.16
637.9	50.25	-0.6	-0.47	0	-89.15	0	5.927	6.089	-0.162
638	49.983	-0.6	-0.989	0	-88.59	0	5.924	6.089	-0.165
638.1	49.71	-0.608	-1.183	0	-87.95	0	5.922	6.089	-0.167
638.2	49.436	-0.59	-0.145	0	-87.18	0	5.919	6.089	-0.17
638.3	49.169	-0.588	-0.883	0	-81.25	0	5.917	6.089	-0.172
638.4	48.914	-0.598	-0.957	0	-69.52	0	5.915	6.089	-0.174
638.5	48.691	-0.598	-0.177	0	-58.55	0	5.914	6.089	-0.176

638.6	48.492	-0.613	-0.576	0	-49.41	0	5.912	6.089	-0.177
638.7	48.318	-0.613	-0.47	0	-35.66	0	5.911	6.089	-0.178
638.8	48.181	-0.618	-0.385	0	-30.3	0	5.91	6.089	-0.179
638.9	48.057	-0.598	-0.431	0	-29.72	0	5.91	6.089	-0.18
639	47.933	-0.593	-1.063	0	-30.36	0	5.909	6.089	-0.181
639.1	47.808	-0.59	-1.028	0	-31	0	5.908	6.089	-0.181
639.2	47.678	-0.605	-0.371	0	-34.07	0	5.907	6.089	-0.182
639.3	47.547	-0.618	-0.399	0	-35.73	0	5.906	6.089	-0.183
639.4	47.411	-0.61	-0.219	0	-35.72	0	5.905	6.089	-0.184
639.5	47.268	-0.598	-0.547	0	-32.84	0	5.904	6.089	-0.185
639.6	47.137	-0.598	-0.886	0	-24.93	0	5.903	6.089	-0.186
639.7	47.025	-0.618	-0.547	0	-16.66	0	5.903	6.089	-0.186
639.8	46.938	-0.628	-0.516	0	-8.46	0	5.903	6.089	-0.187
639.9	46.87	-0.608	-0.173	0	-0.79	0	5.903	6.089	-0.187
640	46.808	-0.6	-0.872	0	0	0	5.903	6.089	-0.187
640.1	46.758	-0.613	-0.858	0	0	0	5.903	6.089	-0.187
640.2	46.715	-0.613	-0.233	0	0	0	5.903	6.089	-0.187
640.3	46.665	-0.615	-0.47	0	0	0	5.903	6.089	-0.187
640.4	46.615	-0.62	-0.692	0	0	0	5.903	6.089	-0.187
640.5	46.566	-0.62	-0.632	0	0	0	5.903	6.089	-0.187
640.6	46.522	-0.625	-0.632	0	0	0	5.903	6.089	-0.187
640.7	46.466	-0.625	-1.119	0	0	0	5.903	6.089	-0.187
640.8	46.416	-0.605	-1.119	0	1.47	0	5.903	6.089	-0.187
640.9	46.373	-0.613	-1.119	0	6.97	0	5.903	6.089	-0.187
641	46.336	-0.62	-0.805	0	12.68	0	5.903	6.09	-0.187
641.1	46.311	-0.613	-0.385	0	12.87	0	5.904	6.09	-0.187
641.2	46.292	-0.605	-0.897	0	12.85	0	5.904	6.091	-0.187
641.3	46.267	-0.598	-0.869	0	12.95	0	5.904	6.091	-0.187
641.4	46.242	-0.603	-0.791	0	16.03	0	5.905	6.091	-0.187
641.5	46.224	-0.603	-0.869	0	22.55	0	5.905	6.092	-0.187
641.6	46.218	-0.62	-0.957	0	24.11	0	5.906	6.093	-0.187
641.7	46.218	-0.648	-0.247	0	24.14	0	5.907	6.093	-0.187
641.8	46.211	-0.653	-0.162	0	24.11	0	5.907	6.094	-0.187
641.9	46.211	-0.618	0.198	0	23.55	0	5.908	6.095	-0.187
642	46.211	-0.608	-1.201	0	23.55	0	5.909	6.095	-0.187
642.1	46.205	-0.605	-1.374	0	23.52	0	5.909	6.096	-0.187
642.2	46.205	-0.618	-0.749	0	23.59	0	5.91	6.097	-0.187
642.3	46.199	-0.623	-0.29	0	23.52	0	5.911	6.097	-0.187
642.4	46.199	-0.62	-0.586	0	23.76	0	5.911	6.098	-0.187
642.5	46.199	-0.608	-0.547	0	24.14	0	5.912	6.099	-0.187
642.6	46.193	-0.605	-0.706	0	24.21	0	5.913	6.099	-0.187
642.7	46.193	-0.62	-0.791	0	24.14	0	5.913	6.1	-0.187
642.8	46.193	-0.64	-0.47	0	24.23	0	5.914	6.101	-0.187
642.9	46.187	-0.633	-0.547	0	24.13	0	5.915	6.101	-0.187
643	46.187	-0.615	-0.304	0	25.79	0	5.915	6.102	-0.187
643.1	46.187	-0.613	-1.285	0	28.14	0	5.916	6.103	-0.187
643.2	46.193	-0.61	-0.791	0	32.64	0	5.917	6.104	-0.187

643.3	46.205	-0.613	-0.837	0	36.99	0	5.918	6.105	-0.187
643.4	46.224	-0.618	-0.643	0	40.41	0	5.919	6.106	-0.187
643.5	46.249	-0.618	-0.791	0	41.5	0	5.92	6.107	-0.187
643.6	46.28	-0.62	-0.547	0	43.36	0	5.922	6.108	-0.187
643.7	46.311	-0.618	-0.911	0	43.62	0	5.923	6.109	-0.187
643.8	46.348	-0.625	-0.83	0	43.53	0	5.924	6.111	-0.187
643.9	46.379	-0.62	-0.47	0	43.49	0	5.925	6.112	-0.187
644	46.41	-0.615	-0.547	0	43.57	0	5.926	6.113	-0.187
644.1	46.441	-0.615	-0.943	0	43.57	0	5.928	6.114	-0.187
644.2	46.479	-0.615	-0.632	0	43.64	0	5.929	6.115	-0.187
644.3	46.51	-0.615	-0.547	0	45.36	0	5.93	6.117	-0.187
644.4	46.541	-0.605	-0.872	0	47.77	0	5.931	6.118	-0.187
644.5	46.584	-0.605	-0.72	0	52.95	0	5.933	6.119	-0.187
644.6	46.634	-0.643	-0.791	0	56.78	0	5.934	6.121	-0.187
644.7	46.684	-0.638	0.046	0	58.39	0	5.936	6.123	-0.187
644.8	46.746	-0.618	0.155	0	58.98	0	5.938	6.124	-0.187
644.9	46.802	-0.628	-1.444	0	59.57	0	5.939	6.126	-0.187
645	46.864	-0.63	-0.646	0	60.96	0	5.941	6.128	-0.187
645.1	46.926	-0.618	-0.484	0	63.93	0	5.943	6.129	-0.187
645.2	46.988	-0.603	-0.837	0	67.62	0	5.945	6.131	-0.187
645.3	47.063	-0.598	-0.996	0	70.29	0	5.947	6.133	-0.187
645.4	47.137	-0.6	-0.911	0	70.54	0	5.949	6.135	-0.187
645.5	47.218	-0.605	-0.791	0	70.45	0	5.951	6.137	-0.187
645.6	47.293	-0.613	-0.385	0	70.2	0	5.953	6.139	-0.187
645.7	47.367	-0.615	-0.427	0	68.33	0	5.954	6.141	-0.187
645.8	47.448	-0.6	-0.261	0	65.05	0	5.956	6.143	-0.187
645.9	47.51	-0.61	-0.72	0	63.37	0	5.958	6.145	-0.187
646	47.578	-0.618	-0.547	0	63.4	0	5.96	6.146	-0.187
646.1	47.641	-0.623	-0.184	0	63.36	0	5.962	6.148	-0.187
646.2	47.703	-0.638	-0.837	0	63.49	0	5.963	6.15	-0.187
646.3	47.765	-0.613	-0.06	0	63.41	0	5.965	6.152	-0.187
646.4	47.827	-0.583	-0.752	0	63.48	0	5.967	6.153	-0.187
646.5	47.889	-0.583	-1.582	0	63.52	0	5.969	6.155	-0.187
646.6	47.951	-0.625	-0.837	0	63.41	0	5.97	6.157	-0.187
646.7	48.013	-0.623	-0.586	0	63.51	0	5.972	6.159	-0.187
646.8	48.075	-0.62	-0.586	0	63.39	0	5.974	6.16	-0.187
646.9	48.138	-0.63	-1.116	0	63.39	0	5.974	6.16	-0.187
647	48.2	-0.638	-0.752	0	63.48	0	5.977	6.164	-0.187
647.1	48.262	-0.628	-0.558	0	64.29	0	5.979	6.166	-0.187
647.2	48.324	-0.608	-0.547	0	65.85	0	5.981	6.168	-0.187
647.3	48.386	-0.603	-1.321	0	65.77	0	5.983	6.169	-0.187
647.4	48.448	-0.608	-0.791	0	65.61	0	5.985	6.171	-0.187
647.5	48.517	-0.608	-0.675	0	65.66	0	5.986	6.173	-0.187
647.6	48.579	-0.608	-0.752	0	65.54	0	5.988	6.175	-0.187
647.7	48.647	-0.608	-0.47	0	65.65	0	5.99	6.177	-0.187
647.8	48.709	-0.618	-0.47	0	65.68	0	5.992	6.179	-0.187
647.9	48.771	-0.623	-0.547	0	65.58	0	5.994	6.18	-0.187

648	48.834	-0.62	-0.219	0	65.64	0	5.996	6.182	-0.187
648.1	48.896	-0.615	-0.918	0	65.56	0	5.997	6.184	-0.187
648.2	48.958	-0.605	-0.59	0	65.65	0	5.999	6.186	-0.187
648.3	49.026	-0.62	-0.858	0	65.58	0	6.001	6.188	-0.187
648.4	49.088	-0.63	-0.47	0	65.6	0	6.003	6.189	-0.187
648.5	49.15	-0.605	-0.219	0	65.61	0	6.005	6.191	-0.187
648.6	49.206	-0.588	-0.622	0	65.45	0	6.007	6.193	-0.187
648.7	49.269	-0.595	-1.628	0	65.53	0	6.008	6.195	-0.187
648.8	49.331	-0.608	-0.675	0	65.38	0	6.01	6.197	-0.187
648.9	49.393	-0.603	-0.47	0	65.47	0	6.012	6.199	-0.187
649	49.455	-0.608	-0.777	0	65.57	0	6.014	6.2	-0.187
649.1	49.517	-0.6	-0.706	0	65.52	0	6.016	6.202	-0.187
649.2	49.579	-0.593	-0.533	0	65.51	0	6.017	6.204	-0.187
649.3	49.641	-0.61	-1.201	0	65.6	0	6.019	6.206	-0.187
649.4	49.697	-0.613	-0.544	0	65.65	0	6.021	6.208	-0.187
649.5	49.759	-0.613	-0.219	0	65.48	0	6.023	6.21	-0.187
649.6	49.815	-0.608	-0.805	0	65.6	0	6.025	6.211	-0.187
649.7	49.884	-0.608	-0.547	0	65.65	0	6.027	6.213	-0.187
649.8	49.94	-0.623	-0.632	0	65.52	0	6.028	6.215	-0.187
649.9	50.002	-0.63	-0.47	0	65.58	0	6.03	6.217	-0.187
650	50.064	-0.628	-0.328	0	65.66	0	6.032	6.219	-0.187
650.1	50.12	-0.62	-0.664	0	65.52	0	6.034	6.22	-0.187
650.2	50.182	-0.623	-1.049	0	65.59	0	6.036	6.222	-0.187
650.3	50.238	-0.603	-0.618	0	65.27	0	6.037	6.224	-0.187
650.4	50.3	-0.605	-0.915	0	64.48	0	6.039	6.226	-0.187
650.5	50.356	-0.605	-0.533	0	63.77	0	6.041	6.228	-0.187
650.6	50.412	-0.595	-0.547	0	63.26	0	6.043	6.229	-0.187
650.7	50.468	-0.595	-0.547	0	63.35	0	6.045	6.231	-0.187
650.8	50.517	-0.595	-0.547	0	63.44	0	6.046	6.233	-0.187
650.9	50.573	-0.605	-0.547	0	63.26	0	6.048	6.235	-0.187
651	50.629	-0.615	-0.074	0	63.33	0	6.05	6.236	-0.187
651.1	50.679	-0.623	-0.706	0	63.42	0	6.052	6.238	-0.187
651.2	50.735	-0.62	-0.06	0	63.38	0	6.053	6.24	-0.187
651.3	50.791	-0.613	-0.547	0	63.23	0	6.055	6.242	-0.187
651.4	50.847	-0.61	-0.664	0	63.31	0	6.057	6.243	-0.187
651.5	50.897	-0.615	-0.872	0	63.35	0	6.059	6.245	-0.187
651.6	50.946	-0.62	-0.586	0	63.33	0	6.06	6.247	-0.187
651.7	51.002	-0.61	-0.572	0	63.22	0	6.062	6.249	-0.187
651.8	51.052	-0.603	-0.791	0	63.3	0	6.064	6.251	-0.187
651.9	51.108	-0.613	-0.999	0	63.52	0	6.066	6.252	-0.187
652	51.157	-0.623	-0.632	0	63.48	0	6.067	6.254	-0.187
652.1	51.213	-0.628	-0.47	0	63.45	0	6.069	6.256	-0.187
652.2	51.263	-0.618	-0.328	0	63.53	0	6.071	6.258	-0.187
652.3	51.313	-0.61	-0.562	0	63.33	0	6.073	6.259	-0.187
652.4	51.363	-0.618	-0.957	0	62.46	0	6.074	6.261	-0.187
652.5	51.412	-0.618	-0.943	0	62.47	0	6.076	6.263	-0.187
652.6	51.462	-0.62	-0.706	0	62.52	0	6.078	6.265	-0.187

652.7	51.512	-0.62	-1.345	0	62.64	0	6.08	6.266	-0.187
652.8	51.561	-0.62	-1.345	0	62.56	0	6.081	6.268	-0.187
652.9	51.611	-0.61	-0.456	0	62.49	0	6.083	6.27	-0.187
653	51.661	-0.6	-0.706	0	62.45	0	6.085	6.271	-0.187
653.1	51.711	-0.608	-1.268	0	62.47	0	6.087	6.273	-0.187
653.2	51.76	-0.618	-0.304	0	62.48	0	6.088	6.275	-0.187
653.3	51.81	-0.618	-0.47	0	62.28	0	6.09	6.277	-0.187
653.4	51.86	-0.6	-0.53	0	62.38	0	6.092	6.278	-0.187
653.5	51.909	-0.6	-0.664	0	61.92	0	6.094	6.28	-0.187
653.6	51.959	-0.62	-0.957	0	60.78	0	6.095	6.282	-0.187
653.7	52.003	-0.62	-0.162	0	59.58	0	6.097	6.283	-0.187
653.8	52.046	-0.62	-0.247	0	57.75	0	6.098	6.285	-0.187
653.9	52.09	-0.613	-0.957	0	56.84	0	6.1	6.287	-0.187
654	52.133	-0.623	-1.091	0	56.79	0	6.102	6.288	-0.187
654.1	52.164	-0.618	-0.501	0	55.93	0	6.103	6.29	-0.187
654.2	52.201	-0.618	-0.791	0	55.51	0	6.105	6.291	-0.187
654.3	52.245	-0.628	-1.021	0	53.71	0	6.106	6.293	-0.187
654.4	52.276	-0.623	-0.459	0	49.27	0	6.108	6.294	-0.187
654.5	52.301	-0.613	-0.632	0	40.31	0	6.109	6.295	-0.187
654.6	52.313	-0.62	-0.837	0	29.83	0	6.11	6.296	-0.187
654.7	52.307	-0.62	-0.692	0	21.27	0	6.11	6.297	-0.187
654.8	52.295	-0.618	-0.371	0	17.18	0	6.111	6.297	-0.187
654.9	52.27	-0.618	-0.692	0	14.54	0	6.111	6.298	-0.187
655	52.245	-0.62	-0.371	0	13.01	0	6.111	6.298	-0.187
655.1	52.214	-0.638	-0.692	0	11.06	0	6.112	6.298	-0.187
655.2	52.17	-0.628	-0.583	0	10.27	0	6.112	6.299	-0.187
655.3	52.139	-0.603	-0.162	0	10.27	0	6.112	6.299	-0.187
655.4	52.102	-0.613	-1.43	0	10.02	0	6.113	6.299	-0.187
655.5	52.065	-0.613	-1.119	0	9.92	0	6.113	6.299	-0.187
655.6	52.027	-0.625	0.053	0	9.99	0	6.113	6.3	-0.187
655.7	51.99	-0.613	-1.003	0	9.98	0	6.113	6.3	-0.187
655.8	51.953	-0.61	-1.003	0	10.33	0	6.114	6.3	-0.187
655.9	51.916	-0.605	-0.943	0	10.98	0	6.114	6.301	-0.187
656	51.878	-0.605	-0.562	0	11.43	0	6.114	6.301	-0.187
656.1	51.841	-0.615	-0.798	0	12.94	0	6.115	6.301	-0.187
656.2	51.81	-0.608	-0.872	0	13.71	0	6.115	6.302	-0.187
656.3	51.779	-0.6	-0.59	0	13.58	0	6.115	6.302	-0.187
656.4	51.754	-0.613	-0.692	0	13.13	0	6.116	6.302	-0.187
656.5	51.717	-0.613	-0.456	0	11.32	0	6.116	6.303	-0.187
656.6	51.686	-0.618	-0.371	0	9.1	0	6.116	6.303	-0.187
656.7	51.648	-0.618	-1.088	0	7.6	0	6.117	6.303	-0.187
656.8	51.605	-0.6	-1.028	0	6.96	0	6.117	6.303	-0.187
656.9	51.568	-0.603	-0.943	0	6.99	0	6.117	6.304	-0.187
657	51.518	-0.618	-0.678	0	6.97	0	6.117	6.304	-0.187
657.1	51.481	-0.623	-0.509	0	6.99	0	6.117	6.304	-0.187
657.2	51.437	-0.62	-0.618	0	6.99	0	6.117	6.304	-0.187
657.3	51.394	-0.63	-1.067	0	7	0	6.118	6.304	-0.187

657.4	51.35	-0.625	-0.396	0	7.01	0	6.118	6.304	-0.187
657.5	51.313	-0.615	-0.569	0	7.01	0	6.118	6.305	-0.187
657.6	51.276	-0.605	-0.858	0	7.45	0	6.118	6.305	-0.187
657.7	51.232	-0.608	-0.953	0	8.54	0	6.119	6.305	-0.187
657.8	51.195	-0.615	-0.646	0	11.99	0	6.119	6.305	-0.187
657.9	51.151	-0.61	-0.441	0	15.97	0	6.119	6.306	-0.187
658	51.133	-0.6	-0.777	0	18.3	0	6.12	6.306	-0.187
658.1	51.108	-0.613	-1.105	0	19.76	0	6.12	6.307	-0.187
658.2	51.089	-0.62	-0.519	0	20.62	0	6.121	6.308	-0.187
658.3	51.077	-0.62	-0.614	0	21.71	0	6.122	6.308	-0.187
658.4	51.058	-0.625	-0.844	0	24.14	0	6.122	6.309	-0.187
658.5	51.046	-0.625	-0.396	0	26.82	0	6.123	6.31	-0.187
658.6	51.039	-0.6	-0.703	0	30.69	0	6.124	6.31	-0.187
658.7	51.033	-0.6	-1.268	0	33.48	0	6.125	6.311	-0.187
658.8	51.039	-0.608	-1.268	0	33.41	0	6.126	6.312	-0.187
658.9	51.039	-0.633	-0.646	0	33.41	0	6.127	6.313	-0.187
659	51.046	-0.625	-0.205	0	33.42	0	6.127	6.314	-0.187
659.1	51.052	-0.618	-0.441	0	33.43	0	6.128	6.315	-0.187
659.2	51.052	-0.633	-1.25	0	33.38	0	6.129	6.316	-0.187
659.3	51.058	-0.625	-0.191	0	33.46	0	6.13	6.317	-0.187
659.4	51.058	-0.6	-0.335	0	33.4	0	6.131	6.318	-0.187
659.5	51.064	-0.6	-1.458	0	33.46	0	6.132	6.319	-0.187
659.6	51.07	-0.605	-0.763	0	33.41	0	6.133	6.32	-0.187
659.7	51.07	-0.605	-0.855	0	33.44	0	6.134	6.321	-0.187
659.8	51.077	-0.603	-0.858	0	33.42	0	6.135	6.322	-0.187
659.9	51.083	-0.6	-0.929	0	33.41	0	6.136	6.322	-0.187
660	51.089	-0.603	-0.632	0	33.43	0	6.137	6.323	-0.187
660.1	51.095	-0.603	-0.385	0	33.96	0	6.138	6.324	-0.187
660.2	51.095	-0.613	-0.547	0	35.92	0	6.139	6.325	-0.187
660.3	51.102	-0.625	-0.703	0	36.1	0	6.14	6.326	-0.187
660.4	51.114	-0.613	-0.113	0	36.13	0	6.141	6.327	-0.187
660.5	51.12	-0.625	-1.017	0	36.09	0	6.142	6.328	-0.187
660.6	51.126	-0.633	-0.929	0	36.15	0	6.143	6.329	-0.187
660.7	51.139	-0.623	-0.028	0	36.11	0	6.144	6.33	-0.187
660.8	51.145	-0.613	-1.105	0	36.19	0	6.145	6.331	-0.187
660.9	51.151	-0.63	-1.25	0	36.12	0	6.146	6.332	-0.187
661	51.157	-0.63	-0.215	0	36.19	0	6.147	6.333	-0.187
661.1	51.17	-0.625	-0.275	0	36.15	0	6.148	6.334	-0.187
661.2	51.176	-0.62	-0.544	0	36.62	0	6.149	6.335	-0.187
661.3	51.189	-0.598	-0.381	0	37.85	0	6.15	6.336	-0.187
661.4	51.195	-0.588	-1.119	0	38.82	0	6.151	6.338	-0.187
661.5	51.207	-0.588	-1.278	0	39.19	0	6.152	6.339	-0.187
661.6	51.226	-0.62	-0.466	0	40.04	0	6.153	6.34	-0.187
661.7	51.238	-0.62	-0.809	0	40.58	0	6.154	6.341	-0.187
661.8	51.251	-0.613	-0.833	0	40.44	0	6.155	6.342	-0.187
661.9	51.269	-0.628	-1.134	0	40.51	0	6.156	6.343	-0.187
662	51.282	-0.625	-0.473	0	40.48	0	6.158	6.344	-0.187

662.1	51.3	-0.615	-0.42	0	40.52	0	6.159	6.345	-0.187
662.2	51.313	-0.635	-1.427	0	40.52	0	6.16	6.346	-0.187
662.3	51.325	-0.643	-0.604	0	41.11	0	6.161	6.348	-0.187
662.4	51.344	-0.635	-0.325	0	43.16	0	6.162	6.349	-0.187
662.5	51.363	-0.635	-1.264	0	43.45	0	6.163	6.35	-0.187
662.6	51.381	-0.605	-1.017	0	44.28	0	6.165	6.351	-0.187
662.7	51.4	-0.605	-0.604	0	44.31	0	6.166	6.352	-0.187
662.8	51.418	-0.608	-0.544	0	46	0	6.167	6.354	-0.187
662.9	51.443	-0.62	-0.879	0	47.57	0	6.168	6.355	-0.187
663	51.468	-0.62	-0.441	0	48.6	0	6.17	6.356	-0.187
663.1	51.499	-0.615	-0.629	0	48.84	0	6.171	6.358	-0.187
663.2	51.524	-0.615	-0.915	0	48.79	0	6.173	6.359	-0.187
663.3	51.555	-0.618	-0.501	0	48.83	0	6.174	6.361	-0.187
663.4	51.58	-0.61	-0.519	0	48.87	0	6.175	6.362	-0.187
663.5	51.611	-0.63	-0.773	0	48.35	0	6.177	6.363	-0.187
663.6	51.636	-0.633	-0.83	0	47.63	0	6.178	6.365	-0.187
663.7	51.667	-0.613	-0.328	0	47.63	0	6.178	6.365	-0.187
663.8	51.686	-0.603	-1.317	0	47.1	0	6.181	6.367	-0.187
663.9	51.711	-0.605	-0.964	0	46.96	0	6.182	6.368	-0.187
664	51.735	-0.613	-0.544	0	46.91	0	6.183	6.37	-0.187
664.1	51.76	-0.613	-0.526	0	46.95	0	6.184	6.371	-0.187
664.2	51.785	-0.615	-0.501	0	47.58	0	6.186	6.372	-0.187
664.3	51.81	-0.625	-0.703	0	47.98	0	6.187	6.374	-0.187
664.4	51.835	-0.613	-0.177	0	47.92	0	6.188	6.375	-0.187
664.5	51.866	-0.613	-0.611	0	47.99	0	6.19	6.376	-0.187
664.6	51.884	-0.595	-0.855	0	47.98	0	6.191	6.378	-0.187
664.7	51.916	-0.603	-0.406	0	48.62	0	6.192	6.379	-0.187
664.8	51.94	-0.608	-0.325	0	48.81	0	6.194	6.38	-0.187
664.9	51.965	-0.593	-0.526	0	48.81	0	6.195	6.382	-0.187
665	51.99	-0.595	-1.112	0	48.87	0	6.196	6.383	-0.187
665.1	52.021	-0.608	-0.939	0	48.87	0	6.198	6.384	-0.187
665.2	52.046	-0.615	-0.424	0	48.93	0	6.199	6.386	-0.187
665.3	52.071	-0.61	-0.773	0	48.93	0	6.201	6.387	-0.187
665.4	52.102	-0.61	-0.689	0	48.96	0	6.202	6.389	-0.187
665.5	52.127	-0.61	-1.074	0	48.74	0	6.203	6.39	-0.187
665.6	52.152	-0.628	-0.452	0	48.71	0	6.205	6.391	-0.187
665.7	52.177	-0.615	-0.569	0	48.78	0	6.206	6.393	-0.187
665.8	52.201	-0.593	-0.569	0	48.76	0	6.207	6.394	-0.187
665.9	52.226	-0.588	-1.508	0	48.79	0	6.209	6.395	-0.187
666	52.257	-0.595	-1.353	0	48.81	0	6.21	6.397	-0.187
666.1	52.282	-0.595	-0.572	0	48.83	0	6.211	6.398	-0.187
666.2	52.307	-0.605	-0.657	0	48.85	0	6.213	6.399	-0.187
666.3	52.332	-0.615	-1.028	0	48.86	0	6.214	6.401	-0.187
666.4	52.357	-0.61	-0.611	0	48.83	0	6.215	6.402	-0.187
666.5	52.388	-0.608	-0.657	0	48.66	0	6.217	6.403	-0.187
666.6	52.406	-0.613	-1.098	0	48.68	0	6.218	6.405	-0.187
666.7	52.438	-0.613	-0.597	0	48.69	0	6.22	6.406	-0.187

666.8	52.462	-0.623	-0.554	0	48.6	0	6.221	6.408	-0.187
666.9	52.487	-0.625	-0.773	0	47.62	0	6.222	6.409	-0.187
667	52.512	-0.625	-0.367	0	46.2	0	6.224	6.41	-0.187
667.1	52.537	-0.615	-0.869	0	43.11	0	6.225	6.411	-0.187
667.2	52.549	-0.61	-0.597	0	37.65	0	6.226	6.412	-0.187
667.3	52.562	-0.615	-0.759	0	33.87	0	6.227	6.413	-0.187
667.4	52.562	-0.62	-0.773	0	30.38	0	6.228	6.414	-0.187
667.5	52.556	-0.62	-0.512	0	30.28	0	6.228	6.415	-0.187
667.6	52.556	-0.628	-0.512	0	29.52	0	6.229	6.416	-0.187
667.7	52.543	-0.59	-1.3	0	29.48	0	6.23	6.417	-0.187
667.8	52.543	-0.59	-1.469	0	29.42	0	6.231	6.417	-0.187
667.9	52.537	-0.628	-1.579	0	29.42	0	6.232	6.418	-0.187
668	52.531	-0.655	0.081	0	29.45	0	6.232	6.419	-0.187
668.1	52.525	-0.643	-0.272	0	29.41	0	6.233	6.42	-0.187
668.2	52.518	-0.615	-0.759	0	29.47	0	6.234	6.421	-0.187
668.3	52.512	-0.61	-1.413	0	29.25	0	6.235	6.422	-0.187
668.4	52.512	-0.628	-1.165	0	28.4	0	6.236	6.422	-0.187
668.5	52.493	-0.628	-0.597	0	26.35	0	6.236	6.423	-0.187
668.6	52.487	-0.633	-0.053	0	25.03	0	6.237	6.424	-0.187
668.7	52.481	-0.633	-0.925	0	25.04	0	6.238	6.424	-0.187
668.8	52.462	-0.633	-0.844	0	25.03	0	6.239	6.425	-0.187
668.9	52.456	-0.62	-0.678	0	25.07	0	6.239	6.426	-0.187
669	52.438	-0.618	-0.84	0	25.02	0	6.24	6.427	-0.187
669.1	52.425	-0.618	-1.098	0	24.99	0	6.241	6.427	-0.187
669.2	52.413	-0.615	-0.512	0	25.05	0	6.241	6.428	-0.187
669.3	52.4	-0.603	-0.968	0	25.71	0	6.242	6.429	-0.187
669.4	52.388	-0.595	-0.675	0	27.32	0	6.243	6.429	-0.187
669.5	52.382	-0.603	-1.056	0	28.76	0	6.244	6.43	-0.187
669.6	52.382	-0.615	-0.191	0	29.14	0	6.244	6.431	-0.187
669.7	52.369	-0.628	-0.357	0	29.14	0	6.245	6.432	-0.187
669.8	52.363	-0.615	-0.512	0	29.09	0	6.246	6.433	-0.187
669.9	52.357	-0.593	-0.47	0	29.81	0	6.247	6.433	-0.187
670	52.357	-0.61	-1.25	0	30.73	0	6.248	6.434	-0.187
670.1	52.351	-0.625	-0.925	0	31.38	0	6.249	6.435	-0.187
670.2	52.344	-0.605	-0.095	0	31.52	0	6.249	6.436	-0.187
670.3	52.344	-0.593	-0.879	0	32.16	0	6.25	6.437	-0.187
670.4	52.344	-0.615	-1.434	0	32.56	0	6.251	6.438	-0.187
670.5	52.344	-0.615	-0.512	0	34.6	0	6.252	6.439	-0.187
670.6	52.351	-0.61	-0.272	0	35.82	0	6.253	6.44	-0.187
670.7	52.351	-0.61	-0.498	0	36.75	0	6.254	6.441	-0.187
670.8	52.357	-0.598	-0.498	0	36.5	0	6.255	6.442	-0.187
670.9	52.369	-0.595	-0.985	0	36.54	0	6.256	6.443	-0.187
671	52.369	-0.615	-0.999	0	36.51	0	6.257	6.444	-0.187
671.1	52.375	-0.623	-0.438	0	36.55	0	6.258	6.445	-0.187
671.2	52.382	-0.613	-0.177	0	37.23	0	6.259	6.446	-0.187
671.3	52.394	-0.608	-0.911	0	37.47	0	6.26	6.447	-0.187
671.4	52.4	-0.618	-0.78	0	38.29	0	6.261	6.448	-0.187

671.5	52.406	-0.618	-0.47	0	38.96	0	6.262	6.449	-0.187
671.6	52.419	-0.613	-0.335	0	40.09	0	6.264	6.45	-0.187
671.7	52.425	-0.613	-0.498	0	40.2	0	6.265	6.451	-0.187
671.8	52.438	-0.625	-0.501	0	40.22	0	6.266	6.452	-0.187
671.9	52.45	-0.623	-0.526	0	40.23	0	6.267	6.454	-0.187
672	52.469	-0.628	-0.554	0	40.2	0	6.268	6.455	-0.187
672.1	52.475	-0.628	-0.911	0	40.26	0	6.269	6.456	-0.187
672.2	52.493	-0.613	-0.424	0	40.26	0	6.27	6.457	-0.187
672.3	52.5	-0.6	-1.236	0	40.31	0	6.271	6.458	-0.187
672.4	52.512	-0.588	-0.985	0	39	0	6.273	6.459	-0.187
672.5	52.525	-0.588	-1.116	0	37.29	0	6.274	6.46	-0.187
672.6	52.531	-0.61	-1.116	0	35.02	0	6.275	6.461	-0.187
672.7	52.537	-0.64	-0.438	0	33.65	0	6.275	6.462	-0.187
672.8	52.537	-0.658	-0.258	0	33.7	0	6.276	6.463	-0.187
672.9	52.543	-0.638	0.088	0	33.7	0	6.277	6.464	-0.187
673	52.537	-0.62	-0.692	0	33.7	0	6.278	6.465	-0.187
673.1	52.543	-0.61	-1.236	0	33.71	0	6.279	6.466	-0.187
673.2	52.543	-0.603	-0.971	0	33.69	0	6.28	6.467	-0.187
673.3	52.543	-0.608	-0.498	0	33.7	0	6.281	6.468	-0.187
673.4	52.549	-0.63	-0.699	0	33.7	0	6.282	6.469	-0.187
673.5	52.549	-0.63	-0.258	0	33.7	0	6.283	6.47	-0.187
673.6	52.549	-0.62	-0.501	0	33.9	0	6.284	6.471	-0.187
673.7	52.556	-0.62	-0.872	0	34.61	0	6.285	6.471	-0.187
673.8	52.556	-0.618	-0.869	0	35.09	0	6.286	6.472	-0.187
673.9	52.562	-0.62	-0.745	0	35.14	0	6.287	6.473	-0.187
674	52.562	-0.625	-0.6	0	35.81	0	6.288	6.474	-0.187
674.1	52.568	-0.628	-0.773	0	35.71	0	6.289	6.475	-0.187
674.2	52.574	-0.61	-0.325	0	35.72	0	6.29	6.476	-0.187
674.3	52.574	-0.598	-0.798	0	35.71	0	6.291	6.477	-0.187
674.4	52.58	-0.608	-1.317	0	35.77	0	6.292	6.478	-0.187
674.5	52.587	-0.608	-0.254	0	35.76	0	6.293	6.479	-0.187
674.6	52.593	-0.608	-0.484	0	35.76	0	6.294	6.48	-0.187
674.7	52.593	-0.608	-0.173	0	35.47	0	6.295	6.481	-0.187
674.8	52.599	-0.61	-0.173	0	34.24	0	6.296	6.482	-0.187
674.9	52.599	-0.608	-0.745	0	31.87	0	6.297	6.483	-0.187
675	52.599	-0.65	-1.494	0	28.39	0	6.297	6.484	-0.187
675.1	52.593	-0.643	0.201	0	25.48	0	6.298	6.485	-0.187
675.2	52.58	-0.61	0.201	0	22.44	0	6.299	6.485	-0.187
675.3	52.562	-0.613	-1.861	0	21.34	0	6.299	6.486	-0.187
675.4	52.543	-0.61	-0.84	0	20.93	0	6.3	6.486	-0.187
675.5	52.525	-0.598	-0.367	0	20.83	0	6.3	6.487	-0.187
675.6	52.506	-0.6	-1.021	0	20.9	0	6.301	6.488	-0.187
675.7	52.487	-0.618	-0.78	0	20.39	0	6.302	6.488	-0.187
675.8	52.469	-0.62	-0.325	0	19.35	0	6.302	6.489	-0.187
675.9	52.444	-0.608	-0.367	0	19.07	0	6.303	6.489	-0.187
676	52.419	-0.605	-0.971	0	19.07	0	6.303	6.49	-0.187
676.1	52.4	-0.603	-0.699	0	19.07	0	6.304	6.49	-0.187

676.2	52.375	-0.613	-0.936	0	19.07	0	6.304	6.491	-0.187
676.3	52.357	-0.618	-0.685	0	19.04	0	6.305	6.491	-0.187
676.4	52.332	-0.615	-0.484	0	19.32	0	6.305	6.492	-0.187
676.5	52.307	-0.615	-0.897	0	18.75	0	6.306	6.492	-0.187
676.6	52.282	-0.615	-0.646	0	18.58	0	6.306	6.493	-0.187
676.7	52.264	-0.62	-0.569	0	18.5	0	6.307	6.493	-0.187
676.8	52.245	-0.628	-0.569	0	17.24	0	6.307	6.494	-0.187
676.9	52.214	-0.618	-0.646	0	16.12	0	6.308	6.494	-0.187
677	52.189	-0.61	-0.59	0	14.06	0	6.308	6.495	-0.187
677.1	52.158	-0.61	-0.936	0	12.14	0	6.309	6.495	-0.187
677.2	52.127	-0.62	-0.911	0	10.87	0	6.309	6.495	-0.187
677.3	52.09	-0.623	-0.597	0	10.45	0	6.309	6.496	-0.187
677.4	52.052	-0.635	-0.6	0	10.06	0	6.309	6.496	-0.187
677.5	52.015	-0.635	-0.731	0	9.66	0	6.31	6.496	-0.187
677.6	51.978	-0.66	-0.526	0	9.43	0	6.31	6.497	-0.187
677.7	51.94	-0.66	0.145	0	8.34	0	6.31	6.497	-0.187
677.8	51.903	-0.648	0.23	0	7.07	0	6.31	6.497	-0.187
677.9	51.86	-0.603	-0.752	0	5.44	0	6.31	6.497	-0.187
678	51.816	-0.603	-1.861	0	3.82	0	6.311	6.497	-0.187
678.1	51.766	-0.62	-1.413	0	2.21	0	6.311	6.497	-0.187
678.2	51.717	-0.62	-0.159	0	0.95	0	6.311	6.497	-0.187
678.3	51.661	-0.605	-0.66	0	0	0	6.311	6.497	-0.187
678.4	51.605	-0.608	-1.162	0	0	0	6.311	6.497	-0.187
678.5	51.555	-0.615	-0.632	0	0	0	6.311	6.497	-0.187
678.6	51.505	-0.62	-0.798	0	0	0	6.311	6.497	-0.187
678.7	51.443	-0.615	-0.339	0	0	0	6.311	6.497	-0.187
678.8	51.394	-0.618	-1.006	0	0	0	6.311	6.497	-0.187
678.9	51.344	-0.623	-0.759	0	0	0	6.311	6.497	-0.187
679	51.288	-0.635	-0.717	0	0	0	6.311	6.497	-0.187
679.1	51.232	-0.633	-0.328	0	0	0	6.311	6.497	-0.187
679.2	51.182	-0.603	-0.675	0	0	0	6.311	6.497	-0.187
679.3	51.126	-0.598	-1.017	0	0	0	6.311	6.497	-0.187
679.4	51.07	-0.613	-1.331	0	0	0	6.311	6.497	-0.187
679.5	51.021	-0.613	-0.173	0	0	0	6.311	6.497	-0.187
679.6	50.965	-0.6	-0.826	0	0	0	6.311	6.497	-0.187
679.7	50.915	-0.6	-0.66	0	0	0	6.311	6.497	-0.187
679.8	50.859	-0.603	-0.636	0	0	0	6.311	6.497	-0.187
679.9	50.803	-0.608	-0.498	0	0.94	0	6.311	6.497	-0.187
680	50.747	-0.61	-0.886	0	1.3	0	6.311	6.497	-0.187
680.1	50.691	-0.598	-0.671	0	2.1	0	6.311	6.497	-0.187
680.2	50.648	-0.603	-0.812	0	2.87	0	6.311	6.498	-0.187
680.3	50.604	-0.608	-0.717	0	3.92	0	6.311	6.498	-0.187
680.4	50.555	-0.593	-0.325	0	4.45	0	6.311	6.498	-0.187
680.5	50.511	-0.593	-0.84	0	5.19	0	6.311	6.498	-0.187
680.6	50.468	-0.628	-0.826	0	5.81	0	6.311	6.498	-0.187
680.7	50.424	-0.628	-0.802	0	6.05	0	6.312	6.498	-0.187
680.8	50.387	-0.593	-0.911	0	6.25	0	6.312	6.498	-0.187

680.9	50.343	-0.605	-1.398	0	7.6	0	6.312	6.499	-0.187
681	50.306	-0.618	-1.017	0	10.33	0	6.312	6.499	-0.187
681.1	50.269	-0.615	-0.339	0	11.44	0	6.313	6.499	-0.187
681.2	50.238	-0.613	-0.66	0	13.18	0	6.313	6.5	-0.187
681.3	50.207	-0.613	-0.897	0	14.47	0	6.313	6.5	-0.187
681.4	50.182	-0.62	-0.752	0	14.41	0	6.314	6.5	-0.187
681.5	50.157	-0.628	-0.583	0	14.45	0	6.314	6.501	-0.187
681.6	50.132	-0.625	-0.314	0	14.43	0	6.315	6.501	-0.187
681.7	50.107	-0.618	-0.498	0	14.41	0	6.315	6.502	-0.187
681.8	50.076	-0.615	-0.798	0	14.45	0	6.315	6.502	-0.187
681.9	50.051	-0.61	-1.035	0	14.41	0	6.316	6.502	-0.187
682	50.027	-0.608	-0.703	0	14.39	0	6.316	6.503	-0.187
682.1	49.996	-0.588	-0.66	0	14.45	0	6.317	6.503	-0.187
682.2	49.971	-0.575	-0.646	0	14.39	0	6.317	6.504	-0.187
682.3	49.946	-0.583	-1.141	0	14.39	0	6.317	6.504	-0.187
682.4	49.921	-0.61	-0.675	0	14.41	0	6.318	6.504	-0.187
682.5	49.89	-0.61	-0.339	0	14.37	0	6.318	6.505	-0.187
682.6	49.871	-0.603	-0.011	0	14.38	0	6.319	6.505	-0.187
682.7	49.84	-0.603	-1.345	0	14.4	0	6.319	6.506	-0.187
682.8	49.815	-0.593	-1.261	0	14.85	0	6.319	6.506	-0.187
682.9	49.79	-0.6	-0.47	0	16.53	0	6.32	6.507	-0.187
683	49.766	-0.608	-0.364	0	16.78	0	6.32	6.507	-0.187
683.1	49.747	-0.643	-0.925	0	17.87	0	6.321	6.507	-0.187
683.2	49.728	-0.635	-0.057	0	18.58	0	6.321	6.508	-0.187
683.3	49.703	-0.608	0.032	0	19	0	6.322	6.509	-0.187
683.4	49.685	-0.6	-1.564	0	19.22	0	6.322	6.509	-0.187
683.5	49.672	-0.6	-1.07	0	19.23	0	6.323	6.51	-0.187
683.6	49.654	-0.63	-0.339	0	19.24	0	6.323	6.51	-0.187
683.7	49.635	-0.63	-0.911	0	19.22	0	6.324	6.511	-0.187
683.8	49.616	-0.605	-0.826	0	19.25	0	6.325	6.511	-0.187
683.9	49.604	-0.615	-1.07	0	19.21	0	6.325	6.512	-0.187
684	49.585	-0.628	-0.745	0	19.08	0	6.326	6.512	-0.187
684.1	49.567	-0.623	-0.311	0	19.53	0	6.326	6.513	-0.187
684.2	49.554	-0.623	-0.47	0	20.59	0	6.327	6.513	-0.187
684.3	49.536	-0.613	-0.731	0	20.6	0	6.327	6.514	-0.187
684.4	49.523	-0.613	-0.883	0	20.74	0	6.328	6.515	-0.187
684.5	49.505	-0.618	-0.883	0	22.57	0	6.329	6.515	-0.187
684.6	49.498	-0.625	-0.456	0	25.12	0	6.329	6.516	-0.187
684.7	49.486	-0.62	-0.321	0	26.43	0	6.33	6.517	-0.187
684.8	49.486	-0.618	-0.618	0	27.24	0	6.331	6.517	-0.187
684.9	49.486	-0.618	-0.745	0	27.64	0	6.331	6.518	-0.187
685	49.48	-0.613	-0.826	0	28.43	0	6.332	6.519	-0.187
685.1	49.48	-0.598	-0.685	0	28.94	0	6.333	6.52	-0.187
685.2	49.48	-0.6	-1.278	0	29.69	0	6.334	6.521	-0.187
685.3	49.48	-0.605	-0.826	0	31.04	0	6.335	6.521	-0.187
685.4	49.48	-0.605	-0.583	0	31.74	0	6.336	6.522	-0.187
685.5	49.486	-0.605	-0.773	0	32.04	0	6.337	6.523	-0.187

685.6	49.492	-0.61	-1.042	0	32.03	0	6.337	6.524	-0.187
685.7	49.498	-0.61	-0.406	0	32.72	0	6.338	6.525	-0.187
685.8	49.505	-0.595	-0.321	0	32.68	0	6.339	6.526	-0.187
685.9	49.511	-0.61	-1.55	0	32.73	0	6.34	6.527	-0.187
686	49.517	-0.648	-1.165	0	32.68	0	6.341	6.528	-0.187
686.1	49.523	-0.638	0.028	0	32.73	0	6.342	6.529	-0.187
686.2	49.529	-0.625	-0.364	0	32.71	0	6.343	6.529	-0.187
686.3	49.536	-0.62	-1.271	0	32.76	0	6.344	6.53	-0.187
686.4	49.542	-0.605	-0.569	0	32.71	0	6.345	6.531	-0.187
686.5	49.548	-0.605	-0.925	0	33.35	0	6.346	6.532	-0.187
686.6	49.554	-0.623	-0.971	0	34.68	0	6.347	6.533	-0.187
686.7	49.567	-0.623	-0.66	0	35.5	0	6.348	6.534	-0.187
686.8	49.579	-0.593	-0.632	0	36.55	0	6.349	6.535	-0.187
686.9	49.592	-0.605	-1.056	0	36.5	0	6.35	6.536	-0.187
687	49.604	-0.623	-0.971	0	36.52	0	6.351	6.537	-0.187
687.1	49.616	-0.613	0.173	0	36.53	0	6.352	6.538	-0.187
687.2	49.629	-0.603	-0.632	0	37.32	0	6.353	6.539	-0.187
687.3	49.641	-0.605	-0.971	0	38.83	0	6.354	6.54	-0.187
687.4	49.654	-0.618	-0.795	0	41.2	0	6.355	6.541	-0.187
687.5	49.679	-0.618	-0.321	0	42.66	0	6.356	6.543	-0.187
687.6	49.697	-0.605	-0.364	0	42.97	0	6.357	6.544	-0.187
687.7	49.722	-0.6	-1.137	0	44.65	0	6.358	6.545	-0.187
687.8	49.747	-0.595	-0.731	0	45.48	0	6.36	6.546	-0.187
687.9	49.778	-0.603	-0.971	0	45.47	0	6.361	6.548	-0.187
688	49.803	-0.603	-0.646	0	45.52	0	6.362	6.549	-0.187
688.1	49.828	-0.605	-0.039	0	46.17	0	6.364	6.55	-0.187
688.2	49.859	-0.618	-0.851	0	46.45	0	6.365	6.551	-0.187
688.3	49.884	-0.628	-0.258	0	46.3	0	6.366	6.553	-0.187
688.4	49.915	-0.618	-0.381	0	46.3	0	6.367	6.554	-0.187
688.5	49.94	-0.618	-0.66	0	46.32	0	6.369	6.555	-0.187
688.6	49.971	-0.595	-1.067	0	46.36	0	6.37	6.557	-0.187
688.7	49.996	-0.595	-0.893	0	46.36	0	6.371	6.558	-0.187
688.8	50.027	-0.603	-0.893	0	46.43	0	6.373	6.559	-0.187
688.9	50.051	-0.61	-0.819	0	46.45	0	6.374	6.56	-0.187
689	50.083	-0.61	-0.378	0	46.69	0	6.375	6.562	-0.187
689.1	50.107	-0.593	-0.339	0	47.4	0	6.376	6.563	-0.187
689.2	50.138	-0.59	-0.731	0	47.27	0	6.378	6.564	-0.187
689.3	50.17	-0.613	-1.137	0	48	0	6.379	6.566	-0.187
689.4	50.201	-0.623	-0.321	0	48.22	0	6.38	6.567	-0.187
689.5	50.232	-0.623	-0.215	0	48.65	0	6.382	6.568	-0.187
689.6	50.263	-0.6	-0.826	0	50.16	0	6.383	6.57	-0.187
689.7	50.294	-0.6	-0.685	0	50.18	0	6.385	6.571	-0.187
689.8	50.331	-0.6	-0.6	0	50.16	0	6.386	6.573	-0.187
689.9	50.362	-0.603	-0.512	0	49.93	0	6.387	6.574	-0.187
690	50.393	-0.61	-1.264	0	50.31	0	6.389	6.575	-0.187
690.1	50.424	-0.623	-0.614	0	52.09	0	6.39	6.577	-0.187
690.2	50.462	-0.625	-0.406	0	53.27	0	6.392	6.578	-0.187

690.3	50.499	-0.618	-0.321	0	53.61	0	6.393	6.58	-0.187
690.4	50.542	-0.61	-0.893	0	54.22	0	6.395	6.581	-0.187
690.5	50.58	-0.583	-0.901	0	55.31	0	6.396	6.583	-0.187
690.6	50.617	-0.58	-1.55	0	56.49	0	6.398	6.584	-0.187
690.7	50.66	-0.59	-0.971	0	57.19	0	6.399	6.586	-0.187
690.8	50.704	-0.6	-0.484	0	57.2	0	6.401	6.588	-0.187
690.9	50.754	-0.615	-0.731	0	57.27	0	6.403	6.589	-0.187
691	50.791	-0.618	-0.646	0	58.36	0	6.404	6.591	-0.187
691.1	50.841	-0.61	-0.484	0	61.19	0	6.406	6.593	-0.187
691.2	50.89	-0.6	-0.826	0	61.62	0	6.408	6.594	-0.187
691.3	50.94	-0.588	-1.148	0	62.67	0	6.409	6.596	-0.187
691.4	50.99	-0.595	-0.999	0	62.44	0	6.411	6.598	-0.187
691.5	51.039	-0.595	-0.971	0	62.48	0	6.413	6.599	-0.187
691.6	51.095	-0.613	-0.509	0	62.53	0	6.415	6.601	-0.187
691.7	51.139	-0.625	-0.283	0	62.52	0	6.416	6.603	-0.187
691.8	51.195	-0.615	-0.307	0	62.39	0	6.418	6.605	-0.187
691.9	51.244	-0.605	-0.6	0	62.48	0	6.42	6.606	-0.187
692	51.294	-0.62	-1.31	0	62.53	0	6.422	6.608	-0.187
692.1	51.344	-0.623	-0.392	0	62.52	0	6.423	6.61	-0.187
692.2	51.394	-0.615	-0.484	0	62.43	0	6.425	6.612	-0.187
692.3	51.443	-0.618	-0.618	0	62.54	0	6.427	6.613	-0.187
692.4	51.493	-0.625	-0.766	0	61.53	0	6.428	6.615	-0.187
692.5	51.537	-0.625	-0.809	0	61.38	0	6.43	6.617	-0.187
692.6	51.586	-0.625	-0.569	0	60.54	0	6.432	6.618	-0.187
692.7	51.63	-0.625	-0.971	0	59.51	0	6.433	6.62	-0.187
692.8	51.679	-0.6	-0.971	0	53.96	0	6.435	6.622	-0.187
692.9	51.711	-0.605	-1.056	0	45.78	0	6.436	6.623	-0.187
693	51.735	-0.613	-0.826	0	39.08	0	6.437	6.624	-0.187
693.1	51.748	-0.608	-0.321	0	36.4	0	6.438	6.625	-0.187
693.2	51.754	-0.608	-0.569	0	36.23	0	6.439	6.626	-0.187
693.3	51.766	-0.615	-0.971	0	36.11	0	6.44	6.627	-0.187
693.4	51.773	-0.6	-0.321	0	36.17	0	6.441	6.628	-0.187
693.5	51.779	-0.593	-1.056	0	36.09	0	6.442	6.629	-0.187
693.6	51.785	-0.61	-1.264	0	36.61	0	6.443	6.63	-0.187
693.7	51.791	-0.61	-0.438	0	36.78	0	6.444	6.631	-0.187
693.8	51.798	-0.6	-0.484	0	36.72	0	6.445	6.632	-0.187
693.9	51.81	-0.605	-1.345	0	36.76	0	6.446	6.633	-0.187
694	51.816	-0.613	-0.795	0	36.72	0	6.447	6.634	-0.187
694.1	51.822	-0.605	-0.583	0	37.44	0	6.448	6.635	-0.187
694.2	51.829	-0.613	-0.826	0	38.75	0	6.45	6.636	-0.187
694.3	51.841	-0.608	-0.576	0	41.4	0	6.451	6.637	-0.187
694.4	51.853	-0.61	-0.456	0	45.18	0	6.452	6.639	-0.187
694.5	51.878	-0.61	-1.194	0	46.3	0	6.453	6.64	-0.187
694.6	51.897	-0.618	-0.155	0	47.44	0	6.455	6.641	-0.187
694.7	51.922	-0.603	-0.795	0	47.41	0	6.456	6.643	-0.187
694.8	51.947	-0.59	-0.795	0	48.32	0	6.457	6.644	-0.187
694.9	51.971	-0.603	-1.07	0	49.19	0	6.459	6.645	-0.187

695	51.996	-0.63	-0.646	0	50.32	0	6.46	6.647	-0.187
695.1	52.027	-0.625	0.237	0	51.79	0	6.461	6.648	-0.187
695.2	52.058	-0.61	-0.646	0	53.09	0	6.463	6.65	-0.187
695.3	52.096	-0.605	-0.932	0	54.13	0	6.464	6.651	-0.187
695.4	52.127	-0.605	-0.809	0	55.05	0	6.466	6.653	-0.187
695.5	52.17	-0.605	-0.646	0	55.66	0	6.467	6.654	-0.187
695.6	52.201	-0.593	-0.618	0	56.12	0	6.469	6.656	-0.187
695.7	52.239	-0.593	-1.18	0	56.18	0	6.471	6.657	-0.187
695.8	52.282	-0.603	-1.18	0	55.96	0	6.472	6.659	-0.187
695.9	52.313	-0.613	-0.385	0	55.97	0	6.474	6.66	-0.187
696	52.351	-0.613	0.159	0	56.02	0	6.475	6.662	-0.187
696.1	52.388	-0.618	-1.222	0	56.07	0	6.477	6.663	-0.187
696.2	52.425	-0.618	-0.53	0	56.13	0	6.478	6.665	-0.187
696.3	52.462	-0.603	-0.3	0	56.16	0	6.48	6.667	-0.187
696.4	52.5	-0.598	-0.971	0	56.07	0	6.482	6.668	-0.187
696.5	52.537	-0.608	-0.971	0	56.04	0	6.483	6.67	-0.187
696.6	52.568	-0.6	-0.321	0	56.06	0	6.485	6.671	-0.187
696.7	52.605	-0.59	-0.498	0	56.1	0	6.486	6.673	-0.187
696.8	52.643	-0.605	-0.971	0	56.13	0	6.488	6.674	-0.187
696.9	52.68	-0.605	-0.484	0	56.15	0	6.489	6.676	-0.187
697	52.711	-0.59	-0.321	0	56.14	0	6.491	6.677	-0.187
697.1	52.748	-0.603	-0.911	0	55.94	0	6.492	6.679	-0.187
697.2	52.785	-0.615	-0.809	0	55.97	0	6.494	6.681	-0.187
697.3	52.823	-0.613	-0.109	0	56.01	0	6.496	6.682	-0.187
697.4	52.86	-0.603	-1.222	0	56.06	0	6.497	6.684	-0.187
697.5	52.897	-0.603	-0.569	0	56.1	0	6.499	6.685	-0.187
697.6	52.928	-0.618	-1.056	0	56.39	0	6.5	6.687	-0.187
697.7	52.966	-0.613	-0.321	0	57.75	0	6.502	6.688	-0.187
697.8	53.003	-0.598	-0.406	0	59.6	0	6.503	6.69	-0.187
697.9	53.04	-0.61	-1.18	0	60.51	0	6.505	6.692	-0.187
698	53.084	-0.615	-0.66	0	61.44	0	6.507	6.693	-0.187
698.1	53.127	-0.608	-0.155	0	61.39	0	6.509	6.695	-0.187
698.2	53.171	-0.603	-0.766	0	61.28	0	6.51	6.697	-0.187
698.3	53.214	-0.598	-0.484	0	61.31	0	6.512	6.699	-0.187
698.4	53.258	-0.61	-0.819	0	61.46	0	6.514	6.7	-0.187
698.5	53.301	-0.61	-0.53	0	61.59	0	6.515	6.702	-0.187
698.6	53.339	-0.603	-0.424	0	61.5	0	6.517	6.704	-0.187
698.7	53.382	-0.603	-1.236	0	62.8	0	6.519	6.705	-0.187
698.8	53.425	-0.593	-1.151	0	62.58	0	6.521	6.707	-0.187
698.9	53.469	-0.59	-0.66	0	62.63	0	6.522	6.709	-0.187
699	53.512	-0.603	-0.855	0	62.68	0	6.524	6.711	-0.187
699.1	53.556	-0.603	-0.689	0	62.75	0	6.526	6.712	-0.187
699.2	53.606	-0.603	-0.629	0	62.72	0	6.528	6.714	-0.187
699.3	53.649	-0.613	-1.056	0	62.51	0	6.529	6.716	-0.187
699.4	53.686	-0.62	-0.773	0	62.55	0	6.531	6.718	-0.187
699.5	53.73	-0.618	-0.438	0	62.43	0	6.533	6.719	-0.187
699.6	53.78	-0.603	-0.66	0	62.5	0	6.534	6.721	-0.187

699.7	53.817	-0.608	-1.056	0	62.38	0	6.536	6.723	-0.187
699.8	53.86	-0.618	-0.809	0	62.32	0	6.538	6.725	-0.187
699.9	53.904	-0.615	-0.498	0	62.44	0	6.54	6.726	-0.187
700	53.947	-0.608	-0.406	0	62.45	0	6.541	6.728	-0.187
700.1	53.991	-0.613	-0.869	0	62.51	0	6.543	6.73	-0.187
700.2	54.028	-0.608	-0.675	0	62.35	0	6.545	6.732	-0.187
700.3	54.078	-0.6	-0.456	0	62.38	0	6.547	6.733	-0.187
700.4	54.115	-0.615	-0.646	0	62.37	0	6.548	6.735	-0.187
700.5	54.159	-0.615	-0.999	0	62.45	0	6.55	6.737	-0.187
700.6	54.196	-0.598	-0.406	0	62.48	0	6.552	6.738	-0.187
700.7	54.239	-0.598	-1.18	0	62.28	0	6.554	6.74	-0.187
700.8	54.283	-0.618	-1.264	0	61.41	0	6.555	6.742	-0.187
700.9	54.32	-0.625	0.004	0	60.46	0	6.557	6.744	-0.187
701	54.358	-0.615	-0.424	0	59.02	0	6.559	6.745	-0.187
701.1	54.395	-0.61	-0.925	0	58.53	0	6.56	6.747	-0.187
701.2	54.432	-0.613	-0.872	0	58.01	0	6.562	6.748	-0.187
701.3	54.469	-0.62	-0.614	0	58.08	0	6.563	6.75	-0.187
701.4	54.5	-0.618	-0.396	0	58.12	0	6.565	6.752	-0.187
701.5	54.538	-0.618	-0.925	0	58.15	0	6.567	6.753	-0.187
701.6	54.569	-0.615	-0.893	0	58.07	0	6.568	6.755	-0.187
701.7	54.606	-0.615	-0.646	0	57.95	0	6.57	6.757	-0.187
701.8	54.637	-0.615	-0.646	0	57.96	0	6.571	6.758	-0.187
701.9	54.674	-0.618	-0.893	0	58	0	6.573	6.76	-0.187
702	54.706	-0.618	-0.66	0	58.05	0	6.575	6.761	-0.187
702.1	54.737	-0.605	-0.512	0	58.08	0	6.576	6.763	-0.187
702.2	54.774	-0.6	-0.911	0	58.14	0	6.578	6.765	-0.187
702.3	54.811	-0.613	-1.151	0	57.98	0	6.58	6.766	-0.187
702.4	54.836	-0.618	-0.54	0	57.97	0	6.581	6.768	-0.187
702.5	54.873	-0.623	-0.544	0	58.02	0	6.583	6.769	-0.187
702.6	54.904	-0.618	-0.597	0	59.04	0	6.584	6.771	-0.187
702.7	54.935	-0.62	-0.675	0	59.06	0	6.586	6.773	-0.187
702.8	54.973	-0.618	-1.056	0	59.07	0	6.588	6.774	-0.187
702.9	55.004	-0.613	-0.498	0	59.06	0	6.589	6.776	-0.187
703	55.041	-0.61	-0.745	0	58.89	0	6.591	6.778	-0.187
703.1	55.072	-0.61	-0.932	0	59.07	0	6.593	6.779	-0.187
703.2	55.109	-0.598	-0.544	0	60.1	0	6.594	6.781	-0.187
703.3	55.153	-0.605	-0.939	0	60.1	0	6.596	6.783	-0.187
703.4	55.178	-0.615	-0.911	0	60.14	0	6.598	6.784	-0.187
703.5	55.215	-0.615	-0.406	0	60.19	0	6.599	6.786	-0.187
703.6	55.246	-0.638	-0.809	0	59.96	0	6.601	6.788	-0.187
703.7	55.283	-0.608	-1.593	0	59.99	0	6.603	6.789	-0.187
703.8	55.314	-0.593	-1.508	0	59.99	0	6.604	6.791	-0.187
703.9	55.352	-0.593	-0.985	0	60.02	0	6.606	6.793	-0.187
704	55.389	-0.605	-0.586	0	60.07	0	6.608	6.794	-0.187
704.1	55.426	-0.628	-0.745	0	60.07	0	6.609	6.796	-0.187
704.2	55.457	-0.638	-0.293	0	59.88	0	6.611	6.798	-0.187
704.3	55.495	-0.613	-0.258	0	59.9	0	6.613	6.799	-0.187

704.4	55.526	-0.593	-1.324	0	59.95	0	6.614	6.801	-0.187
704.5	55.563	-0.593	-0.985	0	59.98	0	6.616	6.803	-0.187
704.6	55.594	-0.59	-0.826	0	60.05	0	6.618	6.804	-0.187
704.7	55.631	-0.59	-0.321	0	60.09	0	6.619	6.806	-0.187
704.8	55.662	-0.6	-0.293	0	60.1	0	6.621	6.808	-0.187
704.9	55.7	-0.615	-0.95	0	59.05	0	6.623	6.809	-0.187
705	55.731	-0.61	-0.173	0	58.98	0	6.624	6.811	-0.187
705.1	55.762	-0.603	-0.498	0	57.08	0	6.626	6.812	-0.187
705.2	55.793	-0.628	-1.035	0	52.38	0	6.627	6.814	-0.187
705.3	55.793	-0.648	-0.456	0	46.49	0	6.629	6.815	-0.187
705.4	55.83	-0.635	0.318	0	45.99	0	6.63	6.816	-0.187
705.5	55.843	-0.633	-1.19	0	45.93	0	6.631	6.818	-0.187
705.6	55.855	-0.64	-0.911	0	45.94	0	6.632	6.819	-0.187
705.7	55.867	-0.65	-0.66	0	45.63	0	6.634	6.82	-0.187
705.8	55.88	-0.638	-0.498	0	45.22	0	6.635	6.822	-0.187
705.9	55.892	-0.623	-0.78	0	45.26	0	6.636	6.823	-0.187
706	55.905	-0.625	-1.035	0	45.35	0	6.637	6.824	-0.187
706.1	55.911	-0.623	-0.66	0	46.1	0	6.639	6.825	-0.187
706.2	55.923	-0.618	-0.424	0	46.9	0	6.64	6.827	-0.187
706.3	55.942	-0.6	-0.745	0	48.25	0	6.641	6.828	-0.187
706.4	55.954	-0.59	-0.953	0	49.57	0	6.643	6.829	-0.187
706.5	55.973	-0.59	-1.48	0	49.83	0	6.644	6.831	-0.187
706.6	55.992	-0.603	-0.498	0	50.65	0	6.646	6.832	-0.187
706.7	56.01	-0.603	-1.003	0	50.82	0	6.647	6.834	-0.187
706.8	56.029	-0.595	-1.031	0	50.82	0	6.648	6.835	-0.187
706.9	56.048	-0.595	-0.745	0	50.86	0	6.65	6.836	-0.187
707	56.066	-0.603	-0.703	0	50.85	0	6.651	6.838	-0.187
707.1	56.085	-0.603	-0.675	0	50.86	0	6.653	6.839	-0.187
707.2	56.104	-0.583	-0.498	0	50.72	0	6.654	6.841	-0.187
707.3	56.128	-0.585	-1.031	0	50.63	0	6.655	6.842	-0.187
707.4	56.141	-0.618	-1.278	0	50.63	0	6.657	6.843	-0.187
707.5	56.166	-0.618	-0.339	0	50.67	0	6.658	6.845	-0.187
707.6	56.184	-0.628	0.159	0	50.67	0	6.66	6.846	-0.187
707.7	56.197	-0.628	-1.607	0	50.68	0	6.661	6.848	-0.187
707.8	56.222	-0.603	-1.607	0	50.7	0	6.662	6.849	-0.187
707.9	56.234	-0.618	-1.084	0	50.73	0	6.664	6.85	-0.187
708	56.253	-0.615	-0.424	0	50.74	0	6.665	6.852	-0.187
708.1	56.271	-0.59	-0.583	0	50.79	0	6.667	6.853	-0.187
708.2	56.296	-0.58	-0.826	0	50.76	0	6.668	6.855	-0.187
708.3	56.309	-0.595	-1.081	0	50.83	0	6.669	6.856	-0.187
708.4	56.327	-0.585	-0.367	0	50.81	0	6.671	6.858	-0.187
708.5	56.352	-0.575	-0.675	0	50.83	0	6.672	6.859	-0.187
708.6	56.371	-0.62	-1.579	0	50.9	0	6.674	6.86	-0.187
708.7	56.383	-0.663	-0.109	0	50.89	0	6.675	6.862	-0.187
708.8	56.408	-0.658	0.544	0	50.92	0	6.677	6.863	-0.187
708.9	56.427	-0.643	-0.727	0	50.82	0	6.678	6.865	-0.187
709	56.439	-0.613	-1.25	0	50.76	0	6.679	6.866	-0.187

709.1	56.458	-0.595	-1.116	0	50.74	0	6.681	6.867	-0.187
709.2	56.483	-0.608	-1.395	0	50.78	0	6.682	6.869	-0.187
709.3	56.495	-0.613	-0.717	0	50.78	0	6.684	6.87	-0.187
709.4	56.514	-0.6	-0.512	0	50.78	0	6.685	6.872	-0.187
709.5	56.532	-0.6	-0.879	0	50.81	0	6.686	6.873	-0.187
709.6	56.551	-0.595	-1.084	0	50.82	0	6.688	6.874	-0.187
709.7	56.57	-0.608	-0.597	0	50.87	0	6.689	6.876	-0.187
709.8	56.588	-0.613	-0.597	0	50.89	0	6.691	6.877	-0.187
709.9	56.607	-0.608	-0.597	0	50.88	0	6.692	6.879	-0.187
710	56.626	-0.603	-1.169	0	50.92	0	6.694	6.88	-0.187
710.1	56.638	-0.603	-0.745	0	50.93	0	6.695	6.882	-0.187
710.2	56.657	-0.62	-0.999	0	50.93	0	6.696	6.883	-0.187
710.3	56.675	-0.605	-0.498	0	50.97	0	6.698	6.884	-0.187
710.4	56.694	-0.588	-0.512	0	51.02	0	6.699	6.886	-0.187
710.5	56.713	-0.588	-1.165	0	50.97	0	6.701	6.887	-0.187
710.6	56.731	-0.593	-0.869	0	50.97	0	6.702	6.889	-0.187
710.7	56.75	-0.59	-0.999	0	50.7	0	6.703	6.89	-0.187
710.8	56.768	-0.6	-0.999	0	50.7	0	6.705	6.891	-0.187
710.9	56.787	-0.605	-0.558	0	50.73	0	6.706	6.893	-0.187
711	56.8	-0.61	-0.173	0	50.75	0	6.708	6.894	-0.187
711.1	56.818	-0.613	-0.968	0	50.76	0	6.709	6.896	-0.187
711.2	56.837	-0.598	-0.353	0	50.76	0	6.71	6.897	-0.187
711.3	56.855	-0.598	-0.999	0	50.8	0	6.712	6.898	-0.187
711.4	56.868	-0.603	-1.045	0	50.79	0	6.713	6.9	-0.187
711.5	56.887	-0.608	-0.597	0	50.84	0	6.715	6.901	-0.187
711.6	56.905	-0.613	-0.558	0	51.21	0	6.716	6.903	-0.187
711.7	56.924	-0.608	-0.66	0	53.76	0	6.718	6.904	-0.187
711.8	56.942	-0.605	-0.597	0	54.86	0	6.719	6.906	-0.187
711.9	56.967	-0.625	-1.084	0	56.5	0	6.721	6.907	-0.187
712	56.992	-0.628	-0.597	0	57.82	0	6.722	6.909	-0.187
712.1	57.017	-0.61	-0.184	0	59.15	0	6.724	6.911	-0.187
712.2	57.042	-0.595	-0.999	0	60.14	0	6.726	6.912	-0.187
712.3	57.073	-0.59	-0.869	0	60	0	6.727	6.914	-0.187
712.4	57.104	-0.6	-0.883	0	59.99	0	6.729	6.916	-0.187
712.5	57.129	-0.6	-0.826	0	60.75	0	6.731	6.917	-0.187
712.6	57.166	-0.615	-0.353	0	61.02	0	6.732	6.919	-0.187
712.7	57.191	-0.608	-0.812	0	61.06	0	6.734	6.921	-0.187
712.8	57.222	-0.598	-0.84	0	61.1	0	6.736	6.922	-0.187
712.9	57.259	-0.608	-0.84	0	61.79	0	6.737	6.924	-0.187
713	57.29	-0.61	-0.47	0	64.12	0	6.739	6.926	-0.187
713.1	57.321	-0.615	-0.187	0	65.24	0	6.741	6.928	-0.187
713.2	57.359	-0.625	-0.512	0	67.08	0	6.743	6.93	-0.187
713.3	57.396	-0.61	-0.159	0	68.27	0	6.745	6.931	-0.187
713.4	57.44	-0.605	-1.014	0	69.31	0	6.747	6.933	-0.187
713.5	57.483	-0.605	-0.756	0	70.33	0	6.749	6.935	-0.187
713.6	57.52	-0.603	-0.54	0	71.12	0	6.751	6.937	-0.187
713.7	57.564	-0.603	-0.512	0	71.32	0	6.753	6.939	-0.187

713.8	57.614	-0.6	-0.512	0	71.86	0	6.755	6.941	-0.187
713.9	57.657	-0.6	-0.84	0	73.86	0	6.757	6.943	-0.187
714	57.707	-0.588	-0.675	0	75.04	0	6.759	6.945	-0.187
714.1	57.756	-0.575	-0.66	0	75.57	0	6.761	6.947	-0.187
714.2	57.8	-0.578	-1.052	0	76.85	0	6.763	6.95	-0.187
714.3	57.856	-0.593	-0.731	0	78.01	0	6.765	6.952	-0.187
714.4	57.906	-0.595	-0.558	0	78.43	0	6.767	6.954	-0.187
714.5	57.962	-0.593	-0.494	0	78.44	0	6.77	6.956	-0.187
714.6	58.011	-0.595	-1.296	0	78.27	0	6.772	6.958	-0.187
714.7	58.067	-0.598	-0.925	0	78.31	0	6.774	6.96	-0.187
714.8	58.117	-0.6	-0.689	0	78.39	0	6.776	6.963	-0.187
714.9	58.173	-0.608	-0.713	0	79.79	0	6.778	6.965	-0.187
715	58.222	-0.605	-0.675	0	79.61	0	6.78	6.967	-0.187
715.1	58.278	-0.595	-0.484	0	79.67	0	6.783	6.969	-0.187
715.2	58.334	-0.598	-1.098	0	79.67	0	6.785	6.972	-0.187
715.3	58.39	-0.598	-0.597	0	79.78	0	6.787	6.974	-0.187
715.4	58.44	-0.598	-0.675	0	79.56	0	6.789	6.976	-0.187
715.5	58.496	-0.598	-0.473	0	79.57	0	6.792	6.978	-0.187
715.6	58.546	-0.593	-0.66	0	79.65	0	6.794	6.98	-0.187
715.7	58.602	-0.6	-0.611	0	79.76	0	6.796	6.983	-0.187
715.8	58.651	-0.613	-0.526	0	80.24	0	6.798	6.985	-0.187
715.9	58.707	-0.595	-0.41	0	81.09	0	6.8	6.987	-0.187
716	58.757	-0.578	-0.367	0	80.76	0	6.803	6.989	-0.187
716.1	58.813	-0.593	-1.324	0	80.25	0	6.805	6.992	-0.187
716.2	58.869	-0.598	-0.558	0	79.6	0	6.807	6.994	-0.187
716.3	58.918	-0.59	0.145	0	78.53	0	6.809	6.996	-0.187
716.4	58.968	-0.595	-1.144	0	78.09	0	6.811	6.998	-0.187
716.5	59.018	-0.595	-0.682	0	76.23	0	6.814	7	-0.187
716.6	59.061	-0.618	-0.689	0	68.92	0	6.816	7.002	-0.187
716.7	59.099	-0.62	-0.773	0	56.6	0	6.817	7.004	-0.187
716.8	59.123	-0.61	-0.689	0	48.69	0	6.818	7.005	-0.187
716.9	59.13	-0.598	-0.985	0	46.33	0	6.82	7.006	-0.187
717	59.136	-0.593	-1.165	0	46.38	0	6.821	7.008	-0.187
717.1	59.142	-0.588	-0.812	0	46.29	0	6.822	7.009	-0.187
717.2	59.148	-0.593	-0.939	0	46.32	0	6.824	7.01	-0.187
717.3	59.155	-0.598	-1.059	0	46.26	0	6.825	7.011	-0.187
717.4	59.155	-0.583	-0.381	0	46.26	0	6.826	7.013	-0.187
717.5	59.161	-0.575	-0.611	0	46.27	0	6.827	7.014	-0.187
717.6	59.167	-0.593	-1.059	0	46.29	0	6.829	7.015	-0.187
717.7	59.173	-0.593	-0.367	0	46.27	0	6.83	7.017	-0.187
717.8	59.173	-0.583	-0.438	0	46.2	0	6.831	7.018	-0.187
717.9	59.179	-0.585	-1.028	0	45.15	0	6.833	7.019	-0.187
718	59.186	-0.593	-0.526	0	43.25	0	6.834	7.02	-0.187
718.1	59.186	-0.61	-0.788	0	41.83	0	6.835	7.022	-0.187
718.2	59.186	-0.61	-0.367	0	40.68	0	6.836	7.023	-0.187
718.3	59.179	-0.61	-0.201	0	39.96	0	6.837	7.024	-0.187
718.4	59.179	-0.62	-0.939	0	38.66	0	6.838	7.025	-0.187

718.5	59.167	-0.62	-0.544	0	37.67	0	6.839	7.026	-0.187
718.6	59.161	-0.603	-0.526	0	36.43	0	6.84	7.027	-0.187
718.7	59.155	-0.61	-0.855	0	34.35	0	6.841	7.028	-0.187
718.8	59.148	-0.623	-0.83	0	31.91	0	6.842	7.029	-0.187
718.9	59.13	-0.623	-0.286	0	29.24	0	6.843	7.03	-0.187
719	59.111	-0.615	-0.689	0	26.73	0	6.844	7.03	-0.187
719.1	59.086	-0.613	-0.939	0	24.54	0	6.844	7.031	-0.187
719.2	59.061	-0.618	-0.939	0	23.4	0	6.845	7.032	-0.187
719.3	59.036	-0.615	-0.381	0	22.42	0	6.846	7.032	-0.187
719.4	59.005	-0.603	-0.413	0	22.26	0	6.846	7.033	-0.187
719.5	58.974	-0.603	-0.897	0	22.3	0	6.847	7.033	-0.187
719.6	58.943	-0.615	-1.07	0	22.2	0	6.847	7.034	-0.187
719.7	58.918	-0.625	-0.438	0	22.26	0	6.848	7.035	-0.187
719.8	58.887	-0.623	-0.466	0	22.14	0	6.849	7.035	-0.187
719.9	58.856	-0.595	-0.689	0	21.33	0	6.849	7.036	-0.187
720	58.831	-0.58	-0.968	0	21.43	0	6.85	7.037	-0.187
720.1	58.794	-0.6	-1.759	0	21.75	0	6.851	7.037	-0.187
720.2	58.769	-0.61	-0.424	0	22.46	0	6.851	7.038	-0.187
720.3	58.738	-0.603	-0.381	0	22.94	0	6.852	7.038	-0.187
720.4	58.713	-0.605	-1.014	0	23.35	0	6.852	7.039	-0.187
720.5	58.682	-0.603	-0.713	0	24.57	0	6.853	7.04	-0.187
720.6	58.657	-0.6	-0.745	0	25.73	0	6.854	7.04	-0.187
720.7	58.639	-0.603	-0.869	0	25.77	0	6.855	7.041	-0.187
720.8	58.614	-0.593	-0.6	0	25.71	0	6.855	7.042	-0.187
720.9	58.589	-0.598	-0.985	0	25.71	0	6.856	7.043	-0.187
721	58.564	-0.615	-0.982	0	25.71	0	6.857	7.043	-0.187
721.1	58.546	-0.628	-0.187	0	25.68	0	6.857	7.044	-0.187
721.2	58.521	-0.618	-0.367	0	25.11	0	6.858	7.045	-0.187
721.3	58.496	-0.608	-0.632	0	23.97	0	6.859	7.045	-0.187
721.4	58.471	-0.615	-1.427	0	22.11	0	6.859	7.046	-0.187
721.5	58.446	-0.615	-0.456	0	20.2	0	6.86	7.047	-0.187
721.6	58.415	-0.598	-0.689	0	19.04	0	6.86	7.047	-0.187
721.7	58.378	-0.605	-0.643	0	18.12	0	6.861	7.048	-0.187
721.8	58.347	-0.615	-0.586	0	16.89	0	6.861	7.048	-0.187
721.9	58.309	-0.62	-0.583	0	15.19	0	6.862	7.048	-0.187
722	58.272	-0.608	-0.516	0	13.46	0	6.862	7.049	-0.187
722.1	58.229	-0.595	-0.83	0	12.6	0	6.863	7.049	-0.187
722.2	58.191	-0.593	-1.194	0	12.08	0	6.863	7.05	-0.187
722.3	58.142	-0.593	-0.689	0	11.96	0	6.863	7.05	-0.187
722.4	58.104	-0.615	-0.717	0	11.98	0	6.864	7.05	-0.187
722.5	58.055	-0.615	-0.554	0	12.02	0	6.864	7.051	-0.187
722.6	58.011	-0.59	-0.396	0	12.39	0	6.864	7.051	-0.187
722.7	57.968	-0.6	-0.597	0	12.93	0	6.865	7.051	-0.187
722.8	57.93	-0.595	-0.54	0	14.35	0	6.865	7.052	-0.187
722.9	57.887	-0.593	-0.54	0	16.61	0	6.865	7.052	-0.187
723	57.856	-0.615	-0.985	0	17.25	0	6.866	7.053	-0.187
723.1	57.819	-0.633	-0.54	0	17.28	0	6.866	7.053	-0.187

723.2	57.781	-0.62	-0.053	0	17.27	0	6.867	7.054	-0.187
723.3	57.75	-0.598	-0.593	0	17.99	0	6.867	7.054	-0.187
723.4	57.713	-0.59	-1.158	0	18.61	0	6.868	7.055	-0.187
723.5	57.682	-0.595	-1.003	0	19.04	0	6.868	7.055	-0.187
723.6	57.651	-0.585	-0.381	0	19.06	0	6.869	7.056	-0.187
723.7	57.62	-0.595	-0.713	0	19.07	0	6.87	7.056	-0.187
723.8	57.589	-0.6	-0.996	0	19.02	0	6.87	7.057	-0.187
723.9	57.558	-0.605	-0.48	0	19.06	0	6.871	7.057	-0.187
724	57.527	-0.603	-0.675	0	19	0	6.871	7.058	-0.187
724.1	57.495	-0.598	-0.675	0	19.04	0	6.872	7.058	-0.187
724.2	57.464	-0.598	-0.823	0	19	0	6.872	7.059	-0.187
724.3	57.433	-0.61	-0.876	0	19.8	0	6.873	7.059	-0.187
724.4	57.402	-0.613	-0.562	0	20.07	0	6.873	7.06	-0.187
724.5	57.371	-0.613	-0.102	0	20.04	0	6.874	7.06	-0.187
724.6	57.34	-0.615	-0.717	0	20.04	0	6.874	7.061	-0.187
724.7	57.315	-0.61	-0.597	0	19.99	0	6.875	7.062	-0.187
724.8	57.284	-0.61	-0.54	0	20.68	0	6.876	7.062	-0.187
724.9	57.253	-0.605	-0.717	0	21.33	0	6.876	7.063	-0.187
725	57.228	-0.6	-1.098	0	21.36	0	6.877	7.063	-0.187
725.1	57.203	-0.618	-1.042	0	21.33	0	6.877	7.064	-0.187
725.2	57.172	-0.62	-0.54	0	21.31	0	6.878	7.065	-0.187
725.3	57.148	-0.6	-0.191	0	21.34	0	6.878	7.065	-0.187
725.4	57.116	-0.588	-0.968	0	21.28	0	6.879	7.066	-0.187
725.5	57.092	-0.588	-1.127	0	21.33	0	6.88	7.066	-0.187
725.6	57.067	-0.6	-0.703	0	21.27	0	6.88	7.067	-0.187
725.7	57.036	-0.605	-0.597	0	21.3	0	6.881	7.067	-0.187
725.8	57.005	-0.613	-0.512	0	21.26	0	6.881	7.068	-0.187
725.9	56.986	-0.61	-0.498	0	21.25	0	6.882	7.069	-0.187
726	56.955	-0.62	-0.869	0	21.44	0	6.883	7.069	-0.187
726.1	56.93	-0.62	-0.583	0	20.88	0	6.883	7.07	-0.187
726.2	56.899	-0.613	-0.703	0	20.6	0	6.884	7.07	-0.187
726.3	56.874	-0.6	-0.968	0	19.48	0	6.884	7.071	-0.187
726.4	56.843	-0.598	-0.855	0	18.9	0	6.885	7.071	-0.187
726.5	56.812	-0.593	-0.773	0	18.04	0	6.885	7.072	-0.187
726.6	56.781	-0.595	-0.862	0	16.67	0	6.886	7.072	-0.187
726.7	56.75	-0.595	-1.183	0	16.06	0	6.886	7.073	-0.187
726.8	56.719	-0.61	-0.516	0	15.35	0	6.887	7.073	-0.187
726.9	56.681	-0.62	-0.759	0	14.92	0	6.887	7.074	-0.187
727	56.644	-0.613	-0.109	0	14.57	0	6.887	7.074	-0.187
727.1	56.607	-0.618	-0.703	0	13.69	0	6.888	7.074	-0.187
727.2	56.57	-0.63	-0.597	0	13.6	0	6.888	7.075	-0.187
727.3	56.526	-0.638	-0.759	0	13.21	0	6.889	7.075	-0.187
727.4	56.495	-0.62	-0.141	0	12.52	0	6.889	7.076	-0.187
727.5	56.452	-0.62	-0.554	0	11.09	0	6.889	7.076	-0.187
727.6	56.408	-0.605	-1.307	0	8.99	0	6.89	7.076	-0.187
727.7	56.365	-0.65	0.371	0	8	0	6.89	7.076	-0.187
727.8	56.321	-0.658	0.371	0	7.48	0	6.89	7.077	-0.187

727.9	56.271	-0.635	-0.215	0	7.41	0	6.89	7.077	-0.187
728	56.222	-0.62	-0.717	0	6.62	0	6.89	7.077	-0.187
728.1	56.178	-0.61	-1.137	0	5.5	0	6.89	7.077	-0.187
728.2	56.128	-0.61	-0.756	0	4.28	0	6.891	7.077	-0.187
728.3	56.073	-0.598	-0.657	0	3.68	0	6.891	7.077	-0.187
728.4	56.023	-0.598	-0.685	0	2.94	0	6.891	7.077	-0.187
728.5	55.967	-0.598	-0.925	0	1.67	0	6.891	7.077	-0.187
728.6	55.905	-0.61	-0.039	0	0	0	6.891	7.077	-0.187
728.7	55.849	-0.603	-1.014	0	0	0	6.891	7.077	-0.187
728.8	55.793	-0.61	-1.014	0	0	0	6.891	7.077	-0.187
728.9	55.725	-0.613	-0.41	0	0	0	6.891	7.077	-0.187
729	55.669	-0.598	-0.283	0	0	0	6.891	7.077	-0.187
729.1	55.613	-0.588	-1.003	0	0	0	6.891	7.077	-0.187
729.2	55.551	-0.588	-1.229	0	0	0	6.891	7.077	-0.187
729.3	55.488	-0.59	-0.731	0	0	0	6.891	7.077	-0.187
729.4	55.433	-0.598	-0.731	0	0	0	6.891	7.077	-0.187
729.5	55.37	-0.61	-0.554	0	0	0	6.891	7.077	-0.187
729.6	55.308	-0.608	-0.494	0	0	0	6.891	7.077	-0.187
729.7	55.252	-0.608	-0.494	0	0	0	6.891	7.078	-0.187
729.8	55.196	-0.625	-0.855	0	0	0	6.891	7.078	-0.187
729.9	55.134	-0.638	-0.205	0	0	0	6.891	7.078	-0.187
730	55.078	-0.628	-0.205	0	0	0	6.891	7.078	-0.187
730.1	55.022	-0.6	-0.703	0	0	0	6.891	7.078	-0.187
730.2	54.96	-0.58	-1.208	0	0	0	6.891	7.078	-0.187
730.3	54.898	-0.57	-1.127	0	0	0	6.891	7.078	-0.187
730.4	54.842	-0.593	-0.915	0	0	0	6.891	7.078	-0.187
730.5	54.786	-0.593	-0.466	0	0	0	6.891	7.078	-0.187
730.6	54.724	-0.615	-0.23	0	0	0	6.891	7.078	-0.187
730.7	54.668	-0.593	-1.345	0	0	0	6.891	7.078	-0.187
730.8	54.606	-0.6	-1.427	0	0	0	6.891	7.078	-0.187
730.9	54.55	-0.605	-0.788	0	0	0	6.891	7.078	-0.187
731	54.494	-0.608	-0.3	0	0	0	6.891	7.078	-0.187
731.1	54.438	-0.61	-0.915	0	0	0	6.891	7.078	-0.187
731.2	54.376	-0.598	-0.526	0	0	0	6.891	7.078	-0.187
731.3	54.32	-0.588	-0.77	0	0	0	6.891	7.078	-0.187
731.4	54.264	-0.593	-0.915	0	0	0	6.891	7.078	-0.187
731.5	54.202	-0.593	-1.063	0	0	0	6.891	7.078	-0.187
731.6	54.152	-0.608	0.124	0	0	0	6.891	7.078	-0.187
731.7	54.097	-0.618	-0.869	0	0	0	6.891	7.078	-0.187
731.8	54.034	-0.633	-0.869	0	0	0	6.891	7.078	-0.187
731.9	53.979	-0.618	0.071	0	0	0	6.891	7.078	-0.187
732	53.923	-0.595	-0.604	0	0	0	6.891	7.078	-0.187
732.1	53.86	-0.595	-0.855	0	0	0	6.891	7.078	-0.187
732.2	53.811	-0.618	-0.897	0	0	0	6.891	7.078	-0.187
732.3	53.749	-0.62	-0.215	0	0	0	6.891	7.078	-0.187
732.4	53.693	-0.6	-0.201	0	0	0	6.891	7.078	-0.187
732.5	53.637	-0.595	-1.141	0	0	0	6.891	7.078	-0.187

732.6	53.575	-0.613	-1.028	0	0	0	6.891	7.078	-0.187
732.7	53.519	-0.6	-0.427	0	0	0	6.891	7.078	-0.187
732.8	53.463	-0.583	-0.396	0	0	0	6.891	7.078	-0.187
732.9	53.407	-0.593	-1.596	0	0	0	6.891	7.078	-0.187
733	53.351	-0.613	-0.258	0	0	0	6.891	7.078	-0.187
733.1	53.289	-0.62	-0.166	0	0	0	6.891	7.078	-0.187
733.2	53.239	-0.623	-0.381	0	0	0	6.891	7.078	-0.187
733.3	53.177	-0.613	-0.544	0	0	0	6.891	7.078	-0.187
733.4	53.121	-0.593	-0.41	0	0	0	6.891	7.078	-0.187
733.5	53.065	-0.593	-1.194	0	0	0	6.891	7.078	-0.187
733.6	53.009	-0.598	-0.816	0	0.7	0	6.891	7.078	-0.187
733.7	52.953	-0.608	-0.424	0	2.17	0	6.891	7.078	-0.187
733.8	52.904	-0.61	-0.48	0	2.67	0	6.891	7.078	-0.187
733.9	52.854	-0.618	-0.657	0	2.94	0	6.891	7.078	-0.187
734	52.804	-0.615	-0.544	0	4.27	0	6.891	7.078	-0.187
734.1	52.754	-0.618	-0.629	0	5.41	0	6.891	7.078	-0.187
734.2	52.705	-0.618	-0.992	0	5.47	0	6.892	7.078	-0.187
734.3	52.661	-0.62	-0.802	0	5.46	0	6.892	7.078	-0.187
734.4	52.618	-0.65	-0.872	0	5.46	0	6.892	7.079	-0.187
734.5	52.574	-0.65	-0.328	0	5.07	0	6.892	7.079	-0.187
734.6	52.518	-0.608	-0.385	0	4.77	0	6.892	7.079	-0.187
734.7	52.475	-0.61	-1.211	0	4.77	0	6.892	7.079	-0.187
734.8	52.425	-0.615	-1.208	0	4.77	0	6.892	7.079	-0.187
734.9	52.382	-0.605	-0.215	0	4.76	0	6.893	7.079	-0.187
735	52.338	-0.605	-1.338	0	4.88	0	6.893	7.079	-0.187
735.1	52.288	-0.6	-0.703	0	4.46	0	6.893	7.079	-0.187
735.2	52.239	-0.605	-1.194	0	3.43	0	6.893	7.08	-0.187
735.3	52.195	-0.605	-0.297	0	1.86	0	6.893	7.08	-0.187
735.4	52.139	-0.598	-0.586	0	0.53	0	6.893	7.08	-0.187
735.5	52.09	-0.608	-0.901	0	0	0	6.893	7.08	-0.187
735.6	52.034	-0.62	-0.498	0	0	0	6.893	7.08	-0.187
735.7	51.978	-0.605	-0.184	0	0	0	6.893	7.08	-0.187
735.8	51.922	-0.6	-0.982	0	0	0	6.893	7.08	-0.187
735.9	51.866	-0.595	-1.158	0	0	0	6.893	7.08	-0.187
736	51.81	-0.585	-0.512	0	0	0	6.893	7.08	-0.187
736.1	51.748	-0.585	-0.897	0	0	0	6.893	7.08	-0.187
736.2	51.704	-0.59	-0.999	0	0	0	6.893	7.08	-0.187
736.3	51.648	-0.613	-0.876	0	0	0	6.893	7.08	-0.187
736.4	51.592	-0.618	-0.381	0	0	0	6.893	7.08	-0.187
736.5	51.537	-0.618	-0.053	0	0	0	6.893	7.08	-0.187
736.6	51.487	-0.59	-1.028	0	0	0	6.893	7.08	-0.187
736.7	51.431	-0.593	-0.872	0	0	0	6.893	7.08	-0.187
736.8	51.381	-0.603	-0.703	0	0	0	6.893	7.08	-0.187
736.9	51.319	-0.615	-0.544	0	0	0	6.893	7.08	-0.187
737	51.269	-0.62	-0.124	0	0	0	6.893	7.08	-0.187
737.1	51.213	-0.62	-0.788	0	0	0	6.893	7.08	-0.187
737.2	51.157	-0.615	-0.872	0	0	0	6.893	7.08	-0.187

737.3	51.114	-0.61	-0.763	0	0	0	6.893	7.08	-0.187
737.4	51.058	-0.615	-0.869	0	0	0	6.893	7.08	-0.187
737.5	51.002	-0.615	-0.703	0	0	0	6.893	7.08	-0.187
737.6	50.946	-0.6	-0.583	0	0	0	6.893	7.08	-0.187
737.7	50.897	-0.598	-0.749	0	0	0	6.893	7.08	-0.187
737.8	50.841	-0.6	-0.749	0	0	0	6.893	7.08	-0.187
737.9	50.785	-0.62	-0.886	0	0	0	6.893	7.08	-0.187
738	50.729	-0.625	-0.17	0	0	0	6.893	7.08	-0.187
738.1	50.667	-0.63	-0.396	0	-4.63	0	6.893	7.08	-0.187
738.2	50.592	-0.615	-0.586	0	-10.97	0	6.893	7.08	-0.187
738.3	50.505	-0.615	-0.953	0	-16.54	0	6.892	7.08	-0.188
738.4	50.406	-0.62	-0.968	0	-17.45	0	6.892	7.08	-0.188
738.5	50.306	-0.605	-0.226	0	-17.28	0	6.891	7.08	-0.188
738.6	50.213	-0.605	-0.706	0	-18.95	0	6.891	7.08	-0.189
738.7	50.107	-0.608	-0.897	0	-21.24	0	6.89	7.08	-0.19
738.8	50.002	-0.623	-0.466	0	-24.45	0	6.889	7.08	-0.19
738.9	49.884	-0.62	-0.558	0	-27.17	0	6.889	7.08	-0.191
739	49.759	-0.595	0.042	0	-29.44	0	6.888	7.08	-0.192
739.1	49.635	-0.598	-1.338	0	-29.81	0	6.887	7.08	-0.193
739.2	49.511	-0.615	-0.703	0	-29.6	0	6.886	7.08	-0.194
739.3	49.387	-0.618	0.085	0	-24.79	0	6.885	7.08	-0.194
739.4	49.281	-0.605	-0.028	0	-19.02	0	6.885	7.08	-0.195
739.5	49.188	-0.605	-0.72	0	-15.67	0	6.884	7.08	-0.195
739.6	49.101	-0.6	-0.703	0	-15.11	0	6.884	7.08	-0.196
739.7	49.014	-0.608	-0.512	0	-15.18	0	6.884	7.08	-0.196
739.8	48.921	-0.608	-0.512	0	-15.78	0	6.883	7.08	-0.196
739.9	48.834	-0.61	-0.544	0	-16.83	0	6.883	7.08	-0.197
740	48.734	-0.608	-0.703	0	-19.76	0	6.882	7.08	-0.197
740.1	48.629	-0.608	-0.558	0	-21.88	0	6.882	7.08	-0.198
740.2	48.523	-0.61	-0.869	0	-21.72	0	6.881	7.08	-0.199
740.3	48.423	-0.595	-0.219	0	-21.47	0	6.88	7.08	-0.199
740.4	48.312	-0.603	-0.802	0	-21.32	0	6.88	7.08	-0.2
740.5	48.212	-0.603	-0.544	0	-21.3	0	6.879	7.08	-0.2
740.6	48.1	-0.618	-0.572	0	-21.23	0	6.879	7.08	-0.201
740.7	48.001	-0.61	-0.703	0	-21.17	0	6.878	7.08	-0.202
740.8	47.895	-0.61	-0.703	0	-21.12	0	6.877	7.08	-0.202
740.9	47.796	-0.608	-0.872	0	-21.06	0	6.877	7.08	-0.203
741	47.684	-0.598	-0.586	0	-21.52	0	6.876	7.08	-0.203
741.1	47.572	-0.6	-0.703	0	-21.14	0	6.876	7.08	-0.204
741.2	47.479	-0.6	-0.643	0	-20.2	0	6.875	7.08	-0.205
741.3	47.38	-0.615	-0.788	0	-18.39	0	6.875	7.08	-0.205
741.4	47.286	-0.643	-0.586	0	-17.44	0	6.874	7.08	-0.206
741.5	47.193	-0.64	-0.138	0	-17.01	0	6.874	7.08	-0.206
741.6	47.1	-0.613	-0.335	0	-16.98	0	6.873	7.08	-0.206
741.7	47.007	-0.598	-1.109	0	-16.91	0	6.873	7.08	-0.207
741.8	46.907	-0.6	-1.045	0	-16.91	0	6.872	7.08	-0.207
741.9	46.82	-0.603	-0.766	0	-16.86	0	6.872	7.08	-0.208

742	46.727	-0.61	-0.802	0	-16.82	0	6.871	7.08	-0.208
742.1	46.634	-0.605	-0.643	0	-16.83	0	6.871	7.08	-0.209
742.2	46.541	-0.605	-0.48	0	-16.72	0	6.87	7.08	-0.209
742.3	46.447	-0.618	-0.869	0	-17.26	0	6.87	7.08	-0.21
742.4	46.354	-0.608	-0.403	0	-18.73	0	6.869	7.08	-0.21
742.5	46.255	-0.608	-0.717	0	-19.22	0	6.869	7.08	-0.211
742.6	46.149	-0.613	-0.968	0	-19.24	0	6.868	7.08	-0.211
742.7	46.056	-0.623	-0.562	0	-19.15	0	6.868	7.08	-0.212
742.8	45.957	-0.623	-0.643	0	-19.13	0	6.867	7.08	-0.212
742.9	45.857	-0.62	-0.396	0	-19.17	0	6.867	7.08	-0.213
743	45.758	-0.608	-0.823	0	-20.08	0	6.866	7.08	-0.214
743.1	45.646	-0.603	-0.717	0	-21.2	0	6.866	7.08	-0.214
743.2	45.547	-0.6	-0.992	0	-22.1	0	6.865	7.08	-0.215
743.3	45.441	-0.603	-0.629	0	-22.64	0	6.864	7.08	-0.215
743.4	45.335	-0.615	-0.72	0	-24.32	0	6.864	7.08	-0.216
743.5	45.217	-0.615	-0.685	0	-29.01	0	6.863	7.08	-0.217
743.6	45.08	-0.635	-0.802	0	-34.64	0	6.862	7.08	-0.218
743.7	44.938	-0.62	-0.558	0	-38.77	0	6.861	7.08	-0.219
743.8	44.782	-0.605	-0.558	0	-40	0	6.86	7.08	-0.22
743.9	44.627	-0.613	-0.643	0	-39.94	0	6.859	7.08	-0.221
744	44.478	-0.62	-0.466	0	-41.6	0	6.857	7.08	-0.222
744.1	44.298	-0.62	-0.473	0	-45.74	0	6.856	7.08	-0.224
744.2	44.136	-0.6	-0.48	0	-53.87	0	6.855	7.08	-0.225
744.3	43.937	-0.593	-1.441	0	-63.67	0	6.853	7.08	-0.227
744.4	43.701	-0.593	-1.035	0	-73.65	0	6.851	7.08	-0.229
744.5	43.44	-0.6	-0.572	0	-81.28	0	6.849	7.08	-0.231
744.6	43.154	-0.61	-0.586	0	-84.21	0	6.846	7.08	-0.233
744.7	42.862	-0.615	-0.396	0	-84.7	0	6.844	7.08	-0.236
744.8	42.564	-0.62	-0.272	0	-84.02	0	6.842	7.08	-0.238
744.9	42.259	-0.608	-0.883	0	-83.34	0	6.839	7.08	-0.24
745	41.961	-0.608	-0.671	0	-82.92	0	6.837	7.08	-0.243
745.1	41.663	-0.623	-1.088	0	-84.18	0	6.835	7.08	-0.245
745.2	41.358	-0.62	-0.41	0	-88.48	0	6.832	7.08	-0.248
745.3	41.029	-0.615	-0.558	0	-92.74	0	6.83	7.08	-0.25
745.4	40.675	-0.625	-0.897	0	-93.94	0	6.827	7.08	-0.253
745.5	40.308	-0.625	-0.498	0	-93.36	0	6.824	7.08	-0.255
745.6	39.942	-0.63	-0.466	0	-83.37	0	6.822	7.08	-0.258
745.7	39.594	-0.638	-0.396	0	-67.1	0	6.82	7.08	-0.259
745.8	39.277	-0.643	-0.399	0	-66.31	0	6.818	7.08	-0.261
745.9	38.997	-0.638	-0.254	0	-67.29	0	6.816	7.08	-0.263
746	38.73	-0.63	-0.643	0	-67.54	0	6.815	7.08	-0.265
746.1	38.438	-0.643	-1.112	0	-67.49	0	6.813	7.08	-0.267
746.2	38.196	-0.643	-0.314	0	-67.46	0	6.811	7.08	-0.269
746.3	37.904	-0.64	-0.494	0	-67.69	0	6.809	7.08	-0.271
746.4	37.624	-0.628	-0.6	0	-68.11	0	6.807	7.08	-0.273
746.5	37.338	-0.628	-0.643	0	-73.64	0	6.805	7.08	-0.275
746.6	37.04	-0.615	-0.717	0	-79.24	0	6.803	7.08	-0.277

746.7	36.729	-0.615	-0.66	0	-80.11	0	6.801	7.08	-0.279
746.8	36.412	-0.618	-0.742	0	-81.63	0	6.798	7.08	-0.281
746.9	36.089	-0.605	-0.396	0	-85.19	0	6.796	7.08	-0.284
747	35.747	-0.608	-0.6	0	-85.19	0	6.794	7.08	-0.286
747.1	35.406	-0.613	-1.045	0	-83.54	0	6.791	7.08	-0.288
747.2	35.033	-0.605	-0.48	0	-79.76	0	6.789	7.08	-0.291
747.3	34.735	-0.603	-0.703	0	-70.91	0	6.787	7.08	-0.293
747.4	34.412	-0.618	-1.187	0	-61.64	0	6.785	7.08	-0.294
747.5	34.064	-0.623	-0.215	0	-62.76	0	6.784	7.08	-0.296
747.6	33.74	-0.6	-0.23	0	-67.71	0	6.782	7.08	-0.298
747.7	33.442	-0.608	-1.204	0	-68.71	0	6.78	7.08	-0.3
747.8	33.144	-0.613	-0.929	0	-64.78	0	6.778	7.08	-0.302
747.9	32.858	-0.608	-0.067	0	-59.34	0	6.776	7.08	-0.303
748	32.597	-0.61	-1.112	0	-58.59	0	6.775	7.08	-0.305
748.1	32.336	-0.608	-0.745	0	-58.19	0	6.773	7.08	-0.306
748.2	32.019	-0.598	-0.247	0	-60.25	0	6.771	7.08	-0.308
748.3	31.74	-0.595	-0.883	0	-68.62	0	6.77	7.08	-0.31
748.4	31.392	-0.615	-0.558	0	-76.65	0	6.767	7.08	-0.312
748.5	31.031	-0.615	-0.215	0	-78.18	0	6.765	7.08	-0.314
748.6	30.683	-0.625	-0.152	0	-73.15	0	6.763	7.08	-0.316
748.7	30.354	-0.618	-0.717	0	-71.5	0	6.761	7.08	-0.318
748.8	30.031	-0.615	-0.717	0	-70.54	0	6.759	7.08	-0.32
748.9	29.708	-0.62	-0.717	0	-67.93	0	6.757	7.08	-0.322
749	29.391	-0.615	-0.562	0	-59.16	0	6.756	7.08	-0.324
749.1	29.117	-0.603	-0.562	0	-55.66	0	6.754	7.08	-0.325
749.2	28.819	-0.593	-0.558	0	-54.32	0	6.753	7.08	-0.327
749.3	28.583	-0.605	-1.112	0	-52.62	0	6.751	7.08	-0.328
749.4	28.328	-0.63	-0.869	0	-52.06	0	6.75	7.08	-0.33
749.5	28.074	-0.63	-0.067	0	-51.49	0	6.748	7.08	-0.331
749.6	27.819	-0.628	-0.187	0	-51.67	0	6.747	7.08	-0.333
749.7	27.558	-0.62	-0.558	0	-54.19	0	6.745	7.08	-0.334
749.8	27.278	-0.613	-0.643	0	-57.49	0	6.744	7.08	-0.336
749.9	26.986	-0.62	-0.968	0	-58.39	0	6.742	7.08	-0.337
750	26.682	-0.633	-0.152	0	-57.78	0	6.741	7.08	-0.339
750.1	26.383	-0.638	-0.244	0	-56.31	0	6.739	7.08	-0.341
750.2	26.067	-0.628	-0.215	0	-50.79	0	6.738	7.08	-0.342
750.3	25.824	-0.605	-0.968	0	-47.09	0	6.736	7.08	-0.343
750.4	25.563	-0.598	-1.243	0	-45.27	0	6.735	7.08	-0.345
750.5	25.302	-0.6	-1.293	0	-44.64	0	6.734	7.08	-0.346
750.6	25.06	-0.6	-0.413	0	-44.11	0	6.733	7.08	-0.347
750.7	24.805	-0.62	-0.685	0	-43.63	0	6.731	7.08	-0.348
750.8	24.557	-0.628	-0.466	0	-43.15	0	6.73	7.08	-0.349
750.9	24.308	-0.62	-0.328	0	-42.54	0	6.729	7.08	-0.351
751	24.059	-0.62	-0.802	0	-42.03	0	6.728	7.08	-0.352
751.1	23.811	-0.613	-0.848	0	-40.54	0	6.727	7.08	-0.353
751.2	23.562	-0.61	-0.742	0	-36.21	0	6.726	7.08	-0.354
751.3	23.295	-0.633	-1.042	0	-32.84	0	6.725	7.08	-0.355

751.4	23.003	-0.63	-0.219	0	-30.65	0	6.724	7.08	-0.356
751.5	22.711	-0.63	-0.466	0	-26.17	0	6.723	7.08	-0.356
751.6	22.45	-0.635	-1.31	0	-21.84	0	6.723	7.08	-0.357
751.7	22.214	-0.655	-0.48	0	-33.42	0	6.722	7.08	-0.358
751.8	21.965	-0.66	-0.48	0	-35.03	0	6.721	7.08	-0.359
751.9	21.717	-0.615	-0.187	0	-35.41	0	6.72	7.08	-0.36
752	21.487	-0.595	-0.893	0	-35.15	0	6.719	7.08	-0.361
752.1	21.251	-0.613	-1.621	0	-35.27	0	6.718	7.08	-0.362
752.2	20.996	-0.618	-0.343	0	-36.88	0	6.717	7.08	-0.363
752.3	20.772	-0.618	-0.198	0	-36.88	0	6.716	7.08	-0.364
752.4	20.53	-0.625	-0.883	0	-36.84	0	6.715	7.08	-0.365
752.5	20.282	-0.625	-0.703	0	-36.49	0	6.714	7.08	-0.366
752.6	20.039	-0.593	-0.23	0	-35.9	0	6.713	7.08	-0.367
752.7	19.797	-0.595	-1.194	0	-35.46	0	6.712	7.08	-0.368
752.8	19.548	-0.62	-1.194	0	-34.89	0	6.711	7.08	-0.369
752.9	19.306	-0.628	-0.314	0	-34.4	0	6.71	7.08	-0.37
753	19.064	-0.625	-0.233	0	-33.81	0	6.709	7.08	-0.371
753.1	18.821	-0.623	-0.883	0	-32.22	0	6.708	7.08	-0.372
753.2	18.585	-0.603	-0.703	0	-27.83	0	6.707	7.08	-0.372
753.3	18.38	-0.61	-0.953	0	-25.24	0	6.706	7.08	-0.373
753.4	18.181	-0.63	-1.116	0	-23.79	0	6.706	7.08	-0.374
753.5	17.995	-0.63	-0.028	0	-22.34	0	6.705	7.08	-0.374
753.6	17.815	-0.625	-0.558	0	-21.39	0	6.705	7.08	-0.375
753.7	17.635	-0.615	-0.547	0	-21.32	0	6.704	7.08	-0.376
753.8	17.454	-0.608	-0.953	0	-22.43	0	6.703	7.08	-0.376
753.9	17.268	-0.608	-0.562	0	-23.92	0	6.703	7.08	-0.377
754	17.063	-0.608	-0.759	0	-24.5	0	6.702	7.08	-0.378
754.1	16.852	-0.603	-0.671	0	-26.28	0	6.701	7.08	-0.378
754.2	16.622	-0.615	-0.992	0	-28.1	0	6.701	7.08	-0.379
754.3	16.373	-0.63	-0.996	0	-28.52	0	6.7	7.08	-0.38
754.4	16.131	-0.64	-0.138	0	-28.36	0	6.699	7.08	-0.381
754.5	15.876	-0.64	-0.399	0	-28.42	0	6.698	7.08	-0.381
754.6	15.609	-0.633	-0.706	0	-28.2	0	6.697	7.08	-0.382
754.7	15.354	-0.62	-0.953	0	-27.63	0	6.697	7.08	-0.383
754.8	15.087	-0.613	-0.869	0	-25.88	0	6.696	7.08	-0.384
754.9	14.832	-0.603	-0.872	0	-24.51	0	6.695	7.08	-0.384
755	14.59	-0.61	-0.643	0	-23.56	0	6.695	7.08	-0.385
755.1	14.354	-0.618	-1.356	0	-22.91	0	6.694	7.08	-0.386
755.2	14.105	-0.595	-0.318	0	-22.35	0	6.693	7.08	-0.386
755.3	13.875	-0.585	-1.293	0	-21.9	0	6.693	7.08	-0.387
755.4	13.608	-0.615	-1.338	0	-21.36	0	6.692	7.08	-0.388
755.5	13.384	-0.615	-0.396	0	-20.88	0	6.691	7.08	-0.388
755.6	13.148	-0.638	0.042	0	-21.02	0	6.691	7.08	-0.389
755.7	12.893	-0.625	-0.929	0	-20.39	0	6.69	7.08	-0.389
755.8	12.639	-0.613	-1.014	0	-17.84	0	6.69	7.08	-0.39
755.9	12.353	-0.608	-0.717	0	-15.92	0	6.689	7.08	-0.39
756	12.079	-0.623	-0.802	0	-14.45	0	6.689	7.08	-0.391

756.1	11.769	-0.62	-0.466	0	-12.5	0	6.689	7.08	-0.391
756.2	11.502	-0.618	-0.466	0	-7.72	0	6.688	7.08	-0.391
756.3	11.222	-0.638	-1.158	0	-8.32	0	6.688	7.08	-0.391
756.4	10.998	-0.635	-0.48	0	-15.3	0	6.688	7.08	-0.392
756.5	10.762	-0.615	-0.095	0	-15.09	0	6.687	7.08	-0.392
756.6	10.526	-0.615	-1.254	0	-15.9	0	6.687	7.08	-0.393
756.7	10.284	-0.613	-1.052	0	-16.92	0	6.686	7.08	-0.393
756.8	10.029	-0.6	-0.703	0	-17.58	0	6.686	7.08	-0.394
756.9	9.756	-0.61	-0.957	0	-17.86	0	6.685	7.08	-0.394
757	9.476	-0.625	-0.788	0	-17.8	0	6.685	7.08	-0.395
757.1	9.19	-0.618	-0.215	0	-17.7	0	6.684	7.08	-0.395
757.2	8.898	-0.608	-0.396	0	-17.03	0	6.684	7.08	-0.396
757.3	8.606	-0.618	-1.028	0	-15.56	0	6.684	7.08	-0.396
757.4	8.32	-0.623	-0.788	0	-14.13	0	6.683	7.08	-0.396
757.5	8.059	-0.623	-0.396	0	-12.79	0	6.683	7.08	-0.397
757.6	7.804	-0.605	-0.706	0	-11.56	0	6.683	7.08	-0.397
757.7	7.556	-0.61	-0.381	0	-10.4	0	6.682	7.08	-0.397
757.8	7.307	-0.6	-0.297	0	-9.27	0	6.682	7.08	-0.398
757.9	7.053	-0.59	-0.703	0	-8.21	0	6.682	7.08	-0.398
758	6.785	-0.6	-0.897	0	-7.07	0	6.682	7.08	-0.398
758.1	6.5	-0.61	-0.41	0	-6.03	0	6.681	7.08	-0.398
758.2	6.201	-0.623	-0.466	0	-4.93	0	6.681	7.08	-0.398
758.3	5.915	-0.62	-0.657	0	-3.83	0	6.681	7.08	-0.398
758.4	5.648	-0.613	-0.657	0	-3.05	0	6.681	7.08	-0.399
758.5	5.394	-0.613	-0.953	0	-2.35	0	6.681	7.08	-0.399
758.6	5.151	-0.628	-0.703	0	-1.8	0	6.681	7.08	-0.399
758.7	4.915	-0.62	-0.629	0	-1.28	0	6.681	7.08	-0.399
758.8	4.685	-0.613	-0.629	0	-0.94	0	6.681	7.08	-0.399
758.9	4.449	-0.613	-1.112	0	-0.53	0	6.681	7.08	-0.399
759	4.207	-0.613	-0.544	0	0	0	6.681	7.08	-0.399
759.1	3.983	-0.608	-0.788	0	0	0	6.681	7.08	-0.399
759.2	3.747	-0.605	-1.141	0	0	0	6.681	7.08	-0.399
759.3	3.554	-0.605	-0.869	0	0.54	0	6.681	7.08	-0.399
759.4	3.349	-0.603	-0.802	0	0.61	0	6.681	7.08	-0.399
759.5	3.144	-0.62	-0.953	0	0.64	0	6.681	7.08	-0.399
759.6	2.945	-0.628	-0.629	0	0.65	0	6.681	7.08	-0.399
759.7	2.74	-0.618	-0.141	0	0.66	0	6.681	7.08	-0.399
759.8	2.541	-0.615	-0.773	0	0.68	0	6.681	7.08	-0.399
759.9	2.355	-0.615	-1.028	0	0.69	0	6.681	7.08	-0.399
760	2.175	-0.608	-0.544	0	0.66	0	6.681	7.08	-0.399
760.1	1.995	-0.6	-0.717	0	0.65	0	6.681	7.08	-0.399
760.2	1.79	-0.613	-1.197	0	0.66	0	6.681	7.08	-0.399
760.3	1.616	-0.635	-0.569	0	0.74	0	6.681	7.08	-0.399
760.4	1.423	-0.638	-0.124	0	0.84	0	6.681	7.08	-0.399
760.5	1.255	-0.638	-0.353	0	0.92	0	6.681	7.08	-0.399
760.6	1.125	-0.618	-0.953	0	0.96	0	6.681	7.08	-0.399
760.7	1.038	-0.623	-0.466	0	1.08	0	6.681	7.08	-0.399

760.8	0.988	-0.62	-0.385	0	1.76	0	6.681	7.08	-0.399
760.9	0.963	-0.618	-0.629	0	2.58	0	6.681	7.08	-0.399
761	0.957	-0.61	-0.629	0	2.22	0	6.681	7.08	-0.399
761.1	0.944	-0.6	-0.943	0	1.91	0	6.681	7.08	-0.399
761.2	0.926	-0.598	-0.939	0	1.85	0	6.681	7.08	-0.399
761.3	0.907	-0.615	-1.13	0	1.92	0	6.682	7.08	-0.399
761.4	0.876	-0.63	-0.3	0	1.67	0	6.682	7.08	-0.399
761.5	0.789	-0.63	-0.367	0	1.39	0	6.682	7.08	-0.399
761.6	0.659	-0.64	-0.773	0	1.32	0	6.682	7.08	-0.399
761.7	0.516	-0.655	-0.802	0	1.32	0	6.682	7.08	-0.399
761.8	0.367	-0.635	-0.773	0	1.3	0	6.682	7.08	-0.399
761.9	0.242	-0.608	-0.611	0	1.31	0	6.682	7.081	-0.399
762	0.168	-0.605	-1.356	0	1.35	0	6.682	7.081	-0.399
762.1	0.112	-0.608	-0.996	0	1.27	0	6.682	7.081	-0.399
762.2	0	-0.608	-0.452	0	1.24	0	6.682	7.081	-0.399
762.3	0	-0.608	-0.611	0	1.2	0	6.682	7.081	-0.399
762.4	0	-0.61	-0.572	0	1.19	0	6.682	7.081	-0.399
762.5	0	-0.625	-0.689	0	1.15	0	6.682	7.081	-0.399
762.6	0	-0.635	-0.671	0	1.14	0	6.682	7.081	-0.399
762.7	0	-0.63	-0.54	0	1.12	0	6.682	7.081	-0.399
762.8	0	-0.615	-0.869	0	1.13	0	6.682	7.081	-0.399
762.9	0	-0.62	-1.042	0	1.1	0	6.682	7.081	-0.399
763	0	-0.633	-1.045	0	1.09	0	6.682	7.081	-0.399
763.1	0	-0.62	-0.286	0	1.1	0	6.682	7.081	-0.399
763.2	0	-0.608	-0.939	0	1.09	0	6.682	7.081	-0.399
763.3	0	-0.62	-1.264	0	1.09	0	6.682	7.081	-0.399
763.4	0	-0.633	-0.657	0	1.09	0	6.682	7.081	-0.399
763.5	0	-0.633	-0.053	0	1.1	0	6.682	7.081	-0.399
763.6	0	-0.6	-0.321	0	1.11	0	6.682	7.081	-0.399
763.7	0	-0.598	-0.999	0	1.11	0	6.682	7.081	-0.399
763.8	0	-0.608	-0.999	0	1.1	0	6.682	7.081	-0.399
763.9	0	-0.61	-0.321	0	1.09	0	6.682	7.081	-0.399
764	0	-0.605	-0.689	0	1.09	0	6.682	7.081	-0.399
764.1	0	-0.6	-0.689	0	1.1	0	6.682	7.081	-0.399
764.2	0	-0.618	-1.098	0	1.11	0	6.682	7.081	-0.399
764.3	0	-0.623	-0.494	0	1.1	0	6.682	7.081	-0.399
764.4	0	-0.635	-0.187	0	1.1	0	6.683	7.081	-0.399
764.5	0	-0.635	-0.526	0	1.1	0	6.683	7.081	-0.399
764.6	0	-0.613	0.173	0	1.1	0	6.683	7.081	-0.399
764.7	0	-0.593	-1.356	0	1	0	6.683	7.081	-0.399
764.8	0	-0.615	-1.356	0	1.07	0	6.683	7.081	-0.399
764.9	0	-0.633	-0.526	0	1.28	0	6.683	7.081	-0.399
765	0	-0.633	0.272	0	1.46	0	6.683	7.081	-0.399
765.05	0	-0.633	-0.717	0	1.34	0	6.683	7.082	-0.399
765.05	0	-0.613	-0.367	0	1.06	0	6.683	7.082	-0.399
765.05	0	-0.608	-1.01	0	1.07	0	6.683	7.082	-0.399
765.05	0	-0.62	-1.059	0	1.07	0	6.683	7.082	-0.399

0	0	-0.608	0.004	0	0	0	0	0	0
0	0	-0.608	0.004	0	1.48	0	0	0	0
0	0	-0.608	0.004	0	1.5	0	0	0	0
0	0	-0.63	0.254	0	1.5	0	0	0	0
0.1	0	-0.585	0.254	0	1.49	0	0	0	0
0.2	0	-0.6	0.244	0	1.49	0	0	0	0
0.3	0	-0.6	0.194	0	1.51	0	0	0	0
0.4	0	-0.61	0.72	0	1.5	0	0	0	0
0.5	0	-0.62	-0.667	0	1.49	0	0	0	0
0.6	0	-0.62	-1.014	0	1.5	0	0	0	0
0.7	0	-0.613	-0.357	0	1.4	0	0	0	0
0.8	0	-0.613	-0.706	0	1.4	0	0	0	0
0.9	0	-0.613	-0.526	0	1.39	0	0	0	0
1	0	-0.625	-0.911	0	1.28	0	0	0	0
1.1	0	-0.64	-0.526	0	1.23	0	0	0	0
1.2	0	-0.64	-0.484	0	1.21	0	0.001	0.001	0
1.3	0	-0.603	-0.897	0	1.22	0	0.001	0.001	0
1.4	0	-0.603	-0.569	0	1.2	0	0.001	0.001	0
1.5	0	-0.603	-0.569	0	1.19	0	0.001	0.001	0
1.6	0	-0.64	-0.851	0	1.27	0	0.001	0.001	0
1.7	0	-0.64	-0.54	0	1.87	0	0.001	0.001	0
1.8	0	-0.638	-0.198	0	1.8	0	0.001	0.001	0
1.9	0	-0.605	-1.038	0	1.79	0	0.001	0.001	0
2	0	-0.598	-0.749	0	1.87	0	0.001	0.001	0
2.1	0	-0.598	-0.643	0	1.97	0	0.001	0.001	0
2.2	0	-0.615	-0.727	0	2.25	0	0.001	0.001	0
2.3	0	-0.6	-0.671	0	3.07	0	0.001	0.001	0
2.4	0	-0.6	-0.643	0	5.14	0	0.001	0.001	0
2.5	0	-0.703	-1.204	0	7.55	0	0.001	0.001	0
2.6	0.18	-0.66	-0.36	0	8.35	0	0.002	0.002	0
2.7	0.354	-0.66	-0.523	0	7.95	0	0.002	0.002	0
2.8	0.603	-0.745	-1.204	0	8.24	0	0.002	0.002	0
2.9	0.845	-0.685	-0.078	0	9.12	0	0.002	0.002	0
3	1.106	-0.685	-0.607	0	9.51	0	0.003	0.003	0
3.1	1.379	-0.62	-1.391	0	10.09	0	0.003	0.003	0
3.2	1.653	-0.685	-0.893	0	10.79	0	0.003	0.003	0
3.3	1.914	-0.685	-0.194	0	11.91	0	0.004	0.004	0
3.4	2.156	-0.623	-0.166	0	13.58	0	0.004	0.004	0
3.5	2.417	-0.595	-1.321	0	15.29	0	0.004	0.004	0
3.6	2.697	-0.595	-1.215	0	17.28	0	0.005	0.005	0
3.7	2.983	-0.62	-0.763	0	19.06	0	0.005	0.005	0
3.8	3.281	-0.668	-0.403	0	20.25	0	0.006	0.006	0
3.9	3.598	-0.668	-0.682	0	21.45	0	0.006	0.006	0
4	3.896	-0.655	-1.243	0	22.76	0	0.007	0.007	0
4.1	4.194	-0.663	-0.597	0	24.62	0	0.008	0.008	0
4.2	4.499	-0.663	-0.523	0	26.95	0	0.009	0.009	0
4.3	4.816	-0.665	-1.035	0	29.27	0	0.009	0.009	0

4.4	5.157	-0.678	-0.523	0	31.11	0	0.01	0.01	0
4.5	5.512	-0.678	-0.565	0	33.97	0	0.011	0.011	0
4.6	5.884	-0.675	-0.332	0	35.38	0	0.012	0.012	0
4.7	6.257	-0.675	-0.872	0	36.53	0	0.013	0.013	0
4.8	6.624	-0.65	-1.067	0	38.53	0	0.014	0.014	0
4.9	6.984	-0.793	-0.777	0	39.42	0	0.015	0.015	0
5	7.338	-0.785	-0.325	0	40.38	0	0.016	0.016	0
5.1	7.693	-0.785	-0.533	0	41.5	0	0.018	0.018	0
5.2	8.041	-0.633	-1.081	0	42.48	0	0.019	0.019	0
5.3	8.376	-0.608	-1.134	0	43.4	0	0.02	0.02	0
5.4	8.73	-0.608	-0.682	0	44.45	0	0.021	0.021	0
5.5	9.06	-0.623	-0.742	0	47.18	0	0.023	0.023	0
5.6	9.389	-0.628	-0.431	0	50.11	0	0.024	0.024	0
5.7	9.718	-0.628	-0.795	0	54.62	0	0.025	0.025	0
5.8	10.054	-0.768	-0.946	0	61.64	0	0.027	0.027	0
5.9	10.389	-0.765	-0.36	0	70.07	0	0.029	0.029	0
6	10.681	-0.765	-0.876	0	74.28	0	0.031	0.031	0
6.1	10.998	-0.683	-1.201	0	55.97	0	0.033	0.033	0
6.2	11.352	-0.758	-1.303	0	60.45	0	0.034	0.034	0
6.3	11.713	-0.758	0.12	0	63.53	0	0.036	0.036	0
6.4	12.073	-0.643	-0.593	0	64.44	0	0.038	0.038	0
6.5	12.446	-0.648	-1.572	0	65.1	0	0.04	0.04	0
6.6	12.8	-0.648	-0.66	0	65.03	0	0.042	0.042	0
6.7	13.154	-0.698	-0.893	0	65.3	0	0.043	0.043	0
6.8	13.502	-0.665	-0.727	0	67.53	0	0.045	0.045	0
6.9	13.857	-0.665	-0.784	0	69.29	0	0.047	0.047	0
7	14.217	-0.725	-0.798	0	68.51	0	0.049	0.049	0
7.1	14.565	-0.753	-0.36	0	68.86	0	0.051	0.051	0
7.2	14.907	-0.753	-0.982	0	68.73	0	0.053	0.053	0
7.3	15.242	-0.76	-0.848	0	67.39	0	0.055	0.055	0
7.4	15.559	-0.703	-0.579	0	67.34	0	0.057	0.057	0
7.5	15.864	-0.703	-0.671	0	63.59	0	0.058	0.058	0
7.6	16.149	-0.735	-0.551	0	57.9	0	0.06	0.06	0
7.7	16.404	-0.735	-0.706	0	57.91	0	0.062	0.062	0
7.8	16.64	-0.688	-0.893	0	59.09	0	0.063	0.063	0
7.9	16.883	-0.728	-0.848	0	60.53	0	0.065	0.065	0
8	17.113	-0.68	-0.636	0	65.41	0	0.067	0.067	0
8.1	17.33	-0.68	-1.081	0	72.16	0	0.069	0.069	0
8.2	17.529	-0.768	-0.579	0	79.9	0	0.071	0.071	0
8.3	17.734	-0.733	-0.18	0	59.68	0	0.073	0.073	0
8.4	17.945	-0.733	-0.208	0	58.63	0	0.074	0.074	0
8.5	18.175	-0.688	-1.653	0	61.03	0	0.076	0.076	0
8.6	18.399	-0.653	-1.067	0	62.36	0	0.078	0.078	0
8.7	18.622	-0.653	-0.869	0	63.85	0	0.079	0.079	0
8.8	18.859	-0.623	-0.339	0	65.18	0	0.081	0.081	0
8.9	19.095	-0.613	-0.611	0	66.08	0	0.083	0.083	0
9	19.337	-0.613	-0.996	0	66.96	0	0.085	0.085	0

9.1	19.573	-0.61	-0.636	0	69.04	0	0.087	0.087	0
9.2	19.816	-0.61	-0.908	0	69.06	0	0.089	0.089	0
9.3	20.058	-0.61	-0.519	0	69.55	0	0.091	0.091	0
9.4	20.306	-0.603	-0.908	0	70.12	0	0.093	0.093	0
9.5	20.555	-0.663	-1.006	0	70.68	0	0.095	0.095	0
9.6	20.791	-0.663	-0.667	0	71.33	0	0.097	0.097	0
9.7	21.033	-0.71	-1.024	0	72.28	0	0.099	0.099	0
9.8	21.276	-0.76	-0.692	0	73.72	0	0.101	0.101	0
9.9	21.531	-0.76	-0.36	0	74.2	0	0.103	0.103	0
10	21.773	-0.733	-0.551	0	74.7	0	0.105	0.105	0
10.1	22.015	-0.68	-0.667	0	74.39	0	0.107	0.107	0
10.2	22.251	-0.68	-0.833	0	74.59	0	0.109	0.109	0
10.3	22.487	-0.673	-0.696	0	75.11	0	0.111	0.111	0
10.4	22.724	-0.693	-0.795	0	75.71	0	0.113	0.113	0
10.5	22.953	-0.693	-0.533	0	76.15	0	0.115	0.115	0
10.6	23.19	-0.608	-0.904	0	76.8	0	0.117	0.117	0
10.7	23.419	-0.608	-0.858	0	77.27	0	0.12	0.12	0
10.8	23.649	-0.608	-1.247	0	77.81	0	0.122	0.122	0
10.9	23.879	-0.588	-0.862	0	78.36	0	0.124	0.124	0
11	24.109	-0.61	-1.052	0	78.82	0	0.126	0.126	0
11.1	24.339	-0.61	-0.438	0	79.35	0	0.128	0.128	0
11.2	24.569	-0.6	-0.809	0	79.67	0	0.131	0.131	0
11.3	24.793	-0.595	-0.872	0	76.2	0	0.133	0.133	0
11.4	25.004	-0.595	-0.752	0	64.73	0	0.134	0.134	0
11.5	25.178	-0.62	-0.417	0	54.18	0	0.136	0.136	0
11.6	25.327	-0.618	-0.251	0	48.25	0	0.137	0.137	0
11.7	25.451	-0.618	-0.696	0	48.17	0	0.139	0.139	0
11.8	25.576	-0.608	-0.537	0	48.11	0	0.14	0.14	0
11.9	25.7	-0.62	-0.992	0	46.49	0	0.141	0.141	0
12	25.812	-0.62	-0.844	0	45.29	0	0.142	0.142	0
12.1	25.917	-0.603	-0.275	0	45.28	0	0.144	0.144	0
12.2	26.029	-0.67	-1.127	0	45.27	0	0.145	0.145	0
12.3	26.129	-0.67	-0.939	0	47.49	0	0.146	0.146	0
12.4	26.234	-0.66	-0.738	0	49.98	0	0.148	0.148	0
12.5	26.352	-0.643	-0.533	0	55.83	0	0.149	0.149	0
12.6	26.464	-0.643	-0.035	0	61.01	0	0.151	0.151	0
12.7	26.557	-0.623	-0.611	0	54.13	0	0.152	0.152	0
12.8	26.651	-0.608	-1.557	0	44.36	0	0.154	0.154	0
12.9	26.762	-0.608	-0.943	0	45.19	0	0.155	0.155	0
13	26.874	-0.623	0.124	0	46.21	0	0.156	0.156	0
13.1	26.98	-0.608	-0.692	0	46.59	0	0.158	0.158	0
13.2	27.086	-0.608	-1.158	0	47.67	0	0.159	0.159	0
13.3	27.191	-0.628	-0.579	0	48.75	0	0.16	0.16	0
13.4	27.303	-0.603	-0.463	0	48.9	0	0.162	0.162	0
13.5	27.415	-0.603	-1.462	0	50.11	0	0.163	0.163	0
13.6	27.527	-0.603	-1.038	0	49.9	0	0.164	0.164	0
13.7	27.639	-0.603	-0.579	0	51.09	0	0.166	0.166	0

13.8	27.757	-0.603	-0.576	0	51.69	0	0.167	0.167	0
13.9	27.875	-0.598	-0.879	0	51.85	0	0.169	0.169	0
14	27.993	-0.585	-0.519	0	51.85	0	0.17	0.17	0
14.1	28.111	-0.585	-0.918	0	51.89	0	0.172	0.172	0
14.2	28.229	-0.625	-0.812	0	51.89	0	0.173	0.173	0
14.3	28.341	-0.623	0.194	0	50.85	0	0.174	0.174	0
14.4	28.453	-0.623	-0.809	0	50.84	0	0.176	0.176	0
14.5	28.564	-0.615	-1.028	0	49.88	0	0.177	0.177	0
14.6	28.67	-0.623	-0.858	0	49.34	0	0.179	0.179	0
14.7	28.769	-0.623	-0.551	0	48.79	0	0.18	0.18	0
14.8	28.875	-0.605	-1.021	0	47.86	0	0.181	0.181	0
14.9	28.975	-0.615	-0.742	0	47.5	0	0.183	0.183	0
15	29.074	-0.615	-0.505	0	46.88	0	0.184	0.184	0
15.1	29.173	-0.618	-0.946	0	46.74	0	0.185	0.185	0
15.2	29.267	-0.625	-1.077	0	46.83	0	0.186	0.186	0
15.3	29.366	-0.625	-0.321	0	46.74	0	0.188	0.188	0
15.4	29.459	-0.608	-0.371	0	46.66	0	0.189	0.189	0
15.5	29.552	-0.603	-1.052	0	46.57	0	0.19	0.19	0
15.6	29.646	-0.603	-1.063	0	46.57	0	0.192	0.192	0
15.7	29.739	-0.603	-0.494	0	46.6	0	0.193	0.193	0
15.8	29.832	-0.635	-0.696	0	46.51	0	0.194	0.194	0
15.9	29.925	-0.635	-0.643	0	46.54	0	0.196	0.196	0
16	30.018	-0.595	-0.904	0	46.43	0	0.197	0.197	0
16.1	30.112	-0.608	-0.862	0	46.48	0	0.198	0.198	0
16.2	30.199	-0.608	-0.36	0	46.41	0	0.199	0.199	0
16.3	30.292	-0.648	-0.742	0	46.5	0	0.201	0.201	0
16.4	30.379	-0.643	-0.124	0	46.25	0	0.202	0.202	0
16.5	30.466	-0.643	-0.657	0	46.15	0	0.203	0.203	0
16.6	30.553	-0.633	-1.229	0	47.65	0	0.205	0.205	0
16.7	30.634	-0.633	-0.844	0	51.25	0	0.206	0.206	0
16.8	30.714	-0.688	-0.667	0	55.62	0	0.208	0.208	0
16.9	30.795	-0.758	-0.357	0	44.81	0	0.209	0.209	0
17	30.882	-0.735	-0.533	0	44.08	0	0.21	0.21	0
17.1	30.963	-0.735	-1.183	0	45.08	0	0.211	0.211	0
17.2	31.044	-0.653	-1.021	0	43.96	0	0.212	0.212	0
17.3	31.112	-0.738	-0.194	0	44.23	0	0.214	0.214	0
17.4	31.187	-0.738	-0.403	0	43.1	0	0.215	0.215	0
17.5	31.261	-0.745	-1.049	0	42.97	0	0.216	0.216	0
17.6	31.33	-0.643	-0.823	0	42.6	0	0.217	0.217	0
17.7	31.404	-0.643	-0.477	0	43.59	0	0.218	0.218	0
17.8	31.479	-0.653	-0.812	0	43.41	0	0.22	0.22	0
17.9	31.559	-0.678	-0.908	0	42.97	0	0.221	0.221	0
18	31.634	-0.678	-0.226	0	42.17	0	0.222	0.222	0
18.1	31.709	-0.598	-0.904	0	41.31	0	0.223	0.223	0
18.2	31.777	-0.588	-0.657	0	41.31	0	0.224	0.224	0
18.3	31.845	-0.588	-0.982	0	40.85	0	0.225	0.225	0
18.4	31.92	-0.623	-0.562	0	40.47	0	0.227	0.227	0

18.5	31.982	-0.625	-0.357	0	40.03	0	0.228	0.228	0
18.6	32.05	-0.625	-0.618	0	39.43	0	0.229	0.229	0
18.7	32.112	-0.64	-0.848	0	39.52	0	0.23	0.23	0
18.8	32.175	-0.695	-0.597	0	39.5	0	0.231	0.231	0
18.9	32.237	-0.695	-0.858	0	39.55	0	0.232	0.232	0
19	32.299	-0.73	-0.533	0	39.49	0	0.233	0.233	0
19.1	32.367	-0.738	-0.562	0	39.47	0	0.234	0.234	0
19.2	32.436	-0.738	-0.643	0	39.47	0	0.235	0.235	0
19.3	32.492	-0.64	-1.021	0	39.49	0	0.237	0.237	0
19.4	32.554	-0.618	-0.678	0	39.6	0	0.238	0.238	0
19.5	32.61	-0.618	-0.611	0	39.6	0	0.239	0.239	0
19.6	32.678	-0.603	-0.494	0	38.77	0	0.24	0.24	0
19.7	32.734	-0.603	-0.738	0	36.63	0	0.241	0.241	0
19.8	32.79	-0.595	-1.003	0	35.35	0	0.242	0.242	0
19.9	32.839	-0.598	-0.494	0	34	0	0.243	0.243	0
20	32.883	-0.618	-0.904	0	33.1	0	0.244	0.244	0
20.1	32.933	-0.618	-0.371	0	33.23	0	0.245	0.245	0
20.2	32.976	-0.598	-0.007	0	33.3	0	0.245	0.245	0
20.3	33.02	-0.648	-1.183	0	33.04	0	0.246	0.246	0
20.4	33.063	-0.648	-1.031	0	32.31	0	0.247	0.247	0
20.5	33.107	-0.773	-0.371	0	31.67	0	0.248	0.248	0
20.6	33.144	-0.725	-0.66	0	31.61	0	0.249	0.249	0
20.7	33.187	-0.725	-0.657	0	31.66	0	0.25	0.25	0
20.8	33.225	-0.595	-1.406	0	31.69	0	0.251	0.251	0
20.9	33.268	-0.62	-1.148	0	32.12	0	0.252	0.252	0
21	33.305	-0.62	-0.403	0	32.52	0	0.253	0.253	0
21.1	33.349	-0.61	-0.049	0	32.74	0	0.254	0.254	0
21.2	33.392	-0.615	-1.187	0	34.31	0	0.254	0.254	0
21.3	33.442	-0.615	-0.417	0	37.64	0	0.256	0.256	0
21.4	33.492	-0.583	-0.251	0	39.82	0	0.257	0.257	0
21.5	33.554	-0.663	-1.582	0	41.06	0	0.258	0.258	0
21.6	33.616	-0.663	-0.533	0	41.28	0	0.259	0.259	0
21.7	33.678	-0.765	0.049	0	41.18	0	0.26	0.26	0
21.8	33.74	-0.665	-0.611	0	41.22	0	0.261	0.261	0
21.9	33.803	-0.665	-0.696	0	41.22	0	0.262	0.262	0
22	33.865	-0.698	-0.611	0	41.29	0	0.264	0.264	0
22.1	33.927	-0.715	-0.438	0	41.17	0	0.265	0.265	0
22.2	33.989	-0.715	-0.533	0	40.25	0	0.266	0.266	0
22.3	34.045	-0.728	-0.452	0	38.25	0	0.267	0.267	0
22.4	34.101	-0.665	-1.063	0	35.72	0	0.268	0.268	0
22.5	34.144	-0.665	-0.901	0	34.47	0	0.269	0.269	0
22.6	34.194	-0.698	0.021	0	33.79	0	0.27	0.27	0
22.7	34.238	-0.698	-0.523	0	33.88	0	0.271	0.271	0
22.8	34.281	-0.735	-0.858	0	33.93	0	0.272	0.272	0
22.9	34.325	-0.705	-1.024	0	32.49	0	0.273	0.273	0
23	34.362	-0.693	-0.692	0	32.12	0	0.273	0.273	0
23.1	34.399	-0.693	-0.752	0	31.28	0	0.274	0.274	0

23.2	34.443	-0.683	-0.283	0	31.29	0	0.275	0.275	0
23.3	34.474	-0.628	-1.021	0	31.34	0	0.276	0.276	0
23.4	34.511	-0.628	-0.936	0	30.78	0	0.277	0.277	0
23.5	34.542	-0.61	-0.727	0	30.74	0	0.278	0.278	0
23.6	34.579	-0.63	-0.996	0	30.58	0	0.279	0.279	0
23.7	34.61	-0.63	-0.371	0	30.6	0	0.279	0.279	0
23.8	34.648	-0.66	-0.777	0	30.7	0	0.28	0.28	0
23.9	34.679	-0.643	-1.331	0	30.57	0	0.281	0.281	0
24	34.716	-0.643	-0.576	0	30.56	0	0.282	0.282	0
24.1	34.747	-0.628	-0.576	0	30.52	0	0.283	0.283	0
24.2	34.784	-0.63	-1.388	0	30.53	0	0.284	0.284	0
24.3	34.815	-0.63	-0.692	0	30.58	0	0.285	0.285	0
24.4	34.853	-0.613	-0.576	0	30.63	0	0.285	0.285	0
24.5	34.884	-0.618	-0.858	0	30.6	0	0.286	0.286	0
24.6	34.909	-0.618	-0.678	0	31.11	0	0.287	0.287	0
24.7	34.94	-0.623	-0.858	0	32.29	0	0.288	0.288	0
24.8	34.977	-0.683	-0.417	0	34.68	0	0.289	0.289	0
24.9	35.014	-0.683	-0.844	0	35.74	0	0.29	0.29	0
25	35.058	-0.615	-1.049	0	37.81	0	0.291	0.291	0
25.1	35.114	-0.615	-0.872	0	40.67	0	0.292	0.292	0
25.2	35.163	-0.615	-0.738	0	41.71	0	0.293	0.293	0
25.3	35.226	-0.61	-1.105	0	42.09	0	0.294	0.294	0
25.4	35.281	-0.625	-0.441	0	42.17	0	0.296	0.296	0
25.5	35.344	-0.625	-0.088	0	41.25	0	0.297	0.297	0
25.6	35.4	-0.585	-0.939	0	39.05	0	0.298	0.298	0
25.7	35.449	-0.585	-1.063	0	36.22	0	0.299	0.299	0
25.8	35.499	-0.588	-0.862	0	33.72	0	0.3	0.3	0
25.9	35.536	-0.64	-0.417	0	32.14	0	0.301	0.301	0
26	35.574	-0.673	-0.251	0	30.72	0	0.302	0.302	0
26.1	35.605	-0.673	-0.692	0	28.72	0	0.302	0.302	0
26.2	35.629	-0.633	-0.858	0	26.36	0	0.303	0.303	0
26.3	35.648	-0.648	-1.243	0	24.6	0	0.304	0.304	0
26.4	35.667	-0.648	-0.335	0	24.25	0	0.304	0.304	0
26.5	35.685	-0.65	-0.371	0	24.22	0	0.305	0.305	0
26.6	35.704	-0.618	-0.29	0	24.28	0	0.306	0.306	0
26.7	35.716	-0.618	-1.021	0	24.3	0	0.306	0.306	0
26.8	35.735	-0.6	-0.858	0	24.09	0	0.307	0.307	0
26.9	35.747	-0.605	-0.491	0	23	0	0.308	0.308	0
27	35.76	-0.605	-0.576	0	22.91	0	0.308	0.308	0
27.1	35.772	-0.615	-0.777	0	23.65	0	0.309	0.309	0
27.2	35.785	-0.628	-0.738	0	24.29	0	0.31	0.31	0
27.3	35.797	-0.628	-0.251	0	24.71	0	0.31	0.31	0
27.4	35.81	-0.59	-0.494	0	20.16	0	0.311	0.311	0
27.5	35.816	-0.595	-1.021	0	14.01	0	0.311	0.311	0
27.6	35.797	-0.595	-0.65	0	7.03	0	0.312	0.312	0
27.7	35.779	-0.64	-0.138	0	4.01	0	0.312	0.312	0
27.8	35.741	-0.665	0.109	0	2.24	0	0.312	0.312	0

27.9	35.698	-0.665	-0.509	0	1.12	0	0.312	0.312	0
28	35.66	-0.63	-1.194	0	0	0	0.312	0.312	0
28.1	35.617	-0.643	-0.908	0	0	0	0.312	0.312	0
28.2	35.574	-0.643	-0.738	0	0	0	0.312	0.312	0
28.3	35.536	-0.62	-0.162	0	-0.94	0	0.312	0.312	0
28.4	35.493	-0.605	-0.872	0	-2.85	0	0.312	0.312	0
28.5	35.443	-0.605	-1.204	0	-1.93	0	0.312	0.312	0
28.6	35.4	-0.673	-0.692	0	-1.5	0	0.312	0.312	0
28.7	35.356	-0.673	-0.205	0	-1.12	0	0.312	0.312	0
28.8	35.313	-0.62	-1.021	0	-0.79	0	0.312	0.312	0
28.9	35.269	-0.69	-1.021	0	0	0	0.312	0.312	0
29	35.226	-0.758	-0.06	0	0.53	0	0.312	0.312	0
29.1	35.182	-0.758	-0.205	0	0	0	0.312	0.312	0
29.2	35.145	-0.615	-1.024	0	0	0	0.312	0.312	0
29.3	35.101	-0.68	-1.021	0	0.52	0	0.312	0.312	0
29.4	35.058	-0.68	-0.576	0	0.52	0	0.312	0.312	0
29.5	35.02	-0.743	-0.904	0	0.52	0	0.312	0.312	0
29.6	34.983	-0.705	-0.667	0	0.52	0	0.312	0.312	0
29.7	34.94	-0.705	-0.371	0	0.51	0	0.312	0.312	0
29.8	34.896	-0.628	-1.183	0	0.52	0	0.312	0.312	0
29.9	34.859	-0.668	-0.533	0	0.52	0	0.312	0.312	0
30	34.822	-0.668	-0.738	0	0.52	0	0.312	0.312	0
30.1	34.778	-0.703	-1.077	0	0.52	0	0.312	0.312	0
30.2	34.741	-0.745	-0.385	0	0.53	0	0.312	0.312	0
30.3	34.697	-0.745	-0.335	0	0.52	0	0.312	0.312	0
30.4	34.66	-0.715	-1.077	0	0.52	0	0.312	0.312	0
30.5	34.623	-0.69	-0.48	0	0.53	0	0.312	0.312	0
30.6	34.579	-0.69	-0.872	0	0.86	0	0.312	0.312	0
30.7	34.542	-0.678	-0.971	0	2.17	0	0.312	0.312	0
30.8	34.505	-0.765	-0.795	0	5.29	0	0.312	0.312	0
30.9	34.48	-0.765	-0.448	0	10.88	0	0.312	0.313	0
31	34.461	-0.665	-0.872	0	11.45	0	0.313	0.313	0
31.1	34.455	-0.613	-0.145	0	11.5	0	0.313	0.313	0
31.2	34.443	-0.613	-0.72	0	11.46	0	0.313	0.314	0
31.3	34.43	-0.668	-1.035	0	13.32	0	0.314	0.314	0
31.4	34.424	-0.74	-0.466	0	16.33	0	0.314	0.314	0
31.5	34.424	-0.74	-0.918	0	17.96	0	0.315	0.315	0
31.6	34.424	-0.623	-0.932	0	19.21	0	0.315	0.315	0
31.7	34.436	-0.623	-0.466	0	20.2	0	0.316	0.316	0
31.8	34.443	-0.613	-0.335	0	20.71	0	0.316	0.317	0
31.9	34.455	-0.723	-1.021	0	20.87	0	0.317	0.317	0
32	34.461	-0.76	-0.865	0	20.84	0	0.317	0.318	0
32.1	34.474	-0.76	-0.007	0	20.88	0	0.318	0.318	0
32.2	34.486	-0.585	-0.858	0	20.85	0	0.319	0.319	0
32.3	34.499	-0.6	-0.809	0	20.93	0	0.319	0.319	0
32.4	34.511	-0.6	-0.78	0	21.1	0	0.32	0.32	0
32.5	34.517	-0.698	-0.431	0	22.19	0	0.32	0.321	0

32.6	34.536	-0.653	-0.318	0	23.59	0	0.321	0.321	0
32.7	34.554	-0.653	-0.59	0	25.87	0	0.322	0.322	0
32.8	34.573	-0.713	-0.664	0	28.14	0	0.323	0.323	0
32.9	34.604	-0.655	-0.547	0	29.24	0	0.323	0.324	0
33	34.629	-0.655	-1.243	0	30.36	0	0.324	0.324	0
33.1	34.666	-0.708	-0.918	0	32.16	0	0.325	0.325	0
33.2	34.704	-0.71	-0.35	0	32.08	0	0.326	0.326	0
33.3	34.741	-0.71	-0.65	0	32.03	0	0.327	0.327	0
33.4	34.778	-0.755	-1.307	0	32.01	0	0.328	0.328	0
33.5	34.815	-0.73	-0.138	0	32.14	0	0.329	0.329	0
33.6	34.853	-0.73	-0.562	0	32.09	0	0.33	0.33	0
33.7	34.89	-0.738	-0.625	0	32.09	0	0.33	0.331	0
33.8	34.927	-0.723	-0.385	0	31.97	0	0.331	0.332	0
33.9	34.965	-0.723	-1.021	0	32.01	0	0.332	0.332	0
34	34.996	-0.718	-0.35	0	32.06	0	0.333	0.333	0
34.1	35.033	-0.76	-0.374	0	32.07	0	0.334	0.334	0
34.2	35.07	-0.76	-1.063	0	32.03	0	0.335	0.335	0
34.3	35.101	-0.745	-0.682	0	32.53	0	0.336	0.336	0
34.4	35.139	-0.765	-0.837	0	34.52	0	0.337	0.337	0
34.5	35.182	-0.765	-0.706	0	34.76	0	0.338	0.338	0
34.6	35.226	-0.668	-0.431	0	35.98	0	0.339	0.339	0
34.7	35.269	-0.668	-0.872	0	37.3	0	0.34	0.34	0
34.8	35.319	-0.698	-0.706	0	37.75	0	0.341	0.341	0
34.9	35.362	-0.775	-0.106	0	37.65	0	0.342	0.342	0
35	35.412	-0.72	-0.466	0	37.65	0	0.343	0.343	0
35.1	35.455	-0.72	-0.48	0	37.64	0	0.344	0.344	0
35.2	35.505	-0.623	-0.918	0	37.65	0	0.345	0.345	0
35.3	35.555	-0.63	-0.671	0	37.53	0	0.346	0.346	0
35.4	35.598	-0.63	-1.201	0	37.63	0	0.347	0.347	0
35.5	35.648	-0.753	-0.752	0	37.65	0	0.348	0.348	0
35.6	35.692	-0.67	-0.078	0	37.53	0	0.349	0.349	0
35.7	35.735	-0.67	-0.872	0	37.54	0	0.35	0.35	0
35.8	35.785	-0.64	-1.204	0	37.45	0	0.351	0.351	0
35.9	35.834	-0.665	0.064	0	35.62	0	0.352	0.352	0
36	35.872	-0.665	-0.332	0	32.85	0	0.353	0.353	0
36.1	35.909	-0.745	-0.275	0	29.61	0	0.354	0.354	0
36.2	35.94	-0.775	-1.201	0	28.67	0	0.355	0.355	0
36.3	35.965	-0.775	-0.886	0	28.71	0	0.356	0.356	0
36.4	35.99	-0.765	-0.685	0	28.55	0	0.356	0.357	0
36.5	36.015	-0.765	-0.431	0	27.6	0	0.357	0.357	0
36.6	36.04	-0.765	-0.516	0	26.34	0	0.358	0.358	0
36.7	36.058	-0.768	-0.706	0	26.22	0	0.359	0.359	0
36.8	36.077	-0.72	-0.809	0	25.97	0	0.359	0.36	0
36.9	36.095	-0.72	-0.59	0	25.87	0	0.36	0.36	0
37	36.114	-0.725	-1.021	0	25.72	0	0.361	0.361	0
37.1	36.133	-0.733	-0.777	0	25.77	0	0.361	0.362	0
37.2	36.151	-0.733	-0.918	0	25.8	0	0.362	0.362	0

37.3	36.176	-0.75	-0.643	0	25.83	0	0.363	0.363	0
37.4	36.189	-0.728	-0.021	0	26.56	0	0.364	0.364	0
37.5	36.214	-0.728	-1.063	0	27.08	0	0.364	0.365	0
37.6	36.232	-0.748	-1.162	0	27.25	0	0.365	0.365	0
37.7	36.257	-0.748	-0.47	0	27.24	0	0.366	0.366	0
37.8	36.276	-0.725	-0.791	0	27.73	0	0.367	0.367	0
37.9	36.301	-0.758	-1.229	0	28.1	0	0.367	0.368	0
38	36.325	-0.78	-0.756	0	28.19	0	0.368	0.368	0
38.1	36.344	-0.78	0.106	0	27.43	0	0.369	0.369	0
38.2	36.369	-0.733	-0.908	0	26.59	0	0.37	0.37	0
38.3	36.387	-0.705	-0.795	0	26.54	0	0.37	0.371	0
38.4	36.412	-0.705	-1.091	0	25.9	0	0.371	0.371	0
38.5	36.431	-0.735	-0.565	0	25.47	0	0.372	0.372	0
38.6	36.443	-0.675	-0.06	0	24.77	0	0.373	0.373	0
38.7	36.456	-0.675	-0.597	0	24.91	0	0.373	0.373	0
38.8	36.468	-0.673	-0.851	0	24.54	0	0.374	0.374	0
38.9	36.481	-0.59	-0.247	0	24.56	0	0.375	0.375	0
39	36.499	-0.59	-1.462	0	24.38	0	0.375	0.376	0
39.1	36.512	-0.66	-0.445	0	24.3	0	0.376	0.376	0
39.2	36.53	-0.598	-0.445	0	24.27	0	0.377	0.377	0
39.3	36.543	-0.598	-0.918	0	24.34	0	0.377	0.378	0
39.4	36.555	-0.64	-0.509	0	24.34	0	0.378	0.378	0
39.5	36.568	-0.64	-0.233	0	24.42	0	0.379	0.379	0
39.6	36.586	-0.64	-0.918	0	24.86	0	0.379	0.38	0
39.7	36.599	-0.69	-0.445	0	25.85	0	0.38	0.38	0
39.8	36.617	-0.705	0.064	0	26.75	0	0.381	0.381	0
39.9	36.636	-0.705	-0.886	0	26.61	0	0.382	0.382	0
40	36.655	-0.768	-0.265	0	27.35	0	0.382	0.383	0
40.1	36.673	-0.713	-0.565	0	27.3	0	0.383	0.383	0
40.2	36.698	-0.713	-1.077	0	27.38	0	0.384	0.384	0
40.3	36.717	-0.605	-1.162	0	27.12	0	0.385	0.385	0
40.4	36.742	-0.653	-0.452	0	26.55	0	0.385	0.386	0
40.5	36.76	-0.653	-0.795	0	26.08	0	0.386	0.386	0
40.6	36.779	-0.63	-0.65	0	25.75	0	0.387	0.387	0
40.7	36.798	-0.63	-1.335	0	24.96	0	0.387	0.388	0
40.8	36.81	-0.695	-0.162	0	24.9	0	0.388	0.388	0
40.9	36.829	-0.723	-0.117	0	24.86	0	0.389	0.389	0
41	36.841	-0.773	-0.547	0	24.89	0	0.39	0.39	0
41.1	36.86	-0.773	-0.484	0	24.92	0	0.39	0.39	0
41.2	36.872	-0.768	-0.399	0	24.3	0	0.391	0.391	0
41.3	36.885	-0.78	-1.137	0	23.97	0	0.392	0.392	0
41.4	36.897	-0.78	-0.946	0	23.44	0	0.392	0.392	0
41.5	36.909	-0.758	-0.445	0	22.94	0	0.393	0.393	0
41.6	36.922	-0.74	-0.886	0	22.88	0	0.393	0.394	0
41.7	36.928	-0.74	-1.232	0	22.99	0	0.394	0.394	0
41.8	36.941	-0.745	-0.837	0	21.81	0	0.395	0.395	0
41.9	36.953	-0.745	-0.766	0	20.11	0	0.395	0.396	0

42	36.953	-0.745	-0.59	0	17.93	0	0.396	0.396	0
42.1	36.953	-0.768	-0.766	0	17.61	0	0.396	0.397	0
42.2	36.953	-0.773	-0.265	0	17.21	0	0.397	0.397	0
42.3	36.953	-0.773	-0.074	0	16.82	0	0.397	0.397	0
42.4	36.947	-0.693	-1.317	0	16.87	0	0.398	0.398	0
42.5	36.947	-0.728	-0.604	0	16.79	0	0.398	0.398	0
42.6	36.941	-0.728	-0.823	0	16.9	0	0.399	0.399	0
42.7	36.941	-0.77	-0.279	0	16.36	0	0.399	0.399	0
42.8	36.934	-0.753	-0.335	0	16.42	0	0.4	0.4	0
42.9	36.928	-0.753	-0.925	0	16.2	0	0.4	0.4	0
43	36.928	-0.733	-0.519	0	15.64	0	0.4	0.401	0
43.1	36.922	-0.73	-0.766	0	16.12	0	0.401	0.401	0
43.2	36.916	-0.73	0.007	0	16.32	0	0.401	0.402	0
43.3	36.916	-0.72	-1.067	0	16.4	0	0.402	0.402	0
43.4	36.909	-0.76	-1.232	0	16.3	0	0.402	0.402	0
43.5	36.903	-0.76	-0.237	0	16.39	0	0.403	0.403	0
43.6	36.897	-0.715	-0.48	0	16.33	0	0.403	0.403	0
43.7	36.897	-0.715	-1.158	0	16.34	0	0.404	0.404	0
43.8	36.891	-0.708	-1.148	0	16.37	0	0.404	0.404	0
43.9	36.891	-0.798	-0.092	0	16.54	0	0.404	0.405	0
44	36.885	-0.765	0.12	0	16.98	0	0.405	0.405	0
44.1	36.885	-0.765	-1.232	0	17.44	0	0.405	0.406	0
44.2	36.885	-0.755	-1.172	0	17.55	0	0.406	0.406	0
44.3	36.878	-0.718	-0.208	0	17.78	0	0.406	0.407	0
44.4	36.878	-0.718	-0.766	0	17.99	0	0.407	0.407	0
44.5	36.878	-0.688	-0.646	0	17.94	0	0.407	0.408	0
44.6	36.878	-0.628	-0.399	0	17.98	0	0.408	0.408	0
44.7	36.878	-0.628	-0.699	0	17.96	0	0.408	0.409	0
44.8	36.878	-0.643	-0.42	0	17.96	0	0.409	0.409	0
44.9	36.878	-0.668	-0.576	0	17.98	0	0.409	0.41	0
45	36.878	-0.668	-1.215	0	17.95	0	0.41	0.41	0
45.1	36.878	-0.688	-0.78	0	17.99	0	0.41	0.411	0
45.2	36.878	-0.755	0.007	0	17.92	0	0.411	0.411	0
45.3	36.878	-0.755	-0.604	0	18.01	0	0.411	0.412	0
45.4	36.878	-0.75	-0.162	0	17.93	0	0.412	0.412	0
45.5	36.878	-0.73	-0.597	0	18.02	0	0.412	0.413	0
45.6	36.878	-0.73	-0.766	0	17.92	0	0.413	0.413	0
45.7	36.878	-0.745	-0.699	0	18.54	0	0.413	0.414	0
45.8	36.885	-0.753	-0.42	0	18.63	0	0.414	0.414	0
45.9	36.885	-0.753	-1.243	0	19.4	0	0.414	0.415	0
46	36.885	-0.763	-1.067	0	20.01	0	0.415	0.415	0
46.1	36.891	-0.763	-0.254	0	21.19	0	0.416	0.416	0
46.2	36.897	-0.763	-0.106	0	22.65	0	0.416	0.417	0
46.3	36.903	-0.763	-0.971	0	23.54	0	0.417	0.417	0
46.4	36.916	-0.75	-0.71	0	23.55	0	0.418	0.418	0
46.5	36.928	-0.75	-0.742	0	24.06	0	0.418	0.419	0
46.6	36.941	-0.745	-1.218	0	24.18	0	0.419	0.419	0

46.7	36.953	-0.745	-0.72	0	24.76	0	0.42	0.42	0
46.8	36.972	-0.695	-0.074	0	24.8	0	0.42	0.421	0
46.9	36.984	-0.758	-0.908	0	24.79	0	0.421	0.421	0
47	37.003	-0.763	-0.399	0	24.74	0	0.422	0.422	0
47.1	37.015	-0.763	-0.562	0	25.9	0	0.422	0.423	0
47.2	37.034	-0.743	-1.42	0	27.65	0	0.423	0.423	0
47.3	37.052	-0.763	-0.766	0	30.01	0	0.424	0.424	0
47.4	37.083	-0.763	-0.42	0	33.2	0	0.425	0.425	0
47.5	37.115	-0.703	-0.72	0	34.83	0	0.426	0.426	0
47.6	37.152	-0.74	-0.742	0	36.59	0	0.427	0.427	0
47.7	37.189	-0.74	-0.279	0	36.64	0	0.428	0.428	0
47.8	37.233	-0.755	-0.579	0	36.43	0	0.429	0.429	0
47.9	37.276	-0.768	-0.724	0	36.49	0	0.43	0.43	0
48	37.313	-0.768	-0.604	0	36.51	0	0.431	0.431	0
48.1	37.351	-0.723	-0.607	0	36.58	0	0.432	0.432	0
48.2	37.394	-0.743	-0.78	0	36.61	0	0.433	0.433	0
48.3	37.431	-0.743	-0.399	0	36.65	0	0.434	0.434	0
48.4	37.475	-0.778	-0.208	0	36.58	0	0.435	0.435	0
48.5	37.512	-0.785	-0.374	0	37.5	0	0.436	0.436	0
48.6	37.556	-0.785	-0.413	0	38.3	0	0.437	0.437	0
48.7	37.593	-0.79	0.049	0	39.55	0	0.438	0.438	0
48.8	37.643	-0.768	-1.487	0	40	0	0.439	0.44	0
48.9	37.686	-0.768	-0.696	0	41.34	0	0.44	0.441	0
49	37.736	-0.78	-0.399	0	43.43	0	0.442	0.442	0
49.1	37.792	-0.775	-0.562	0	45.7	0	0.443	0.443	0
49.2	37.848	-0.775	-0.756	0	47.1	0	0.444	0.445	0
49.3	37.91	-0.773	-0.579	0	47.96	0	0.446	0.446	0
49.4	37.972	-0.773	-0.78	0	48.77	0	0.447	0.447	0
49.5	38.034	-0.773	-0.551	0	49.54	0	0.448	0.449	0
49.6	38.102	-0.755	-0.862	0	50.56	0	0.45	0.45	0
49.7	38.165	-0.755	-0.537	0	50.48	0	0.451	0.451	0
49.8	38.233	-0.77	0.004	0	50.57	0	0.453	0.453	0
49.9	38.308	-0.745	-0.879	0	50.51	0	0.454	0.454	0
50	38.37	-0.705	-0.932	0	50.61	0	0.455	0.456	0
50.1	38.438	-0.705	-0.908	0	50.6	0	0.457	0.457	0
50.2	38.5	-0.708	-0.551	0	50.92	0	0.458	0.458	0
50.3	38.569	-0.74	-0.42	0	51.65	0	0.46	0.46	0
50.4	38.637	-0.74	-0.152	0	51.66	0	0.461	0.461	0
50.5	38.705	-0.735	-0.671	0	51.74	0	0.462	0.463	0
50.6	38.774	-0.675	-1.6	0	51.76	0	0.464	0.464	0
50.7	38.836	-0.675	-0.766	0	51.91	0	0.465	0.466	0
50.8	38.904	-0.765	-0.519	0	51.81	0	0.467	0.467	0
50.9	38.972	-0.76	-0.618	0	51.47	0	0.468	0.468	0
51	39.035	-0.76	-0.509	0	50.8	0	0.47	0.47	0
51.1	39.103	-0.76	-0.579	0	50.81	0	0.471	0.471	0
51.2	39.165	-0.72	-0.71	0	50.79	0	0.472	0.473	0
51.3	39.227	-0.72	-0.805	0	50.86	0	0.474	0.474	0

51.4	39.289	-0.765	-0.374	0	50.79	0	0.475	0.476	0
51.5	39.358	-0.753	-0.516	0	51.99	0	0.477	0.477	0
51.6	39.42	-0.753	-1.081	0	53.62	0	0.478	0.478	0
51.7	39.488	-0.715	-0.901	0	55.52	0	0.48	0.48	0
51.8	39.563	-0.705	-0.862	0	57.52	0	0.481	0.482	0
51.9	39.631	-0.705	-0.473	0	58.05	0	0.483	0.483	0
52	39.712	-0.768	-0.604	0	58	0	0.485	0.485	0
52.1	39.786	-0.765	-0.971	0	57.94	0	0.486	0.486	0
52.2	39.861	-0.765	-0.992	0	58.65	0	0.488	0.488	0
52.3	39.942	-0.76	-1.006	0	59.1	0	0.489	0.49	0
52.4	40.016	-0.758	-0.795	0	59	0	0.491	0.491	0
52.5	40.091	-0.758	-0.71	0	59.12	0	0.493	0.493	0
52.6	40.172	-0.75	-0.876	0	59.03	0	0.494	0.495	0
52.7	40.246	-0.75	-0.477	0	58.93	0	0.496	0.496	0
52.8	40.321	-0.725	-0.699	0	57.93	0	0.498	0.498	0
52.9	40.395	-0.735	-0.717	0	57.29	0	0.499	0.499	0
53	40.47	-0.773	-0.826	0	55.75	0	0.501	0.501	0
53.1	40.538	-0.773	-0.353	0	54.66	0	0.502	0.503	0
53.2	40.607	-0.725	-0.434	0	54.7	0	0.504	0.504	0
53.3	40.669	-0.728	-0.593	0	54.8	0	0.505	0.506	0
53.4	40.737	-0.728	-0.551	0	54.71	0	0.507	0.507	0
53.5	40.805	-0.735	-0.335	0	54.77	0	0.508	0.509	0
53.6	40.868	-0.658	-1.437	0	54.63	0	0.51	0.51	0
53.7	40.936	-0.658	-0.837	0	54.73	0	0.511	0.512	0
53.8	40.998	-0.765	0.106	0	54.64	0	0.513	0.513	0
53.9	41.066	-0.775	-0.735	0	54.71	0	0.514	0.515	0
54	41.135	-0.775	-1.165	0	54.66	0	0.516	0.516	0
54.1	41.197	-0.72	-0.547	0	54.66	0	0.517	0.518	0
54.2	41.259	-0.738	-0.371	0	54.62	0	0.519	0.519	0
54.3	41.327	-0.738	-0.876	0	55.73	0	0.521	0.521	0
54.4	41.39	-0.73	-0.501	0	56.78	0	0.522	0.522	0
54.5	41.458	-0.65	-1.067	0	57.19	0	0.524	0.524	0
54.6	41.526	-0.65	-1.257	0	57.76	0	0.525	0.526	0
54.7	41.601	-0.668	-0.576	0	57.69	0	0.527	0.527	0
54.8	41.669	-0.76	-0.279	0	58.99	0	0.529	0.529	0
54.9	41.744	-0.76	-1.031	0	61.47	0	0.53	0.531	0
55	41.812	-0.793	-0.579	0	64.39	0	0.532	0.532	0
55.1	41.893	-0.775	0.106	0	65.03	0	0.534	0.534	0
55.2	41.974	-0.775	-0.593	0	65.02	0	0.536	0.536	0
55.3	42.054	-0.658	-1.271	0	65.04	0	0.537	0.538	0
55.4	42.135	-0.705	-0.756	0	64.96	0	0.539	0.54	0
55.5	42.222	-0.705	-0.593	0	65.01	0	0.541	0.541	0
55.6	42.303	-0.75	-1.105	0	64.98	0	0.543	0.543	0
55.7	42.384	-0.75	-0.106	0	64.95	0	0.545	0.545	0
55.8	42.465	-0.775	-0.487	0	64.96	0	0.546	0.547	0
55.9	42.539	-0.763	-0.222	0	64.55	0	0.548	0.549	0
56	42.62	-0.723	-0.735	0	62.77	0	0.55	0.55	0

56.1	42.694	-0.723	-1.038	0	60.69	0	0.552	0.552	0
56.2	42.769	-0.758	-0.826	0	57.7	0	0.553	0.554	0
56.3	42.831	-0.743	-0.184	0	54.23	0	0.555	0.555	0
56.4	42.887	-0.743	-0.89	0	52.87	0	0.556	0.557	0
56.5	42.943	-0.75	-0.434	0	51.94	0	0.558	0.558	0
56.6	42.999	-0.768	-0.078	0	50.94	0	0.559	0.559	0
56.7	43.049	-0.768	-0.138	0	50.1	0	0.561	0.561	0
56.8	43.098	-0.755	-0.89	0	50.26	0	0.562	0.562	0
56.9	43.154	-0.753	-0.636	0	50.2	0	0.563	0.564	0
57	43.204	-0.753	-0.544	0	50.07	0	0.565	0.565	0
57.1	43.254	-0.713	-1.006	0	50.13	0	0.566	0.566	0
57.2	43.303	-0.755	-1.049	0	50.13	0	0.568	0.568	0
57.3	43.353	-0.755	-0.519	0	50.18	0	0.569	0.569	0
57.4	43.397	-0.795	-0.473	0	49.98	0	0.57	0.571	0
57.5	43.446	-0.775	0.166	0	50.05	0	0.572	0.572	0
57.6	43.496	-0.775	-0.576	0	50.09	0	0.573	0.573	0
57.7	43.546	-0.753	-1.985	0	50.1	0	0.574	0.575	0
57.8	43.595	-0.76	-0.625	0	50.05	0	0.576	0.576	0
57.9	43.645	-0.76	-0.191	0	50.09	0	0.577	0.578	0
58	43.695	-0.763	-1.006	0	49.72	0	0.579	0.579	0
58.1	43.738	-0.76	-0.922	0	47.89	0	0.58	0.58	0
58.2	43.782	-0.76	-0.551	0	45.81	0	0.581	0.581	0
58.3	43.825	-0.758	-1.063	0	45.33	0	0.582	0.583	0
58.4	43.863	-0.755	-0.293	0	45.22	0	0.584	0.584	0
58.5	43.906	-0.755	-0.501	0	45.25	0	0.585	0.585	0
58.6	43.937	-0.743	-0.996	0	44.9	0	0.586	0.587	0
58.7	43.981	-0.743	-0.862	0	44.24	0	0.587	0.588	0
58.8	44.012	-0.768	-0.106	0	42.74	0	0.589	0.589	0
58.9	44.049	-0.763	-0.106	0	40.39	0	0.59	0.59	0
59	44.08	-0.755	-1.081	0	38.16	0	0.591	0.591	0
59.1	44.105	-0.755	-1.105	0	37.43	0	0.592	0.592	0
59.2	44.13	-0.76	-0.434	0	37.49	0	0.593	0.593	0
59.3	44.155	-0.768	-0.551	0	37.45	0	0.594	0.594	0
59.4	44.179	-0.768	-0.922	0	36.81	0	0.595	0.595	0
59.5	44.198	-0.755	-0.283	0	36.59	0	0.596	0.596	0
59.6	44.223	-0.765	-1.247	0	36.64	0	0.597	0.597	0
59.7	44.248	-0.765	-0.222	0	37.01	0	0.598	0.598	0
59.8	44.266	-0.745	0.021	0	37.59	0	0.599	0.599	0
59.9	44.291	-0.773	-1.243	0	38.69	0	0.6	0.6	0
60	44.316	-0.773	-0.304	0	39.05	0	0.601	0.602	0
60.1	44.341	-0.765	0.265	0	39.04	0	0.602	0.603	0
60.2	44.366	-0.748	-1.165	0	39.07	0	0.603	0.604	0
60.3	44.397	-0.748	-1.342	0	39.06	0	0.605	0.605	0
60.4	44.422	-0.743	-0.742	0	39.01	0	0.606	0.606	0
60.5	44.447	-0.75	-0.565	0	38.68	0	0.607	0.607	0
60.6	44.472	-0.75	-0.59	0	38.02	0	0.608	0.608	0
60.7	44.496	-0.76	-0.487	0	37.19	0	0.609	0.609	0

60.8	44.521	-0.768	-0.643	0	37.26	0	0.61	0.61	0
60.9	44.546	-0.768	-0.445	0	36.71	0	0.611	0.611	0
61	44.571	-0.748	-1.734	0	36.45	0	0.612	0.612	0
61.1	44.59	-0.755	-0.611	0	36.5	0	0.613	0.613	0
61.2	44.608	-0.755	0.148	0	36.49	0	0.614	0.614	0
61.3	44.627	-0.76	-0.819	0	36.54	0	0.615	0.615	0
61.4	44.652	-0.763	-0.89	0	37.31	0	0.616	0.616	0
61.5	44.67	-0.763	-0.268	0	37.41	0	0.617	0.617	0
61.6	44.695	-0.77	-0.756	0	37.33	0	0.618	0.618	0
61.7	44.72	-0.77	-0.749	0	37.39	0	0.619	0.619	0
61.8	44.739	-0.8	0.134	0	36.72	0	0.62	0.62	0
61.9	44.764	-0.75	-0.795	0	36.63	0	0.621	0.621	0
62	44.782	-0.748	-1.72	0	35.58	0	0.622	0.622	0
62.1	44.807	-0.748	-0.593	0	34.91	0	0.623	0.623	0
62.2	44.82	-0.758	-0.551	0	34.88	0	0.624	0.624	0
62.3	44.838	-0.748	-0.922	0	34.96	0	0.625	0.625	0
62.4	44.857	-0.748	-0.448	0	34.92	0	0.626	0.626	0
62.5	44.875	-0.745	-0.551	0	34.89	0	0.627	0.627	0
62.6	44.894	-0.753	-0.222	0	34.75	0	0.628	0.628	0
62.7	44.913	-0.753	-0.71	0	34.76	0	0.629	0.629	0
62.8	44.925	-0.73	-0.537	0	34.78	0	0.63	0.63	0
62.9	44.944	-0.735	-0.304	0	34.79	0	0.631	0.631	0
63	44.962	-0.735	-0.59	0	35.07	0	0.632	0.632	0
63.1	44.981	-0.758	-0.89	0	35.69	0	0.633	0.633	0
63.2	45	-0.753	-0.756	0	35.74	0	0.634	0.634	0
63.3	45.018	-0.753	-0.622	0	35.74	0	0.635	0.635	0
63.4	45.037	-0.738	-1.052	0	35.72	0	0.636	0.636	0
63.5	45.056	-0.735	-0.537	0	35.79	0	0.637	0.637	0
63.6	45.074	-0.735	-0.795	0	35.71	0	0.638	0.638	0
63.7	45.093	-0.755	-0.434	0	36.34	0	0.639	0.639	0
63.8	45.112	-0.768	-0.434	0	36.33	0	0.64	0.64	0
63.9	45.13	-0.768	-0.625	0	36.45	0	0.641	0.641	0
64	45.149	-0.765	-0.237	0	36.36	0	0.642	0.642	0
64.1	45.167	-0.758	-1.095	0	36.46	0	0.643	0.643	0
64.2	45.186	-0.758	-0.876	0	36.38	0	0.644	0.644	0
64.3	45.211	-0.775	-0.191	0	37.28	0	0.645	0.645	0
64.4	45.23	-0.75	-0.403	0	37.3	0	0.646	0.646	0
64.5	45.254	-0.75	-0.936	0	37.42	0	0.647	0.647	0
64.6	45.273	-0.753	-1.081	0	37.21	0	0.648	0.648	0
64.7	45.292	-0.753	-0.551	0	37.82	0	0.649	0.649	0
64.8	45.317	-0.758	-0.413	0	38.02	0	0.65	0.65	0
64.9	45.341	-0.733	-0.72	0	38.08	0	0.651	0.651	0
65	45.36	-0.753	-0.699	0	38.05	0	0.652	0.652	0
65.1	45.385	-0.753	-0.879	0	38.12	0	0.653	0.653	0
65.2	45.404	-0.78	-0.819	0	38.08	0	0.654	0.654	0
65.3	45.428	-0.763	-0.388	0	38.15	0	0.655	0.656	0
65.4	45.447	-0.763	-0.851	0	37.9	0	0.656	0.657	0

65.5	45.472	-0.763	-1.204	0	38.01	0	0.657	0.658	0
65.6	45.491	-0.76	-0.434	0	39.18	0	0.658	0.659	0
65.7	45.515	-0.76	-0.448	0	41.18	0	0.66	0.66	0
65.8	45.54	-0.765	-0.78	0	41.72	0	0.661	0.661	0
65.9	45.571	-0.783	-0.505	0	41.78	0	0.662	0.662	0
66	45.596	-0.783	-0.268	0	41.79	0	0.663	0.663	0
66.1	45.627	-0.765	-0.48	0	41.75	0	0.664	0.665	0
66.2	45.658	-0.76	-0.837	0	40.86	0	0.665	0.666	0
66.3	45.683	-0.76	-1.247	0	40.93	0	0.667	0.667	0
66.4	45.708	-0.77	-0.463	0	40.91	0	0.668	0.668	0
66.5	45.733	-0.765	-0.593	0	41	0	0.669	0.669	0
66.6	45.764	-0.765	-0.876	0	40.96	0	0.67	0.67	0
66.7	45.789	-0.738	-0.593	0	41.04	0	0.671	0.671	0
66.8	45.814	-0.775	-0.551	0	41.02	0	0.672	0.673	0
66.9	45.839	-0.775	-0.756	0	40.97	0	0.673	0.674	0
67	45.863	-0.765	-0.434	0	40.91	0	0.675	0.675	0
67.1	45.888	-0.783	-0.576	0	40.94	0	0.676	0.676	0
67.2	45.913	-0.783	-0.509	0	40.97	0	0.677	0.677	0
67.3	45.944	-0.733	-1.038	0	40.8	0	0.678	0.678	0
67.4	45.969	-0.755	-0.685	0	40.86	0	0.679	0.679	0
67.5	45.994	-0.755	-0.837	0	40.82	0	0.68	0.68	0
67.6	46.019	-0.723	-0.533	0	40.87	0	0.681	0.682	0
67.7	46.044	-0.723	-0.304	0	40.89	0	0.682	0.683	0
67.8	46.068	-0.708	-0.922	0	40.88	0	0.684	0.684	0
67.9	46.093	-0.763	-0.851	0	40.74	0	0.685	0.685	0
68	46.124	-0.758	-0.434	0	40.7	0	0.686	0.686	0
68.1	46.149	-0.758	-0.463	0	40.77	0	0.687	0.687	0
68.2	46.174	-0.753	-0.802	0	40.87	0	0.688	0.688	0
68.3	46.199	-0.753	-0.699	0	40.94	0	0.689	0.69	0
68.4	46.224	-0.753	-0.388	0	40.92	0	0.69	0.691	0
68.5	46.249	-0.75	-0.837	0	40.99	0	0.692	0.692	0
68.6	46.274	-0.76	-0.42	0	41.01	0	0.693	0.693	0
68.7	46.298	-0.76	-0.537	0	41.02	0	0.694	0.694	0
68.8	46.323	-0.785	-0.381	0	40.29	0	0.695	0.695	0
68.9	46.348	-0.763	-0.222	0	39.94	0	0.696	0.696	0
69	46.373	-0.763	-0.901	0	39.99	0	0.697	0.697	0
69.1	46.398	-0.768	-0.922	0	39.97	0	0.698	0.699	0
69.2	46.416	-0.773	-0.42	0	40.04	0	0.699	0.7	0
69.3	46.441	-0.773	-0.388	0	39.98	0	0.7	0.701	0
69.4	46.466	-0.738	-1.204	0	40.11	0	0.702	0.702	0
69.5	46.485	-0.765	-0.756	0	40.01	0	0.703	0.703	0
69.6	46.51	-0.765	-0.388	0	39.69	0	0.704	0.704	0
69.7	46.534	-0.76	-0.904	0	38.92	0	0.705	0.705	0
69.8	46.553	-0.753	-0.618	0	39.02	0	0.706	0.706	0
69.9	46.578	-0.753	-0.494	0	39.07	0	0.707	0.707	0
70	46.597	-0.743	-0.17	0	39.08	0	0.708	0.708	0
70.1	46.615	-0.698	-1.271	0	39.12	0	0.709	0.71	0

70.2	46.64	-0.698	-1.271	0	39.14	0	0.71	0.711	0
70.3	46.659	-0.758	-0.35	0	39.11	0	0.711	0.712	0
70.4	46.677	-0.763	-0.388	0	38.26	0	0.712	0.713	0
70.5	46.696	-0.763	-0.696	0	36.94	0	0.714	0.714	0
70.6	46.715	-0.725	-0.593	0	35.55	0	0.714	0.715	0
70.7	46.727	-0.725	-0.915	0	35.07	0	0.715	0.716	0
70.8	46.746	-0.758	-0.374	0	35.07	0	0.716	0.717	0
70.9	46.752	-0.675	-0.092	0	35.09	0	0.717	0.718	0
71	46.771	-0.743	-1.215	0	34.6	0	0.718	0.719	0
71.1	46.783	-0.743	-0.795	0	34.19	0	0.719	0.72	0
71.2	46.795	-0.748	-0.092	0	34.19	0	0.72	0.721	0
71.3	46.802	-0.743	-0.756	0	33.57	0	0.721	0.721	0
71.4	46.814	-0.743	-1.353	0	33.55	0	0.722	0.722	0
71.5	46.827	-0.775	-0.696	0	33.35	0	0.723	0.723	0
71.6	46.839	-0.775	-0.208	0	33.38	0	0.724	0.724	0
71.7	46.851	-0.775	-0.434	0	33.38	0	0.725	0.725	0
71.8	46.858	-0.758	-0.35	0	33.35	0	0.726	0.726	0
71.9	46.87	-0.75	-0.777	0	33.39	0	0.727	0.727	0
72	46.882	-0.75	-0.95	0	33.33	0	0.728	0.728	0
72.1	46.889	-0.75	-0.124	0	33.4	0	0.729	0.729	0
72.2	46.901	-0.76	-0.579	0	32.75	0	0.73	0.73	0
72.3	46.907	-0.76	-1.091	0	32.52	0	0.73	0.731	0
72.4	46.92	-0.73	-0.166	0	32.48	0	0.731	0.732	0
72.5	46.926	-0.66	-1.038	0	31.93	0	0.732	0.732	0
72.6	46.932	-0.66	-0.664	0	31.87	0	0.733	0.733	0
72.7	46.945	-0.708	0.092	0	31.91	0	0.734	0.734	0
72.8	46.951	-0.74	-0.494	0	31.91	0	0.735	0.735	0
72.9	46.957	-0.74	-0.452	0	31.89	0	0.736	0.736	0
73	46.963	-0.773	-0.374	0	31.89	0	0.737	0.737	0
73.1	46.976	-0.768	-0.968	0	31.92	0	0.738	0.738	0
73.2	46.982	-0.768	-0.735	0	31.19	0	0.738	0.739	0
73.3	46.988	-0.755	-0.604	0	30.99	0	0.739	0.74	0
73.4	46.994	-0.76	-0.374	0	31	0	0.74	0.74	0
73.5	46.994	-0.76	-0.565	0	31.02	0	0.741	0.741	0
73.6	47.001	-0.75	-0.374	0	31.01	0	0.742	0.742	0
73.7	47.013	-0.75	-0.71	0	30.77	0	0.743	0.743	0
73.8	47.013	-0.775	-0.593	0	29.78	0	0.744	0.744	0
73.9	47.019	-0.75	-0.71	0	29.51	0	0.744	0.745	0
74	47.019	-0.74	-0.448	0	29.59	0	0.745	0.745	0
74.1	47.025	-0.74	-0.992	0	29.53	0	0.746	0.746	0
74.2	47.025	-0.72	-0.862	0	29.57	0	0.747	0.747	0
74.3	47.032	-0.728	-0.65	0	29.6	0	0.748	0.748	0
74.4	47.032	-0.728	-1.067	0	30.19	0	0.748	0.749	0
74.5	47.038	-0.755	-0.862	0	30.09	0	0.749	0.75	0
74.6	47.044	-0.718	-0.562	0	30.18	0	0.75	0.75	0
74.7	47.044	-0.718	-1.024	0	30.09	0	0.751	0.751	0
74.8	47.05	-0.758	-0.562	0	30.16	0	0.752	0.752	0

74.9	47.056	-0.765	-0.862	0	30.09	0	0.753	0.753	0
75	47.063	-0.765	-0.862	0	30.2	0	0.754	0.754	0
75.1	47.069	-0.768	-0.625	0	30.09	0	0.754	0.755	0
75.2	47.069	-0.758	-0.388	0	30.18	0	0.755	0.755	0
75.3	47.075	-0.758	-0.604	0	29.7	0	0.756	0.756	0
75.4	47.075	-0.73	-0.703	0	29.59	0	0.757	0.757	0
75.5	47.081	-0.728	-0.547	0	29.52	0	0.758	0.758	0
75.6	47.088	-0.728	-0.763	0	29.57	0	0.758	0.759	0
75.7	47.088	-0.783	-0.784	0	29.53	0	0.759	0.76	0
75.8	47.094	-0.77	-0.696	0	28.96	0	0.76	0.76	0
75.9	47.094	-0.77	-0.756	0	28.66	0	0.761	0.761	0
76	47.094	-0.775	-0.918	0	28.48	0	0.762	0.762	0
76.1	47.094	-0.788	-0.562	0	27.82	0	0.762	0.763	0
76.2	47.1	-0.788	-0.632	0	26.29	0	0.763	0.763	0
76.3	47.094	-0.745	-1.049	0	25.44	0	0.764	0.764	0
76.4	47.088	-0.743	-1.105	0	24.62	0	0.765	0.765	0
76.5	47.088	-0.743	-0.946	0	24.49	0	0.765	0.766	0
76.6	47.081	-0.775	-0.593	0	24.49	0	0.766	0.766	0
76.7	47.075	-0.775	-0.166	0	24.43	0	0.767	0.767	0
76.8	47.075	-0.763	-0.579	0	24.44	0	0.767	0.768	0
76.9	47.063	-0.663	-0.901	0	23.03	0	0.768	0.768	0
77	47.056	-0.695	-0.805	0	19.56	0	0.768	0.769	0
77.1	47.038	-0.695	-0.618	0	18.56	0	0.769	0.769	0
77.2	47.025	-0.778	-0.547	0	18.21	0	0.769	0.77	0
77.3	47.007	-0.743	-0.685	0	18.2	0	0.77	0.77	0
77.4	46.994	-0.743	-0.494	0	18.2	0	0.771	0.771	0
77.5	46.976	-0.733	-1.176	0	18.71	0	0.771	0.771	0
77.6	46.957	-0.768	-0.653	0	18.88	0	0.772	0.772	0
77.7	46.945	-0.768	-0.59	0	19.31	0	0.772	0.772	0
77.8	46.926	-0.763	-0.18	0	19.62	0	0.773	0.773	0
77.9	46.914	-0.783	-1.243	0	20.65	0	0.773	0.773	0
78	46.901	-0.783	-0.283	0	21.39	0	0.774	0.774	0
78.1	46.889	-0.735	0.095	0	21.67	0	0.774	0.775	0
78.2	46.882	-0.748	-0.791	0	21.71	0	0.775	0.775	0
78.3	46.87	-0.748	-0.996	0	22.26	0	0.776	0.776	0
78.4	46.858	-0.758	-0.837	0	22.21	0	0.776	0.777	0
78.5	46.851	-0.775	-0.932	0	22.22	0	0.777	0.777	0
78.6	46.839	-0.775	0.035	0	22.34	0	0.777	0.778	0
78.7	46.833	-0.77	-0.918	0	25.04	0	0.778	0.778	0
78.8	46.827	-0.77	-0.537	0	27.14	0	0.779	0.779	0
78.9	46.827	-0.77	-0.752	0	27.64	0	0.78	0.78	0
79	46.827	-0.77	-0.848	0	27.87	0	0.78	0.781	0
79.1	46.827	-0.763	-0.516	0	27.94	0	0.781	0.782	0
79.2	46.827	-0.763	-0.742	0	27.88	0	0.782	0.782	0
79.3	46.833	-0.798	-0.117	0	27.95	0	0.783	0.783	0
79.4	46.833	-0.768	-0.766	0	27.89	0	0.784	0.784	0
79.5	46.833	-0.768	-1.095	0	27.95	0	0.784	0.785	0

79.6	46.833	-0.758	-0.72	0	27.89	0	0.785	0.785	0
79.7	46.839	-0.758	-0.851	0	27.96	0	0.786	0.786	0
79.8	46.833	-0.74	-0.851	0	27.91	0	0.787	0.787	0
79.9	46.839	-0.73	-1.091	0	27.96	0	0.787	0.788	0
80	46.839	-0.733	-0.509	0	27.89	0	0.788	0.788	0
80.1	46.839	-0.733	-0.509	0	27.95	0	0.789	0.789	0
80.2	46.839	-0.785	-0.406	0	27.92	0	0.79	0.79	0
80.3	46.845	-0.77	0.583	0	27.96	0	0.791	0.791	0
80.4	46.845	-0.77	-0.65	0	27.96	0	0.791	0.792	0
80.5	46.845	-0.763	-1.345	0	27.95	0	0.792	0.792	0
80.6	46.845	-0.76	-0.406	0	28.55	0	0.793	0.793	0
80.7	46.845	-0.76	-1.091	0	28.52	0	0.794	0.794	0
80.8	46.851	-0.745	-0.385	0	28.72	0	0.794	0.795	0
80.9	46.858	-0.753	-1.091	0	29.41	0	0.795	0.796	0
81	46.858	-0.753	-0.59	0	29.45	0	0.796	0.796	0
81.1	46.864	-0.785	-0.562	0	29.39	0	0.797	0.797	0
81.2	46.864	-0.77	0.064	0	29.43	0	0.798	0.798	0
81.3	46.87	-0.77	-0.848	0	29.37	0	0.799	0.799	0
81.4	46.87	-0.765	-1.176	0	29.43	0	0.799	0.8	0
81.5	46.876	-0.75	-0.364	0	29.5	0	0.8	0.8	0
81.6	46.876	-0.75	-1.003	0	29.62	0	0.801	0.801	0
81.7	46.882	-0.76	-1.257	0	29.57	0	0.802	0.802	0
81.8	46.889	-0.765	-0.279	0	29.72	0	0.803	0.803	0
81.9	46.895	-0.765	-0.752	0	31.12	0	0.804	0.804	0
82	46.895	-0.738	-0.565	0	32.08	0	0.804	0.805	0
82.1	46.907	-0.725	-0.886	0	31.97	0	0.805	0.806	0
82.2	46.914	-0.725	-1.077	0	32.04	0	0.806	0.806	0
82.3	46.926	-0.748	-0.738	0	31.99	0	0.807	0.807	0
82.4	46.932	-0.768	-0.689	0	32.05	0	0.808	0.808	0
82.5	46.938	-0.768	-0.219	0	32	0	0.809	0.809	0
82.6	46.951	-0.74	-0.706	0	32.05	0	0.81	0.81	0
82.7	46.951	-0.74	-1.091	0	32.05	0	0.811	0.811	0
82.8	46.963	-0.753	-0.268	0	31.97	0	0.812	0.812	0
82.9	46.963	-0.75	-0.304	0	31.89	0	0.812	0.813	0
83	46.976	-0.76	-0.872	0	31.85	0	0.813	0.814	0
83.1	46.988	-0.76	-0.431	0	31.91	0	0.814	0.814	0
83.2	46.988	-0.768	0.268	0	31.85	0	0.815	0.815	0
83.3	47.001	-0.77	-1.035	0	31.94	0	0.816	0.816	0
83.4	47.007	-0.77	-0.795	0	31.72	0	0.817	0.817	0
83.5	47.013	-0.778	-0.59	0	31.66	0	0.818	0.818	0
83.6	47.019	-0.78	-0.848	0	31.61	0	0.819	0.819	0
83.7	47.032	-0.78	-0.268	0	31.68	0	0.82	0.82	0
83.8	47.038	-0.753	-1.01	0	31.6	0	0.82	0.821	0
83.9	47.044	-0.748	-0.802	0	31.7	0	0.821	0.822	0
84	47.05	-0.748	-1.049	0	31.61	0	0.822	0.822	0
84.1	47.056	-0.77	-0.805	0	31.69	0	0.823	0.823	0
84.2	47.069	-0.755	-0.219	0	31	0	0.824	0.824	0

84.3	47.075	-0.755	-0.385	0	30.15	0	0.825	0.825	0
84.4	47.081	-0.76	-1.504	0	30.13	0	0.826	0.826	0
84.5	47.088	-0.775	-0.706	0	30.17	0	0.826	0.827	0
84.6	47.088	-0.775	0.219	0	30.13	0	0.827	0.827	0
84.7	47.094	-0.77	-1.003	0	30.18	0	0.828	0.828	0
84.8	47.094	-0.765	-0.625	0	29.69	0	0.829	0.829	0
84.9	47.1	-0.765	-0.547	0	29.56	0	0.83	0.83	0
85	47.106	-0.765	-0.547	0	29.5	0	0.831	0.831	0
85.1	47.106	-0.76	-0.607	0	28.56	0	0.831	0.832	0
85.2	47.112	-0.76	-0.692	0	28.48	0	0.832	0.832	0
85.3	47.112	-0.76	-0.692	0	27.81	0	0.833	0.833	0
85.4	47.112	-0.758	-0.738	0	27.45	0	0.834	0.834	0
85.5	47.112	-0.758	-0.805	0	26.48	0	0.834	0.835	0
85.6	47.112	-0.768	-0.918	0	25.96	0	0.835	0.835	0
85.7	47.106	-0.768	-0.646	0	25.93	0	0.836	0.836	0
85.8	47.1	-0.78	-0.311	0	25.92	0	0.837	0.837	0
85.9	47.1	-0.75	-0.374	0	25.96	0	0.837	0.838	0
86	47.094	-0.748	-1.183	0	25.92	0	0.838	0.838	0
86.1	47.094	-0.748	-0.738	0	25.96	0	0.839	0.839	0
86.2	47.094	-0.768	-0.59	0	25.92	0	0.839	0.84	0
86.3	47.088	-0.775	-0.547	0	25.92	0	0.84	0.84	0
86.4	47.088	-0.775	-0.219	0	25.93	0	0.841	0.841	0
86.5	47.081	-0.778	-0.752	0	25.62	0	0.842	0.842	0
86.6	47.081	-0.795	-1.035	0	23.76	0	0.842	0.843	0
86.7	47.075	-0.795	0.166	0	22.16	0	0.843	0.843	0
86.8	47.063	-0.763	-0.823	0	20.86	0	0.843	0.844	0
86.9	47.056	-0.75	-1.077	0	20.18	0	0.844	0.844	0
87	47.038	-0.75	-0.872	0	19.11	0	0.845	0.845	0
87.1	47.025	-0.755	-0.752	0	18.37	0	0.845	0.845	0
87.2	47.007	-0.755	-0.533	0	18.21	0	0.846	0.846	0
87.3	46.988	-0.755	-0.858	0	18.24	0	0.846	0.846	0
87.4	46.976	-0.755	-1.081	0	18.19	0	0.847	0.847	0
87.5	46.957	-0.743	-0.138	0	18.18	0	0.847	0.847	0
87.6	46.945	-0.743	-0.671	0	18.2	0	0.848	0.848	0
87.7	46.92	-0.75	-1.045	0	18.14	0	0.848	0.848	0
87.8	46.907	-0.758	-0.35	0	18.14	0	0.849	0.849	0
87.9	46.889	-0.758	-0.579	0	18.15	0	0.849	0.849	0
88	46.87	-0.758	-0.579	0	17.89	0	0.85	0.85	0
88.1	46.858	-0.778	-0.78	0	17.73	0	0.85	0.85	0
88.2	46.839	-0.778	-0.064	0	16.33	0	0.851	0.851	0
88.3	46.82	-0.735	-0.696	0	14.88	0	0.851	0.851	0
88.4	46.795	-0.735	-1.077	0	13.56	0	0.851	0.852	0
88.5	46.771	-0.735	-0.519	0	12.85	0	0.852	0.852	0
88.6	46.746	-0.765	-0.205	0	12.71	0	0.852	0.852	0
88.7	46.721	-0.765	-0.219	0	12.54	0	0.852	0.853	0
88.8	46.69	-0.763	-1.243	0	10.98	0	0.853	0.853	0
88.9	46.665	-0.748	-0.904	0	9.63	0	0.853	0.853	0

89	46.628	-0.75	-0.219	0	7.77	0	0.853	0.853	0
89.1	46.597	-0.75	-0.908	0	6.55	0	0.853	0.854	0
89.2	46.559	-0.745	-0.35	0	5.82	0	0.854	0.854	0
89.3	46.516	-0.758	-0.738	0	5.84	0	0.854	0.854	0
89.4	46.479	-0.758	-0.533	0	6.34	0	0.854	0.854	0
89.5	46.441	-0.76	-0.046	0	8.41	0	0.854	0.854	0
89.6	46.41	-0.743	-0.371	0	11.97	0	0.854	0.855	0
89.7	46.379	-0.743	-1.134	0	14.02	0	0.855	0.855	0
89.8	46.361	-0.77	-0.738	0	14.95	0	0.855	0.855	0
89.9	46.336	-0.76	-0.251	0	15.25	0	0.856	0.856	0
90	46.317	-0.76	-0.858	0	16.5	0	0.856	0.856	0
90.1	46.298	-0.755	-0.65	0	18.05	0	0.857	0.857	0
90.2	46.28	-0.748	-0.417	0	19.19	0	0.857	0.857	0
90.3	46.267	-0.748	-1.388	0	20.74	0	0.858	0.858	0
90.4	46.255	-0.758	-1.063	0	21.85	0	0.858	0.859	0
90.5	46.249	-0.773	0.021	0	22.85	0	0.859	0.859	0
90.6	46.242	-0.773	-0.682	0	23.37	0	0.86	0.86	0
90.7	46.236	-0.77	-0.537	0	23.57	0	0.86	0.861	0
90.8	46.23	-0.775	-0.29	0	23.51	0	0.861	0.861	0
90.9	46.224	-0.775	-1.049	0	23.58	0	0.862	0.862	0
91	46.218	-0.778	-0.576	0	24.51	0	0.862	0.863	0
91.1	46.218	-0.765	-0.417	0	25.63	0	0.863	0.863	0
91.2	46.211	-0.765	-0.533	0	26.17	0	0.864	0.864	0
91.3	46.211	-0.74	-1.388	0	26.89	0	0.864	0.865	0
91.4	46.218	-0.745	-0.576	0	27.68	0	0.865	0.865	0
91.5	46.218	-0.745	-0.403	0	28.8	0	0.866	0.866	0
91.6	46.224	-0.775	-0.576	0	29.12	0	0.867	0.867	0
91.7	46.224	-0.775	-0.872	0	30.12	0	0.868	0.868	0
91.8	46.23	-0.773	-0.611	0	31.24	0	0.869	0.869	0
91.9	46.242	-0.755	-1.063	0	31.72	0	0.869	0.87	0
92	46.249	-0.748	-0.823	0	32.36	0	0.87	0.871	0
92.1	46.261	-0.748	-0.657	0	33.28	0	0.871	0.871	0
92.2	46.274	-0.768	-0.657	0	34.96	0	0.872	0.872	0
92.3	46.286	-0.763	-0.335	0	35.56	0	0.873	0.873	0
92.4	46.305	-0.763	-0.533	0	36.32	0	0.874	0.874	0
92.5	46.317	-0.77	-0.632	0	37.7	0	0.875	0.875	0
92.6	46.336	-0.753	-0.279	0	38.62	0	0.876	0.877	0
92.7	46.361	-0.753	-1.105	0	40.26	0	0.877	0.878	0
92.8	46.385	-0.745	-0.908	0	41.63	0	0.879	0.879	0
92.9	46.41	-0.753	-0.908	0	41.55	0	0.88	0.88	0
93	46.441	-0.753	-0.742	0	42.47	0	0.881	0.881	0
93.1	46.466	-0.793	-0.35	0	42.49	0	0.882	0.882	0
93.2	46.491	-0.785	-0.205	0	42.87	0	0.883	0.884	0
93.3	46.522	-0.785	-0.918	0	45.76	0	0.885	0.885	0
93.4	46.553	-0.773	-0.766	0	46.22	0	0.886	0.886	0
93.5	46.584	-0.765	-0.742	0	46.13	0	0.887	0.887	0
93.6	46.615	-0.765	-0.78	0	46.16	0	0.888	0.889	0

93.7	46.653	-0.76	-1.151	0	46.19	0	0.89	0.89	0
93.8	46.684	-0.718	-0.738	0	46.23	0	0.891	0.891	0
93.9	46.715	-0.718	-0.562	0	46.25	0	0.892	0.893	0
94	46.746	-0.698	-1.077	0	46.23	0	0.894	0.894	0
94.1	46.783	-0.733	-0.576	0	45.77	0	0.895	0.895	0
94.2	46.814	-0.733	-1.021	0	44.8	0	0.896	0.896	0
94.3	46.845	-0.743	-0.904	0	43.64	0	0.897	0.898	0
94.4	46.87	-0.768	-0.487	0	43.38	0	0.898	0.899	0
94.5	46.901	-0.768	-0.138	0	43.39	0	0.9	0.9	0
94.6	46.926	-0.775	-0.692	0	43.46	0	0.901	0.901	0
94.7	46.957	-0.775	-0.763	0	43.47	0	0.902	0.902	0
94.8	46.982	-0.783	-0.205	0	43.49	0	0.903	0.904	0
94.9	47.013	-0.765	-0.904	0	43.37	0	0.905	0.905	0
95	47.038	-0.78	-1.063	0	43.27	0	0.906	0.906	0
95.1	47.069	-0.78	-0.71	0	43.3	0	0.907	0.907	0
95.2	47.094	-0.725	-0.219	0	43.34	0	0.908	0.908	0
95.3	47.125	-0.733	-1.229	0	43.34	0	0.909	0.91	0
95.4	47.15	-0.733	-1.035	0	43.39	0	0.911	0.911	0
95.5	47.181	-0.735	-0.946	0	43.42	0	0.912	0.912	0
95.6	47.206	-0.738	-0.724	0	43.41	0	0.913	0.913	0
95.7	47.23	-0.738	-0.191	0	43.43	0	0.914	0.914	0
95.8	47.261	-0.75	-0.533	0	43.26	0	0.915	0.916	0
95.9	47.286	-0.753	-0.494	0	43.35	0	0.917	0.917	0
96	47.311	-0.753	-0.653	0	43.31	0	0.918	0.918	0
96.1	47.342	-0.755	-0.576	0	43.36	0	0.919	0.919	0
96.2	47.367	-0.753	-0.805	0	43.37	0	0.92	0.92	0
96.3	47.398	-0.753	-0.89	0	43.38	0	0.921	0.922	0
96.4	47.423	-0.768	-1.021	0	43.4	0	0.923	0.923	0
96.5	47.448	-0.778	-0.678	0	43.43	0	0.924	0.924	0
96.6	47.479	-0.778	-0.205	0	43.31	0	0.925	0.925	0
96.7	47.504	-0.778	-0.36	0	43.23	0	0.926	0.926	0
96.8	47.529	-0.753	-0.611	0	43.26	0	0.927	0.928	0
96.9	47.56	-0.753	-1.049	0	43.27	0	0.929	0.929	0
97	47.585	-0.773	-0.653	0	43.43	0	0.93	0.93	0
97.1	47.609	-0.778	-0.562	0	43.48	0	0.931	0.931	0
97.2	47.634	-0.778	-0.357	0	43.52	0	0.932	0.932	0
97.3	47.665	-0.763	-0.371	0	44.48	0	0.933	0.934	0
97.4	47.69	-0.755	-1.017	0	44.51	0	0.935	0.935	0
97.5	47.715	-0.755	-1.229	0	45.43	0	0.936	0.936	0
97.6	47.746	-0.75	-0.848	0	45.32	0	0.937	0.937	0
97.7	47.777	-0.75	-0.876	0	46.38	0	0.938	0.939	0
97.8	47.808	-0.745	-0.427	0	46.23	0	0.94	0.94	0
97.9	47.833	-0.76	-0.844	0	46.2	0	0.941	0.941	0
98	47.87	-0.748	0.053	0	46.18	0	0.942	0.943	0
98.1	47.902	-0.748	-1.088	0	46.24	0	0.944	0.944	0
98.2	47.926	-0.738	-1.088	0	46.24	0	0.945	0.945	0
98.3	47.964	-0.743	-0.823	0	46.26	0	0.946	0.946	0

98.4	47.988	-0.743	-0.487	0	46.11	0	0.947	0.948	0
98.5	48.02	-0.74	-0.533	0	46.11	0	0.949	0.949	0
98.6	48.051	-0.743	-0.752	0	45.96	0	0.95	0.95	0
98.7	48.075	-0.743	-0.89	0	46.02	0	0.951	0.952	0
98.8	48.107	-0.735	-0.579	0	46.02	0	0.953	0.953	0
98.9	48.138	-0.733	-0.809	0	46.06	0	0.954	0.954	0
99	48.169	-0.733	-1.049	0	46.06	0	0.955	0.955	0
99.1	48.194	-0.753	-0.237	0	46.1	0	0.956	0.957	0
99.2	48.225	-0.755	-0.519	0	46.07	0	0.958	0.958	0
99.3	48.256	-0.755	-1.102	0	45.89	0	0.959	0.959	0
99.4	48.281	-0.753	-0.576	0	45.93	0	0.96	0.961	0
99.5	48.312	-0.758	-0.724	0	45.79	0	0.962	0.962	0
99.6	48.343	-0.758	-0.533	0	45.08	0	0.963	0.963	0
99.7	48.368	-0.773	-0.371	0	45.13	0	0.964	0.964	0
99.8	48.399	-0.743	-0.777	0	45.14	0	0.965	0.966	0
99.9	48.423	-0.743	-1.335	0	44.96	0	0.967	0.967	0
100	48.455	-0.743	-1.335	0	44.98	0	0.968	0.968	0
100.1	48.479	-0.745	-0.403	0	45.02	0	0.969	0.969	0
100.2	48.504	-0.745	-0.752	0	45.05	0	0.97	0.971	0
100.3	48.535	-0.748	-0.904	0	45.07	0	0.972	0.972	0
100.4	48.56	-0.748	-0.904	0	45.11	0	0.973	0.973	0
100.5	48.585	-0.755	-1.049	0	45.14	0	0.974	0.974	0
100.6	48.61	-0.74	0.092	0	45.15	0	0.975	0.976	0
100.7	48.641	-0.74	-1.063	0	44.95	0	0.977	0.977	0
100.8	48.666	-0.733	-1.543	0	44.92	0	0.978	0.978	0
100.9	48.691	-0.743	-1.063	0	44.93	0	0.979	0.979	0
101	48.722	-0.755	-0.283	0	44.98	0	0.98	0.981	0
101.1	48.747	-0.755	-0.321	0	44.97	0	0.982	0.982	0
101.2	48.765	-0.733	-0.763	0	45	0	0.983	0.983	0
101.3	48.796	-0.745	-1.374	0	45.04	0	0.984	0.984	0
101.4	48.821	-0.745	-0.565	0	45.05	0	0.985	0.986	0
101.5	48.846	-0.765	-0.724	0	45	0	0.987	0.987	0
101.6	48.877	-0.75	-0.452	0	44.87	0	0.988	0.988	0
101.7	48.896	-0.75	-0.59	0	44.93	0	0.989	0.989	0
101.8	48.927	-0.745	-1.497	0	44.93	0	0.99	0.991	0
101.9	48.952	-0.745	-0.29	0	44.98	0	0.992	0.992	0
102	48.976	-0.745	-0.519	0	44.96	0	0.993	0.993	0
102.1	49.001	-0.773	-1.021	0	44.61	0	0.994	0.994	0
102.2	49.026	-0.765	-0.074	0	43.42	0	0.995	0.995	0
102.3	49.051	-0.765	-0.678	0	41.79	0	0.996	0.997	0
102.4	49.076	-0.765	-0.678	0	38.37	0	0.997	0.998	0
102.5	49.088	-0.738	-0.392	0	34.87	0	0.998	0.999	0
102.6	49.101	-0.738	-1.215	0	32.16	0	0.999	1	0
102.7	49.101	-0.74	-0.727	0	29.64	0	1	1	0
102.8	49.101	-0.765	-0.417	0	28.76	0	1.001	1.001	0
102.9	49.095	-0.765	-0.24	0	28.52	0	1.002	1.002	0
103	49.095	-0.748	-0.724	0	28.52	0	1.003	1.003	0

103.1	49.095	-0.75	-0.844	0	28.5	0	1.003	1.004	0
103.2	49.088	-0.75	-0.388	0	28.46	0	1.004	1.004	0
103.3	49.088	-0.763	-0.724	0	27.84	0	1.005	1.005	0
103.4	49.082	-0.753	-0.706	0	27.85	0	1.006	1.006	0
103.5	49.082	-0.753	-0.809	0	27.86	0	1.006	1.007	0
103.6	49.082	-0.748	-0.968	0	27.83	0	1.007	1.007	0
103.7	49.076	-0.748	-0.932	0	27.87	0	1.008	1.008	0
103.8	49.076	-0.76	-0.48	0	27.81	0	1.009	1.009	0
103.9	49.07	-0.758	-0.219	0	28.24	0	1.01	1.01	0
104	49.07	-0.75	-0.922	0	28.47	0	1.01	1.011	0
104.1	49.063	-0.75	-0.922	0	28.45	0	1.011	1.011	0
104.2	49.063	-0.75	-0.844	0	28.47	0	1.012	1.012	0
104.3	49.057	-0.773	-0.032	0	27.95	0	1.013	1.013	0
104.4	49.057	-0.773	-0.667	0	27.86	0	1.013	1.014	0
104.5	49.051	-0.755	-1.215	0	27.79	0	1.014	1.014	0
104.6	49.051	-0.758	-0.48	0	27.88	0	1.015	1.015	0
104.7	49.051	-0.758	-0.667	0	27.79	0	1.016	1.016	0
104.8	49.045	-0.758	-0.547	0	27.87	0	1.017	1.017	0
104.9	49.045	-0.758	-0.646	0	27.77	0	1.017	1.018	0
105	49.039	-0.758	-1.215	0	27.87	0	1.018	1.018	0
105.1	49.039	-0.77	-0.403	0	27.77	0	1.019	1.019	0
105.2	49.032	-0.765	-0.406	0	27.86	0	1.02	1.02	0
105.3	49.026	-0.765	-0.876	0	28.13	0	1.02	1.021	0
105.4	49.026	-0.763	-0.505	0	28.49	0	1.021	1.021	0
105.5	49.02	-0.75	-0.89	0	28.4	0	1.022	1.022	0
105.6	49.02	-0.75	-0.724	0	28.47	0	1.023	1.023	0
105.7	49.02	-0.75	-0.724	0	28.38	0	1.024	1.024	0
105.8	49.014	-0.75	-0.752	0	28.64	0	1.024	1.025	0
105.9	49.014	-0.763	0.109	0	29.09	0	1.025	1.025	0
106	49.014	-0.763	-0.237	0	29.14	0	1.026	1.026	0
106.1	49.014	-0.75	-0.809	0	29.11	0	1.027	1.027	0
106.2	49.014	-0.75	-0.346	0	29.1	0	1.028	1.028	0
106.3	49.008	-0.753	-0.788	0	29.13	0	1.028	1.029	0
106.4	49.008	-0.76	-0.547	0	29.1	0	1.029	1.029	0
106.5	49.008	-0.76	-0.89	0	29.15	0	1.03	1.03	0
106.6	49.008	-0.765	-0.71	0	29.07	0	1.031	1.031	0
106.7	49.008	-0.765	-0.466	0	29.18	0	1.032	1.032	0
106.8	49.008	-0.763	-0.968	0	29.08	0	1.032	1.033	0
106.9	49.001	-0.753	-0.463	0	29.93	0	1.033	1.034	0
107	49.001	-0.77	-0.922	0	29.91	0	1.034	1.034	0
107.1	49.001	-0.77	-0.738	0	30	0	1.035	1.035	0
107.2	49.001	-0.77	-0.738	0	30.6	0	1.036	1.036	0
107.3	49.008	-0.763	-0.343	0	30.7	0	1.037	1.037	0
107.4	49.008	-0.768	-0.89	0	30.61	0	1.038	1.038	0
107.5	49.014	-0.768	-0.357	0	31.6	0	1.038	1.039	0
107.6	49.014	-0.748	-0.459	0	32.93	0	1.039	1.04	0
107.7	49.02	-0.74	-1.098	0	34.34	0	1.04	1.041	0

107.8	49.026	-0.765	-0.562	0	35.29	0	1.041	1.041	0
107.9	49.032	-0.733	-0.678	0	36.06	0	1.042	1.042	0
108	49.051	-0.733	-1.021	0	35.98	0	1.043	1.043	0
108.1	49.063	-0.76	-1.049	0	36.06	0	1.044	1.045	0
108.2	49.07	-0.758	-0.222	0	36.02	0	1.045	1.046	0
108.3	49.082	-0.758	-0.509	0	36.09	0	1.046	1.047	0
108.4	49.095	-0.77	-0.678	0	36.04	0	1.047	1.048	0
108.5	49.101	-0.753	-0.752	0	36.11	0	1.048	1.049	0
108.6	49.113	-0.753	-0.547	0	36.07	0	1.049	1.05	0
108.7	49.126	-0.755	-0.357	0	36.11	0	1.05	1.051	0
108.8	49.132	-0.768	-1.049	0	36.07	0	1.051	1.052	0
108.9	49.144	-0.768	-0.89	0	36.13	0	1.052	1.053	0
109	49.157	-0.768	-0.89	0	35.8	0	1.053	1.054	0
109.1	49.163	-0.753	-0.346	0	34.39	0	1.054	1.054	0
109.2	49.175	-0.758	-1.052	0	33.86	0	1.055	1.055	0
109.3	49.182	-0.758	-1.229	0	33.9	0	1.056	1.056	0
109.4	49.188	-0.75	0.184	0	33.87	0	1.057	1.057	0
109.5	49.194	-0.72	0.007	0	33.95	0	1.058	1.058	0
109.6	49.2	-0.735	-0.791	0	33.87	0	1.059	1.059	0
109.7	49.206	-0.735	-0.562	0	33.93	0	1.06	1.06	0
109.8	49.213	-0.743	-0.417	0	33.86	0	1.061	1.061	0
109.9	49.225	-0.738	-0.727	0	33.95	0	1.062	1.062	0
110	49.225	-0.713	-1.201	0	33.88	0	1.063	1.063	0
110.1	49.231	-0.713	-0.632	0	33.95	0	1.064	1.064	0
110.2	49.244	-0.75	-0.431	0	33.91	0	1.065	1.065	0
110.3	49.25	-0.77	-1.063	0	33.94	0	1.066	1.066	0
110.4	49.256	-0.77	-0.357	0	33.94	0	1.066	1.067	0
110.5	49.262	-0.77	-0.357	0	33.99	0	1.067	1.068	0
110.6	49.269	-0.753	-0.724	0	33.88	0	1.068	1.069	0
110.7	49.275	-0.765	-0.763	0	33.7	0	1.069	1.07	0
110.8	49.287	-0.765	-0.18	0	33.73	0	1.07	1.07	0
110.9	49.287	-0.725	-0.844	0	33.72	0	1.071	1.071	0
111	49.293	-0.725	-1.497	0	33.75	0	1.072	1.072	0
111.1	49.3	-0.725	-0.802	0	33.74	0	1.073	1.073	0
111.2	49.306	-0.765	-0.177	0	33.76	0	1.074	1.074	0
111.3	49.312	-0.763	-0.83	0	33.75	0	1.075	1.075	0
111.4	49.318	-0.693	-0.523	0	33.78	0	1.076	1.076	0
111.5	49.324	-0.738	-0.777	0	33.73	0	1.077	1.077	0
111.6	49.331	-0.738	-0.519	0	33.78	0	1.078	1.078	0
111.7	49.337	-0.765	-0.222	0	33.75	0	1.079	1.079	0
111.8	49.343	-0.773	-1.035	0	33.8	0	1.08	1.08	0
111.9	49.349	-0.773	-1.049	0	33.75	0	1.081	1.081	0
112	49.356	-0.765	-0.562	0	33.81	0	1.081	1.082	0
112.1	49.362	-0.745	-0.682	0	33.76	0	1.082	1.083	0
112.2	49.368	-0.745	-0.477	0	33.81	0	1.083	1.084	0
112.3	49.374	-0.745	-0.477	0	33.77	0	1.084	1.085	0
112.4	49.38	-0.618	-0.982	0	33.81	0	1.085	1.085	0

112.5	49.387	-0.69	-0.953	0	33.85	0	1.086	1.086	0
112.6	49.393	-0.69	-0.738	0	33.94	0	1.087	1.087	0
112.7	49.399	-0.73	-0.678	0	33.98	0	1.088	1.088	0
112.8	49.411	-0.73	-0.487	0	33.95	0	1.089	1.089	0
112.9	49.411	-0.65	-0.724	0	34	0	1.09	1.09	0
113	49.418	-0.745	-1.134	0	33.96	0	1.091	1.091	0
113.1	49.424	-0.655	-0.844	0	34.02	0	1.092	1.092	0
113.2	49.43	-0.618	-1.229	0	33.99	0	1.093	1.093	0
113.3	49.436	-0.673	-0.653	0	34.02	0	1.094	1.094	0
113.4	49.443	-0.673	-0.431	0	34.04	0	1.095	1.095	0
113.5	49.449	-0.62	-0.777	0	34.02	0	1.096	1.096	0
113.6	49.455	-0.61	-0.466	0	34.07	0	1.097	1.097	0
113.7	49.461	-0.61	-0.622	0	34.03	0	1.097	1.098	0
113.8	49.467	-0.61	-0.622	0	33.84	0	1.098	1.099	0
113.9	49.474	-0.64	-0.343	0	32.57	0	1.099	1.1	0
114	49.474	-0.633	-0.706	0	31.83	0	1.1	1.1	0
114.1	49.48	-0.633	-0.763	0	30.93	0	1.101	1.101	0
114.2	49.48	-0.703	-0.848	0	29.84	0	1.102	1.102	0
114.3	49.48	-0.648	-0.607	0	28.3	0	1.103	1.103	0
114.4	49.48	-0.648	-0.643	0	26.57	0	1.103	1.104	0
114.5	49.474	-0.66	-1.077	0	25.68	0	1.104	1.104	0
114.6	49.461	-0.638	-0.307	0	24.91	0	1.105	1.105	0
114.7	49.455	-0.638	-0.752	0	24.89	0	1.106	1.106	0
114.8	49.449	-0.763	-0.403	0	23.8	0	1.106	1.106	0
114.9	49.436	-0.763	-0.547	0	22.77	0	1.107	1.107	0
115	49.424	-0.663	-0.738	0	21.28	0	1.107	1.108	0
115.1	49.405	-0.64	-0.872	0	20.6	0	1.108	1.108	0
115.2	49.393	-0.64	-0.678	0	20.04	0	1.109	1.109	0
115.3	49.374	-0.66	-0.872	0	19.66	0	1.109	1.109	0
115.4	49.356	-0.74	-0.904	0	18.98	0	1.11	1.11	0
115.5	49.337	-0.74	-0.904	0	17.9	0	1.11	1.11	0
115.6	49.318	-0.74	-0.763	0	17.38	0	1.111	1.111	0
115.7	49.3	-0.753	-0.862	0	17.39	0	1.111	1.111	0
115.8	49.275	-0.753	-1.063	0	17.41	0	1.112	1.112	0
115.9	49.256	-0.755	-1.035	0	17.46	0	1.112	1.112	0
116	49.231	-0.773	-0.191	0	17.6	0	1.113	1.113	0
116.1	49.213	-0.748	-0.403	0	17.55	0	1.113	1.113	0
116.2	49.194	-0.748	-1.285	0	16.87	0	1.113	1.114	0
116.3	49.169	-0.775	-0.505	0	16.67	0	1.114	1.114	0
116.4	49.144	-0.775	-0.191	0	16.63	0	1.114	1.115	0
116.5	49.119	-0.775	-1.201	0	16.62	0	1.115	1.115	0
116.6	49.101	-0.74	-0.989	0	17.16	0	1.115	1.116	0
116.7	49.082	-0.74	-1.229	0	17.48	0	1.116	1.116	0
116.8	49.057	-0.775	-0.901	0	17.52	0	1.116	1.117	0
116.9	49.039	-0.77	-0.237	0	17.49	0	1.117	1.117	0
117	49.02	-0.77	-0.678	0	17.5	0	1.117	1.118	0
117.1	48.995	-0.77	-0.678	0	17.51	0	1.118	1.118	0

117.2	48.97	-0.713	-1.169	0	17.45	0	1.118	1.119	0
117.3	48.952	-0.678	-0.59	0	17.51	0	1.119	1.119	0
117.4	48.933	-0.678	-0.724	0	17.41	0	1.119	1.12	0
117.5	48.908	-0.64	-0.438	0	17.48	0	1.12	1.12	0
117.6	48.889	-0.705	-0.562	0	17.41	0	1.12	1.12	0
117.7	48.871	-0.705	-1.049	0	17.45	0	1.121	1.121	0
117.8	48.846	-0.773	-0.678	0	17.87	0	1.121	1.121	0
117.9	48.827	-0.718	-0.724	0	17.86	0	1.122	1.122	0
118	48.809	-0.718	-0.48	0	17.88	0	1.122	1.122	0
118.1	48.79	-0.715	-0.724	0	17.84	0	1.123	1.123	0
118.2	48.765	-0.753	-0.463	0	17.88	0	1.123	1.123	0
118.3	48.753	-0.638	-0.968	0	17.95	0	1.124	1.124	0
118.4	48.734	-0.688	-0.17	0	17.43	0	1.124	1.124	0
118.5	48.709	-0.688	-0.65	0	17.35	0	1.125	1.125	0
118.6	48.691	-0.748	-0.872	0	16.72	0	1.125	1.125	0
118.7	48.666	-0.748	-0.872	0	16.44	0	1.126	1.126	0
118.8	48.641	-0.748	-0.89	0	15.29	0	1.126	1.126	0
118.9	48.622	-0.75	-0.597	0	13.72	0	1.126	1.127	0
119	48.597	-0.773	-0.809	0	12.62	0	1.127	1.127	0
119.1	48.566	-0.718	-0.622	0	12.41	0	1.127	1.127	0
119.2	48.535	-0.718	-0.791	0	12.4	0	1.127	1.128	0
119.3	48.504	-0.753	-0.682	0	12.37	0	1.128	1.128	0
119.4	48.479	-0.738	-0.406	0	12.51	0	1.128	1.128	0
119.5	48.448	-0.738	-0.724	0	12.04	0	1.128	1.129	0
119.6	48.417	-0.775	-1.3	0	11.91	0	1.129	1.129	0
119.7	48.386	-0.74	-0.074	0	11.91	0	1.129	1.129	0
119.8	48.355	-0.74	-0.918	0	12.17	0	1.129	1.13	0
119.9	48.33	-0.758	-1.268	0	12.13	0	1.13	1.13	0
120	48.299	-0.755	-0.074	0	12.14	0	1.13	1.13	0
120.1	48.268	-0.758	-0.844	0	12.04	0	1.13	1.131	0
120.2	48.237	-0.755	-0.159	0	9.73	0	1.131	1.131	0
120.3	48.206	-0.755	-1.035	0	8	0	1.131	1.131	0
120.4	48.169	-0.755	-1.035	0	7.88	0	1.131	1.131	0
120.5	48.138	-0.66	-1.215	0	7.87	0	1.131	1.132	0
120.6	48.1	-0.715	-0.752	0	8.38	0	1.132	1.132	0
120.7	48.057	-0.715	-0.247	0	8.62	0	1.132	1.132	0
120.8	48.02	-0.75	-0.678	0	8.92	0	1.132	1.132	0
120.9	47.988	-0.763	-0.205	0	8.94	0	1.132	1.133	0
121	47.951	-0.763	-0.417	0	8.93	0	1.133	1.133	0
121.1	47.92	-0.7	-1.293	0	8.92	0	1.133	1.133	0
121.2	47.889	-0.653	-0.611	0	8.92	0	1.133	1.133	0
121.3	47.852	-0.653	-0.932	0	8.91	0	1.133	1.134	0
121.4	47.821	-0.713	-0.766	0	8.9	0	1.134	1.134	0
121.5	47.777	-0.743	-0.562	0	9.29	0	1.134	1.134	0
121.6	47.746	-0.743	-0.59	0	9.67	0	1.134	1.134	0
121.7	47.715	-0.77	-0.724	0	10.14	0	1.134	1.135	0
121.8	47.684	-0.79	0.343	0	10.91	0	1.135	1.135	0

121.9	47.653	-0.79	0.343	0	12.72	0	1.135	1.135	0
122	47.628	-0.735	-0.858	0	13.31	0	1.135	1.136	0
122.1	47.603	-0.728	-1.374	0	14.23	0	1.136	1.136	0
122.2	47.572	-0.728	-1.063	0	15.57	0	1.136	1.137	0
122.3	47.547	-0.755	-1.388	0	18.4	0	1.137	1.137	0
122.4	47.535	-0.753	-0.371	0	20.4	0	1.137	1.138	0
122.5	47.522	-0.753	-0.547	0	21.21	0	1.138	1.138	0
122.6	47.51	-0.753	-0.597	0	23.43	0	1.139	1.139	0
122.7	47.498	-0.755	-1.243	0	24.88	0	1.139	1.14	0
122.8	47.491	-0.755	-0.932	0	25.67	0	1.14	1.14	0
122.9	47.491	-0.753	-0.406	0	26.43	0	1.141	1.141	0
123	47.485	-0.738	-0.501	0	28.51	0	1.141	1.142	0
123.1	47.485	-0.738	-1.247	0	31.31	0	1.142	1.143	0
123.2	47.491	-0.768	-0.766	0	33.21	0	1.143	1.144	0
123.3	47.498	-0.76	-0.364	0	34.57	0	1.144	1.145	0
123.4	47.51	-0.76	-0.872	0	36.54	0	1.145	1.146	0
123.5	47.529	-0.753	-0.494	0	37.7	0	1.146	1.147	0
123.6	47.541	-0.753	-0.494	0	37.84	0	1.147	1.148	0
123.7	47.56	-0.753	-0.562	0	37.81	0	1.148	1.149	0
123.8	47.578	-0.775	-0.466	0	37.85	0	1.149	1.15	0
123.9	47.597	-0.77	-0.335	0	37.82	0	1.151	1.151	0
124	47.616	-0.77	-0.371	0	37.88	0	1.152	1.152	0
124.1	47.628	-0.763	-1.229	0	37.88	0	1.153	1.153	0
124.2	47.647	-0.75	-0.83	0	37.93	0	1.154	1.154	0
124.3	47.665	-0.75	-0.417	0	37.92	0	1.155	1.155	0
124.4	47.684	-0.768	-0.904	0	37.95	0	1.156	1.156	0
124.5	47.696	-0.765	-0.335	0	36.77	0	1.157	1.157	0
124.6	47.715	-0.765	-0.89	0	34.9	0	1.158	1.158	0
124.7	47.728	-0.773	-0.604	0	34.4	0	1.159	1.159	0
124.8	47.74	-0.773	-0.678	0	34.06	0	1.16	1.16	0
124.9	47.746	-0.765	-0.738	0	34.09	0	1.161	1.161	0
125	47.759	-0.758	-1.183	0	34.05	0	1.162	1.162	0
125.1	47.771	-0.748	-0.533	0	34.12	0	1.163	1.163	0
125.2	47.777	-0.748	-0.487	0	34.06	0	1.163	1.164	0
125.3	47.79	-0.745	-1.458	0	34.08	0	1.164	1.165	0
125.4	47.796	-0.768	-0.989	0	34.1	0	1.165	1.166	0
125.5	47.808	-0.768	0.152	0	34.09	0	1.166	1.167	0
125.6	47.821	-0.76	-1.363	0	33.91	0	1.167	1.167	0
125.7	47.827	-0.755	-1.049	0	33.17	0	1.168	1.168	0
125.8	47.839	-0.755	-0.191	0	33.01	0	1.169	1.169	0
125.9	47.846	-0.755	-0.357	0	30.92	0	1.17	1.17	0
126	47.852	-0.743	-0.978	0	30.16	0	1.171	1.171	0
126.1	47.852	-0.743	-0.519	0	30.19	0	1.172	1.172	0
126.2	47.858	-0.733	-0.872	0	30.19	0	1.172	1.173	0
126.3	47.858	-0.745	-0.494	0	30.19	0	1.173	1.174	0
126.4	47.864	-0.745	-1.077	0	30.22	0	1.174	1.174	0
126.5	47.864	-0.745	-0.59	0	30.18	0	1.175	1.175	0

126.6	47.87	-0.74	-0.251	0	29.64	0	1.176	1.176	0
126.7	47.877	-0.74	-0.904	0	27.61	0	1.177	1.177	0
126.8	47.87	-0.745	-1.144	0	27.19	0	1.177	1.178	0
126.9	47.87	-0.753	-0.918	0	27.2	0	1.178	1.178	0
127	47.87	-0.753	-0.59	0	27.19	0	1.179	1.179	0
127.1	47.864	-0.75	-0.417	0	27.21	0	1.18	1.18	0
127.2	47.864	-0.75	-1.105	0	27.16	0	1.18	1.181	0
127.3	47.864	-0.75	-0.819	0	27.2	0	1.181	1.181	0
127.4	47.864	-0.715	-0.512	0	27.18	0	1.182	1.182	0
127.5	47.864	-0.74	-0.618	0	27	0	1.183	1.183	0
127.6	47.864	-0.74	-1.229	0	26.12	0	1.183	1.184	0
127.7	47.858	-0.738	-0.17	0	25.27	0	1.184	1.184	0
127.8	47.852	-0.738	-0.706	0	25	0	1.185	1.185	0
127.9	47.846	-0.725	-0.509	0	24.96	0	1.185	1.186	0
128	47.839	-0.725	-0.932	0	25.03	0	1.186	1.186	0
128.1	47.833	-0.77	-0.692	0	25.13	0	1.187	1.187	0
128.2	47.827	-0.77	-0.858	0	25.11	0	1.187	1.188	0
128.3	47.821	-0.743	-0.134	0	25.16	0	1.188	1.188	0
128.4	47.821	-0.75	-0.371	0	25.11	0	1.189	1.189	0
128.5	47.815	-0.75	-0.858	0	25.19	0	1.19	1.19	0
128.6	47.808	-0.745	-0.572	0	25.12	0	1.19	1.191	0
128.7	47.802	-0.743	-1.049	0	25.17	0	1.191	1.191	0
128.8	47.796	-0.743	-0.975	0	25.13	0	1.192	1.192	0
128.9	47.79	-0.76	-0.088	0	25.15	0	1.192	1.193	0
129	47.783	-0.745	-0.576	0	25.13	0	1.193	1.193	0
129.1	47.777	-0.745	-0.904	0	25.15	0	1.194	1.194	0
129.2	47.777	-0.73	-0.996	0	25.15	0	1.194	1.195	0
129.3	47.771	-0.73	-0.533	0	25.13	0	1.195	1.195	0
129.4	47.759	-0.73	-0.724	0	25.03	0	1.196	1.196	0
129.5	47.759	-0.765	-0.533	0	24.94	0	1.197	1.197	0
129.6	47.752	-0.768	-0.59	0	25.01	0	1.197	1.198	0
129.7	47.746	-0.768	-0.417	0	25.88	0	1.198	1.198	0
129.8	47.74	-0.775	-0.046	0	26.76	0	1.199	1.199	0
129.9	47.74	-0.76	-1.123	0	27.68	0	1.199	1.2	0
130	47.74	-0.76	-1.511	0	27.97	0	1.2	1.201	0
130.1	47.74	-0.763	-0.576	0	27.92	0	1.201	1.201	0
130.2	47.734	-0.78	-0.205	0	27.95	0	1.202	1.202	0
130.3	47.734	-0.78	-0.088	0	27.89	0	1.203	1.203	0
130.4	47.734	-0.745	-0.417	0	27.97	0	1.203	1.204	0
130.5	47.734	-0.77	-1.526	0	27.92	0	1.204	1.204	0
130.6	47.734	-0.77	-0.738	0	27.98	0	1.205	1.205	0
130.7	47.734	-0.748	-0.046	0	27.12	0	1.206	1.206	0
130.8	47.734	-0.748	-0.777	0	26.65	0	1.206	1.207	0
130.9	47.728	-0.74	-1.635	0	26.13	0	1.207	1.207	0
131	47.728	-0.708	-0.837	0	26.05	0	1.208	1.208	0
131.1	47.721	-0.648	-0.431	0	25.99	0	1.209	1.209	0
131.2	47.721	-0.648	-0.35	0	26.04	0	1.209	1.21	0

131.3	47.715	-0.763	-1.229	0	26.05	0	1.21	1.21	0
131.4	47.715	-0.768	-0.293	0	27.25	0	1.211	1.211	0
131.5	47.709	-0.768	0.198	0	28.39	0	1.212	1.212	0
131.6	47.709	-0.755	-1.183	0	29.42	0	1.212	1.213	0
131.7	47.715	-0.765	-0.766	0	30.09	0	1.213	1.213	0
131.8	47.715	-0.765	-0.388	0	30.13	0	1.214	1.214	0
131.9	47.721	-0.758	-1.243	0	30.06	0	1.215	1.215	0
132	47.721	-0.758	-0.304	0	30.13	0	1.216	1.216	0
132.1	47.728	-0.758	-0.286	0	30.08	0	1.217	1.217	0
132.2	47.734	-0.76	-0.731	0	30.15	0	1.217	1.218	0
132.3	47.734	-0.77	-0.576	0	30.1	0	1.218	1.219	0
132.4	47.74	-0.77	-0.357	0	30.16	0	1.219	1.219	0
132.5	47.74	-0.748	-0.706	0	30.09	0	1.22	1.22	0
132.6	47.746	-0.755	-1.081	0	30.17	0	1.221	1.221	0
132.7	47.752	-0.755	-0.576	0	30.11	0	1.222	1.222	0
132.8	47.752	-0.758	-0.667	0	30.17	0	1.222	1.223	0
132.9	47.752	-0.75	-0.978	0	30.1	0	1.223	1.224	0
133	47.759	-0.75	-1.19	0	30.16	0	1.224	1.224	0
133.1	47.765	-0.738	-0.304	0	30.09	0	1.225	1.225	0
133.2	47.765	-0.753	-0.837	0	30.17	0	1.226	1.226	0
133.3	47.771	-0.753	-0.671	0	30.11	0	1.227	1.227	0
133.4	47.771	-0.75	-0.473	0	29.57	0	1.227	1.228	0
133.5	47.777	-0.758	-0.487	0	29.24	0	1.228	1.229	0
133.6	47.777	-0.758	-0.837	0	28.72	0	1.229	1.229	0
133.7	47.777	-0.775	-0.576	0	28.28	0	1.23	1.23	0
133.8	47.777	-0.775	-0.918	0	26.27	0	1.231	1.231	0
133.9	47.771	-0.75	-0.335	0	19.96	0	1.231	1.231	0
134	47.759	-0.773	-0.562	0	9.15	0	1.231	1.232	0
134.1	47.728	-0.74	-0.872	0	4.59	0	1.232	1.232	0
134.2	47.684	-0.74	-0.59	0	2.45	0	1.232	1.232	0
134.3	47.634	-0.758	-0.953	0	1.05	0	1.232	1.232	0
134.4	47.591	-0.768	-0.385	0	0	0	1.232	1.232	0
134.5	47.535	-0.768	-0.547	0	0	0	1.232	1.232	0
134.6	47.485	-0.703	-0.844	0	0	0	1.232	1.232	0
134.7	47.435	-0.708	-0.59	0	0	0	1.232	1.232	0
134.8	47.38	-0.708	-1.204	0	0	0	1.232	1.232	0
134.9	47.33	-0.695	-0.685	0	0	0	1.232	1.232	0
135	47.274	-0.725	-0.59	0	-1.76	0	1.232	1.232	0
135.1	47.193	-0.725	-0.385	0	-16.54	0	1.231	1.232	-0.001
135.2	47.069	-0.72	-0.745	0	-21.11	0	1.231	1.232	-0.001
135.3	46.957	-0.735	-0.957	0	-23	0	1.23	1.232	-0.002
135.4	46.839	-0.735	-1.017	0	-26.67	0	1.229	1.232	-0.003
135.5	46.715	-0.733	-0.06	0	-31.48	0	1.228	1.232	-0.004
135.6	46.584	-0.735	-0.752	0	-32.12	0	1.227	1.232	-0.005
135.7	46.454	-0.735	-1.289	0	-37.97	0	1.226	1.232	-0.006
135.8	46.298	-0.753	-0.576	0	-42.55	0	1.225	1.232	-0.007
135.9	46.143	-0.745	-0.636	0	-42.14	0	1.224	1.232	-0.008

136	45.981	-0.745	-0.795	0	-44.93	0	1.223	1.232	-0.009
136.1	45.82	-0.703	-0.431	0	-53.86	0	1.221	1.232	-0.011
136.2	45.627	-0.725	-0.685	0	-60.83	0	1.22	1.232	-0.012
136.3	45.404	-0.725	-0.946	0	-63.45	0	1.218	1.232	-0.014
136.4	45.199	-0.735	-1.077	0	-67.75	0	1.216	1.232	-0.016
136.5	44.975	-0.68	-0.431	0	-74.7	0	1.214	1.232	-0.018
136.6	44.726	-0.68	-0.996	0	-80.66	0	1.212	1.232	-0.02
136.7	44.447	-0.713	-0.265	0	-81.49	0	1.209	1.232	-0.023
136.8	44.167	-0.713	-0.509	0	-80.94	0	1.207	1.232	-0.025
136.9	43.894	-0.66	-0.625	0	-77.35	0	1.205	1.232	-0.027
137	43.633	-0.743	-0.233	0	-66.72	0	1.203	1.232	-0.029
137.1	43.397	-0.725	-0.35	0	-64.89	0	1.201	1.232	-0.031
137.2	43.179	-0.725	-0.59	0	-64.42	0	1.199	1.232	-0.032
137.3	42.931	-0.745	-1.243	0	-64.09	0	1.198	1.232	-0.034
137.4	42.725	-0.758	-0.713	0	-63.66	0	1.196	1.232	-0.036
137.5	42.496	-0.758	-0.547	0	-62.75	0	1.194	1.232	-0.038
137.6	42.278	-0.768	-0.219	0	-56.78	0	1.193	1.232	-0.039
137.7	42.067	-0.76	-0.65	0	-53.21	0	1.191	1.232	-0.041
137.8	41.874	-0.76	-0.922	0	-52.82	0	1.19	1.232	-0.042
137.9	41.675	-0.758	-0.89	0	-52.59	0	1.188	1.232	-0.044
138	41.483	-0.765	-0.431	0	-51.92	0	1.187	1.232	-0.045
138.1	41.284	-0.765	-0.706	0	-51.6	0	1.185	1.232	-0.047
138.2	41.073	-0.753	-1.201	0	-51.33	0	1.184	1.232	-0.048
138.3	40.899	-0.735	-0.706	0	-51.02	0	1.183	1.232	-0.049
138.4	40.706	-0.735	-0.918	0	-50.77	0	1.181	1.232	-0.051
138.5	40.513	-0.755	-1.257	0	-50.45	0	1.18	1.232	-0.052
138.6	40.321	-0.77	-0.901	0	-41.51	0	1.179	1.232	-0.053
138.7	40.159	-0.77	-0.35	0	-15.6	0	1.178	1.232	-0.054
138.8	40.072	-0.77	-0.59	0	-2.25	0	1.178	1.232	-0.054
138.9	40.01	-0.75	-0.72	0	0	0	1.178	1.232	-0.054
139	39.954	-0.75	-1.42	0	0	0	1.178	1.232	-0.054
139.1	39.911	-0.693	-0.547	0	0	0	1.178	1.232	-0.054
139.2	39.873	-0.73	-0.576	0	0	0	1.178	1.232	-0.054
139.3	39.83	-0.73	-0.886	0	0	0	1.178	1.232	-0.054
139.4	39.78	-0.773	-0.131	0	0	0	1.178	1.232	-0.054
139.5	39.73	-0.758	-0.233	0	0	0	1.178	1.232	-0.054
139.6	39.693	-0.758	-1.204	0	0	0	1.178	1.232	-0.054
139.7	39.65	-0.768	-0.932	0	0	0	1.178	1.232	-0.054
139.8	39.6	-0.768	-0.689	0	0	0	1.178	1.232	-0.054
139.9	39.563	-0.775	-0.06	0	0	0	1.178	1.232	-0.054
140	39.519	-0.708	-1.215	0	0	0	1.178	1.232	-0.054
140.1	39.476	-0.728	-1.049	0	0	0	1.178	1.232	-0.054
140.2	39.432	-0.728	-0.851	0	0	0	1.178	1.232	-0.054
140.3	39.389	-0.76	-0.618	0	0	0	1.178	1.232	-0.054
140.4	39.345	-0.755	-0.074	0	0.75	0	1.178	1.232	-0.054
140.5	39.302	-0.755	-0.886	0	1.8	0	1.178	1.232	-0.054
140.6	39.258	-0.758	-1.017	0	2.99	0	1.178	1.232	-0.054

140.7	39.227	-0.738	-0.851	0	4.16	0	1.178	1.232	-0.054
140.8	39.196	-0.738	-0.932	0	5.23	0	1.179	1.232	-0.054
140.9	39.165	-0.745	-0.766	0	6.74	0	1.179	1.233	-0.054
141	39.134	-0.775	-0.77	0	8.95	0	1.179	1.233	-0.054
141.1	39.115	-0.775	-0.48	0	10.45	0	1.179	1.233	-0.054
141.2	39.097	-0.753	-0.766	0	10.6	0	1.18	1.233	-0.054
141.3	39.078	-0.68	-0.65	0	10.89	0	1.18	1.234	-0.054
141.4	39.059	-0.68	-1.035	0	11.85	0	1.18	1.234	-0.054
141.5	39.041	-0.76	-0.604	0	15.8	0	1.181	1.235	-0.054
141.6	39.035	-0.758	-0.371	0	18.3	0	1.181	1.235	-0.054
141.7	39.035	-0.758	-0.752	0	21.18	0	1.182	1.236	-0.054
141.8	39.035	-0.698	-1.052	0	23.57	0	1.182	1.236	-0.054
141.9	39.047	-0.678	-0.59	0	24.86	0	1.183	1.237	-0.054
142	39.053	-0.678	-0.604	0	25.06	0	1.184	1.238	-0.054
142.1	39.066	-0.768	-0.562	0	26.38	0	1.185	1.238	-0.054
142.2	39.084	-0.755	-0.247	0	26.53	0	1.185	1.239	-0.054
142.3	39.097	-0.755	-0.604	0	26.58	0	1.186	1.24	-0.054
142.4	39.115	-0.758	-1.105	0	26.54	0	1.187	1.241	-0.054
142.5	39.128	-0.763	-0.932	0	26.63	0	1.187	1.241	-0.054
142.6	39.146	-0.763	-0.445	0	26.58	0	1.188	1.242	-0.054
142.7	39.159	-0.755	-0.152	0	26.64	0	1.189	1.243	-0.054
142.8	39.171	-0.755	-0.946	0	26.61	0	1.19	1.244	-0.054
142.9	39.19	-0.73	-1.42	0	26.62	0	1.19	1.244	-0.054
143	39.202	-0.745	-0.445	0	26.62	0	1.191	1.245	-0.054
143.1	39.215	-0.753	-0.318	0	26.65	0	1.192	1.246	-0.054
143.2	39.233	-0.753	-1.091	0	27.09	0	1.193	1.247	-0.054
143.3	39.246	-0.738	-0.932	0	27.93	0	1.193	1.247	-0.054
143.4	39.264	-0.75	-0.523	0	29.96	0	1.194	1.248	-0.054
143.5	39.289	-0.75	-0.445	0	30.87	0	1.195	1.249	-0.054
143.6	39.308	-0.75	-0.399	0	32.72	0	1.196	1.25	-0.054
143.7	39.333	-0.755	-0.562	0	35.69	0	1.197	1.251	-0.054
143.8	39.37	-0.755	-0.72	0	36.97	0	1.198	1.252	-0.054
143.9	39.401	-0.703	-0.279	0	38.15	0	1.199	1.253	-0.054
144	39.438	-0.715	-0.802	0	40.26	0	1.2	1.254	-0.054
144.1	39.488	-0.715	-1.049	0	40.28	0	1.201	1.255	-0.054
144.2	39.525	-0.743	-0.766	0	40.32	0	1.202	1.256	-0.054
144.3	39.569	-0.735	-0.576	0	40.38	0	1.204	1.257	-0.054
144.4	39.612	-0.735	-0.576	0	41.91	0	1.205	1.259	-0.054
144.5	39.656	-0.755	-0.445	0	47.53	0	1.206	1.26	-0.054
144.6	39.718	-0.75	-0.562	0	48.97	0	1.207	1.261	-0.054
144.7	39.774	-0.75	-0.901	0	50.44	0	1.209	1.263	-0.054
144.8	39.836	-0.748	-0.946	0	51.39	0	1.21	1.264	-0.054
144.9	39.898	-0.755	-0.459	0	52.57	0	1.212	1.266	-0.054
145	39.967	-0.755	-0.501	0	53.2	0	1.213	1.267	-0.054
145.1	40.029	-0.773	-1.257	0	54.77	0	1.215	1.269	-0.054
145.2	40.103	-0.773	-0.978	0	57.78	0	1.216	1.27	-0.054
145.3	40.178	-0.773	-0.477	0	58.87	0	1.218	1.272	-0.054

145.4	40.259	-0.77	-1.105	0	60.2	0	1.22	1.274	-0.054
145.5	40.333	-0.778	-0.604	0	61.53	0	1.221	1.275	-0.054
145.6	40.42	-0.778	-0.459	0	62.86	0	1.223	1.277	-0.054
145.7	40.501	-0.758	-0.251	0	63.52	0	1.225	1.279	-0.054
145.8	40.588	-0.758	-0.735	0	64.6	0	1.227	1.281	-0.054
145.9	40.669	-0.73	-1.3	0	64.57	0	1.228	1.282	-0.054
146	40.762	-0.728	-0.293	0	64.56	0	1.23	1.284	-0.054
146.1	40.849	-0.735	-0.911	0	64.55	0	1.232	1.286	-0.054
146.2	40.936	-0.735	-0.766	0	64.48	0	1.234	1.288	-0.054
146.3	41.029	-0.765	-0.703	0	65.15	0	1.236	1.29	-0.054
146.4	41.116	-0.745	-0.293	0	65.66	0	1.237	1.291	-0.054
146.5	41.191	-0.745	-0.784	0	65.63	0	1.239	1.293	-0.054
146.6	41.278	-0.763	-0.946	0	65.63	0	1.241	1.295	-0.054
146.7	41.358	-0.763	-0.293	0	65.63	0	1.243	1.297	-0.054
146.8	41.445	-0.763	-0.618	0	66.27	0	1.245	1.299	-0.054
146.9	41.532	-0.765	-1.105	0	67.76	0	1.247	1.301	-0.054
147	41.619	-0.758	-0.636	0	69.6	0	1.249	1.302	-0.054
147.1	41.713	-0.758	-0.78	0	70.53	0	1.251	1.304	-0.054
147.2	41.806	-0.765	-0.212	0	71.34	0	1.253	1.306	-0.054
147.3	41.911	-0.785	-0.194	0	71.56	0	1.255	1.308	-0.054
147.4	41.992	-0.785	-0.205	0	73.04	0	1.257	1.31	-0.054
147.5	42.092	-0.77	-0.703	0	74.33	0	1.259	1.312	-0.054
147.6	42.191	-0.76	-0.932	0	75.52	0	1.261	1.315	-0.054
147.7	42.291	-0.76	-0.752	0	76.47	0	1.263	1.317	-0.054
147.8	42.39	-0.755	-1.049	0	76.36	0	1.265	1.319	-0.054
147.9	42.489	-0.675	-0.604	0	76.31	0	1.267	1.321	-0.054
148	42.589	-0.675	-0.703	0	76.35	0	1.269	1.323	-0.054
148.1	42.688	-0.713	-0.865	0	76.24	0	1.271	1.325	-0.054
148.2	42.794	-0.725	-0.374	0	76.19	0	1.273	1.327	-0.054
148.3	42.899	-0.725	-1.031	0	76.12	0	1.276	1.329	-0.054
148.4	42.986	-0.753	-0.735	0	76.14	0	1.278	1.332	-0.054
148.5	43.086	-0.743	-0.042	0	74.96	0	1.28	1.334	-0.054
148.6	43.185	-0.743	-0.72	0	73.62	0	1.282	1.336	-0.054
148.7	43.272	-0.74	-0.427	0	70.95	0	1.284	1.338	-0.054
148.8	43.365	-0.74	-1.091	0	70.08	0	1.286	1.34	-0.054
148.9	43.446	-0.713	-0.901	0	70.14	0	1.288	1.342	-0.054
149	43.533	-0.758	-0.261	0	70.16	0	1.29	1.343	-0.054
149.1	43.62	-0.765	-0.247	0	70.16	0	1.292	1.345	-0.054
149.2	43.707	-0.765	-0.378	0	66.24	0	1.293	1.347	-0.054
149.3	43.788	-0.775	-0.35	0	60.58	0	1.295	1.349	-0.054
149.4	43.85	-0.758	-0.699	0	55.68	0	1.297	1.35	-0.054
149.5	43.906	-0.758	-1.105	0	53.84	0	1.298	1.352	-0.054
149.6	43.968	-0.763	-0.805	0	53.8	0	1.3	1.353	-0.054
149.7	44.018	-0.76	-0.035	0	53.75	0	1.301	1.355	-0.054
149.8	44.074	-0.76	-0.208	0	53.81	0	1.303	1.356	-0.054
149.9	44.13	-0.738	-1.271	0	53.74	0	1.304	1.358	-0.054
150	44.186	-0.76	-0.886	0	52.69	0	1.306	1.359	-0.054

150.1	44.235	-0.76	-0.293	0	46.63	0	1.307	1.361	-0.054
150.2	44.279	-0.773	-0.088	0	38.65	0	1.308	1.362	-0.054
150.3	44.304	-0.76	-0.819	0	34.96	0	1.309	1.363	-0.054
150.4	44.322	-0.76	-0.735	0	33.76	0	1.31	1.364	-0.054
150.5	44.341	-0.773	-0.59	0	33.65	0	1.311	1.365	-0.054
150.6	44.36	-0.758	-0.247	0	33.59	0	1.312	1.366	-0.054
150.7	44.378	-0.758	-0.752	0	32.93	0	1.313	1.366	-0.054
150.8	44.391	-0.748	-0.802	0	31.75	0	1.314	1.367	-0.054
150.9	44.403	-0.753	-0.876	0	30.67	0	1.314	1.368	-0.054
151	44.416	-0.753	-0.946	0	30.59	0	1.315	1.369	-0.054
151.1	44.428	-0.74	-1.045	0	30.59	0	1.316	1.37	-0.054
151.2	44.44	-0.768	-0.576	0	31.11	0	1.317	1.371	-0.054
151.3	44.453	-0.768	-0.332	0	31.48	0	1.318	1.372	-0.054
151.4	44.465	-0.758	-0.576	0	32.82	0	1.319	1.373	-0.054
151.5	44.478	-0.755	-1.328	0	33.06	0	1.32	1.373	-0.054
151.6	44.496	-0.755	-0.473	0	33.65	0	1.321	1.374	-0.054
151.7	44.515	-0.735	-0.653	0	33.65	0	1.321	1.375	-0.054
151.8	44.527	-0.735	-0.78	0	33.68	0	1.322	1.376	-0.054
151.9	44.546	-0.75	-0.579	0	33.68	0	1.323	1.377	-0.054
152	44.559	-0.738	-0.618	0	33.68	0	1.324	1.378	-0.054
152.1	44.583	-0.743	-0.413	0	33.7	0	1.325	1.379	-0.054
152.2	44.596	-0.743	-1.434	0	33.71	0	1.326	1.38	-0.054
152.3	44.614	-0.745	-0.618	0	33.56	0	1.327	1.381	-0.054
152.4	44.627	-0.75	-0.618	0	33.58	0	1.328	1.382	-0.054
152.5	44.639	-0.75	-0.434	0	33.57	0	1.329	1.383	-0.054
152.6	44.664	-0.763	-0.399	0	33.58	0	1.33	1.384	-0.054
152.7	44.677	-0.75	-0.459	0	33.59	0	1.331	1.385	-0.054
152.8	44.695	-0.75	-0.78	0	33.61	0	1.332	1.386	-0.054
152.9	44.708	-0.693	-0.795	0	32.78	0	1.333	1.387	-0.054
153	44.726	-0.765	-0.293	0	32.25	0	1.334	1.387	-0.054
153.1	44.739	-0.765	-0.018	0	32.01	0	1.334	1.388	-0.054
153.2	44.751	-0.745	-0.837	0	32.02	0	1.335	1.389	-0.054
153.3	44.764	-0.773	-1.006	0	32.02	0	1.336	1.39	-0.054
153.4	44.776	-0.773	-0.484	0	32.08	0	1.337	1.391	-0.054
153.5	44.788	-0.708	-0.735	0	32.04	0	1.338	1.392	-0.054
153.6	44.801	-0.705	-0.915	0	32.06	0	1.339	1.393	-0.054
153.7	44.813	-0.705	-0.946	0	32.07	0	1.34	1.394	-0.054
153.8	44.832	-0.743	-0.59	0	32.6	0	1.341	1.395	-0.054
153.9	44.844	-0.755	-0.562	0	33.66	0	1.342	1.396	-0.054
154	44.857	-0.755	-0.833	0	33.82	0	1.343	1.396	-0.054
154.1	44.875	-0.77	-0.53	0	36.65	0	1.344	1.397	-0.054
154.2	44.9	-0.758	-0.639	0	40.77	0	1.345	1.399	-0.054
154.3	44.931	-0.758	-0.618	0	41.2	0	1.346	1.4	-0.054
154.4	44.956	-0.74	-0.494	0	41.22	0	1.347	1.401	-0.054
154.5	44.987	-0.753	-0.961	0	41.26	0	1.348	1.402	-0.054
154.6	45.012	-0.753	-0.735	0	41.27	0	1.349	1.403	-0.054
154.7	45.043	-0.778	-0.261	0	41.16	0	1.35	1.404	-0.054

154.8	45.074	-0.778	-0.735	0	41.18	0	1.352	1.405	-0.054
154.9	45.099	-0.778	-0.166	0	41.21	0	1.353	1.407	-0.054
155	45.13	-0.743	-0.784	0	41.26	0	1.354	1.408	-0.054
155.1	45.161	-0.768	-1.434	0	41.26	0	1.355	1.409	-0.054
155.2	45.192	-0.768	-0.254	0	41.26	0	1.356	1.41	-0.054
155.3	45.223	-0.745	0.035	0	41.3	0	1.357	1.411	-0.054
155.4	45.248	-0.75	-1.388	0	41.31	0	1.358	1.412	-0.054
155.5	45.279	-0.75	-1.247	0	40.99	0	1.36	1.413	-0.054
155.6	45.304	-0.743	-0.448	0	40.17	0	1.361	1.415	-0.054
155.7	45.335	-0.748	-0.459	0	39.83	0	1.362	1.416	-0.054
155.8	45.36	-0.748	-0.675	0	39.29	0	1.363	1.417	-0.054
155.9	45.385	-0.783	-0.636	0	39.22	0	1.364	1.418	-0.054
156	45.41	-0.755	-0.378	0	39.26	0	1.365	1.419	-0.054
156.1	45.435	-0.755	-0.636	0	39.28	0	1.366	1.42	-0.054
156.2	45.46	-0.753	-1.614	0	39.31	0	1.367	1.421	-0.054
156.3	45.484	-0.773	-0.611	0	39.35	0	1.368	1.422	-0.054
156.4	45.509	-0.773	-0.473	0	38.72	0	1.369	1.423	-0.054
156.5	45.534	-0.755	-0.735	0	38.46	0	1.371	1.424	-0.054
156.6	45.553	-0.763	-0.611	0	38.38	0	1.372	1.425	-0.054
156.7	45.578	-0.763	-0.618	0	38.26	0	1.373	1.427	-0.054
156.8	45.602	-0.765	-0.72	0	38.32	0	1.374	1.428	-0.054
156.9	45.627	-0.768	-1.119	0	38.29	0	1.375	1.429	-0.054
157	45.646	-0.768	-0.636	0	38.97	0	1.376	1.43	-0.054
157.1	45.671	-0.773	-0.576	0	39.22	0	1.377	1.431	-0.054
157.2	45.689	-0.753	-0.756	0	39.91	0	1.378	1.432	-0.054
157.3	45.72	-0.753	-0.78	0	40.19	0	1.379	1.433	-0.054
157.4	45.752	-0.763	-0.696	0	40.82	0	1.38	1.434	-0.054
157.5	45.77	-0.755	-0.42	0	41.09	0	1.381	1.435	-0.054
157.6	45.801	-0.755	-1.119	0	42	0	1.383	1.437	-0.054
157.7	45.826	-0.76	-0.378	0	42.71	0	1.384	1.438	-0.054
157.8	45.857	-0.76	-0.865	0	43.75	0	1.385	1.439	-0.054
157.9	45.888	-0.748	-1.473	0	43.89	0	1.386	1.44	-0.054
158	45.919	-0.768	-0.177	0	45.04	0	1.388	1.441	-0.054
158.1	45.95	-0.76	-0.558	0	46.28	0	1.389	1.443	-0.054
158.2	45.988	-0.76	-1.095	0	46.66	0	1.39	1.444	-0.054
158.3	46.031	-0.763	-0.332	0	46.43	0	1.391	1.445	-0.054
158.4	46.068	-0.775	-0.293	0	46.47	0	1.393	1.447	-0.054
158.5	46.1	-0.775	-0.413	0	46.48	0	1.394	1.448	-0.054
158.6	46.137	-0.748	-0.505	0	46.56	0	1.395	1.449	-0.054
158.7	46.174	-0.743	-1.056	0	46.56	0	1.397	1.45	-0.054
158.8	46.205	-0.743	-0.618	0	46.6	0	1.398	1.452	-0.054
158.9	46.242	-0.76	-0.233	0	46.44	0	1.399	1.453	-0.054
159	46.28	-0.76	-0.819	0	46.47	0	1.4	1.454	-0.054
159.1	46.317	-0.76	-0.576	0	46.61	0	1.402	1.456	-0.054
159.2	46.354	-0.753	0.007	0	46.73	0	1.403	1.457	-0.054
159.3	46.385	-0.76	-0.946	0	46.76	0	1.404	1.458	-0.054
159.4	46.423	-0.76	-1.243	0	46.79	0	1.406	1.459	-0.054

159.5	46.46	-0.773	-0.399	0	46.66	0	1.407	1.461	-0.054
159.6	46.491	-0.755	-0.184	0	46.67	0	1.408	1.462	-0.054
159.7	46.528	-0.755	-1.119	0	46.7	0	1.41	1.463	-0.054
159.8	46.566	-0.74	-1.187	0	46.75	0	1.411	1.465	-0.054
159.9	46.603	-0.75	0.049	0	46.46	0	1.412	1.466	-0.054
160	46.634	-0.75	-0.247	0	45.57	0	1.413	1.467	-0.054
160.1	46.665	-0.76	-0.625	0	44.74	0	1.415	1.468	-0.054
160.2	46.702	-0.755	-0.745	0	43.51	0	1.416	1.47	-0.054
160.3	46.727	-0.755	-0.537	0	40.7	0	1.417	1.471	-0.054
160.4	46.752	-0.753	-0.636	0	37.39	0	1.418	1.472	-0.054
160.5	46.771	-0.765	-0.833	0	34.85	0	1.419	1.473	-0.054
160.6	46.783	-0.765	-0.618	0	33.32	0	1.42	1.474	-0.054
160.7	46.795	-0.77	-0.268	0	32.56	0	1.421	1.475	-0.054
160.8	46.808	-0.77	-0.795	0	32.35	0	1.422	1.476	-0.054
160.9	46.814	-0.77	-0.735	0	32.25	0	1.423	1.476	-0.054
161	46.82	-0.755	-0.795	0	32.61	0	1.423	1.477	-0.054
161.1	46.833	-0.753	-0.622	0	32.77	0	1.424	1.478	-0.054
161.2	46.839	-0.753	-1.038	0	32.77	0	1.425	1.479	-0.054
161.3	46.851	-0.763	-0.862	0	33.64	0	1.426	1.48	-0.054
161.4	46.864	-0.755	-0.562	0	33.88	0	1.427	1.481	-0.054
161.5	46.87	-0.755	-0.989	0	34.55	0	1.428	1.482	-0.054
161.6	46.882	-0.768	-0.879	0	35.36	0	1.429	1.483	-0.054
161.7	46.901	-0.76	-0.279	0	36.21	0	1.43	1.484	-0.054
161.8	46.92	-0.76	-0.703	0	36.64	0	1.431	1.485	-0.054
161.9	46.938	-0.76	-1.162	0	37.3	0	1.432	1.486	-0.054
162	46.951	-0.745	-0.59	0	37.56	0	1.433	1.487	-0.054
162.1	46.969	-0.745	-0.66	0	37.51	0	1.434	1.488	-0.054
162.2	46.988	-0.763	-1.105	0	37.96	0	1.435	1.489	-0.054
162.3	47.007	-0.745	-0.413	0	39.54	0	1.436	1.49	-0.054
162.4	47.032	-0.745	-0.819	0	41.28	0	1.438	1.491	-0.054
162.5	47.05	-0.773	-0.851	0	42.19	0	1.439	1.493	-0.054
162.6	47.075	-0.768	-0.215	0	43.84	0	1.44	1.494	-0.054
162.7	47.106	-0.768	-0.593	0	46.15	0	1.441	1.495	-0.054
162.8	47.143	-0.76	-1.19	0	48.15	0	1.443	1.496	-0.054
162.9	47.175	-0.755	-0.618	0	49.05	0	1.444	1.498	-0.054
163	47.212	-0.755	-0.399	0	49.43	0	1.445	1.499	-0.054
163.1	47.249	-0.753	-0.735	0	49.33	0	1.447	1.501	-0.054
163.2	47.286	-0.77	-1.035	0	49.2	0	1.448	1.502	-0.054
163.3	47.33	-0.77	-0.004	0	49.26	0	1.449	1.503	-0.054
163.4	47.367	-0.778	-0.71	0	49.28	0	1.451	1.505	-0.054
163.5	47.398	-0.773	-0.886	0	49.35	0	1.452	1.506	-0.054
163.6	47.442	-0.773	-0.537	0	49.38	0	1.454	1.507	-0.054
163.7	47.479	-0.753	-0.968	0	49.31	0	1.455	1.509	-0.054
163.8	47.51	-0.753	-0.618	0	48.62	0	1.456	1.51	-0.054
163.9	47.547	-0.755	-0.777	0	47.48	0	1.458	1.511	-0.054
164	47.578	-0.755	-0.78	0	47.5	0	1.459	1.513	-0.054
164.1	47.609	-0.745	-0.413	0	47.39	0	1.46	1.514	-0.054

164.2	47.647	-0.745	-0.982	0	47.4	0	1.462	1.515	-0.054
164.3	47.678	-0.778	-0.318	0	46.88	0	1.463	1.517	-0.054
164.4	47.715	-0.75	-0.576	0	46.52	0	1.464	1.518	-0.054
164.5	47.746	-0.75	-0.78	0	46.56	0	1.465	1.519	-0.054
164.6	47.777	-0.763	-0.985	0	46.36	0	1.467	1.521	-0.054
164.7	47.808	-0.77	-1.091	0	44.5	0	1.468	1.522	-0.054
164.8	47.833	-0.77	-0.399	0	42.68	0	1.469	1.523	-0.054
164.9	47.858	-0.755	-0.77	0	40.34	0	1.47	1.524	-0.054
165	47.883	-0.778	-0.908	0	37.29	0	1.471	1.525	-0.054
165.1	47.902	-0.778	0.24	0	34.47	0	1.472	1.526	-0.054
165.2	47.914	-0.763	-0.261	0	32.93	0	1.473	1.527	-0.054
165.3	47.92	-0.775	-1.434	0	32.39	0	1.474	1.528	-0.054
165.4	47.926	-0.775	-0.374	0	31.47	0	1.475	1.529	-0.054
165.5	47.933	-0.763	-0.932	0	30.67	0	1.476	1.53	-0.054
165.6	47.939	-0.753	-0.932	0	30.35	0	1.477	1.53	-0.054
165.7	47.939	-0.753	-0.904	0	30.36	0	1.477	1.531	-0.054
165.8	47.945	-0.765	-0.413	0	30.35	0	1.478	1.532	-0.054
165.9	47.951	-0.763	0.049	0	30.38	0	1.479	1.533	-0.054
166	47.951	-0.763	-0.696	0	30.35	0	1.48	1.534	-0.054
166.1	47.957	-0.76	-1.271	0	30.34	0	1.481	1.535	-0.054
166.2	47.957	-0.76	-0.727	0	30.36	0	1.482	1.536	-0.054
166.3	47.964	-0.76	-0.537	0	29.53	0	1.482	1.536	-0.054
166.4	47.964	-0.768	-0.932	0	26.97	0	1.483	1.537	-0.054
166.5	47.964	-0.773	-0.72	0	23.62	0	1.484	1.538	-0.054
166.6	47.957	-0.773	-0.074	0	22.62	0	1.485	1.538	-0.054
166.7	47.945	-0.77	-0.604	0	22.38	0	1.485	1.539	-0.054
166.8	47.939	-0.77	-1.049	0	22.33	0	1.486	1.54	-0.054
166.9	47.926	-0.765	-0.872	0	22.35	0	1.486	1.54	-0.054
167	47.914	-0.74	-0.886	0	22.34	0	1.487	1.541	-0.054
167.1	47.902	-0.743	-0.851	0	21.77	0	1.488	1.541	-0.054
167.2	47.895	-0.743	-0.918	0	21.35	0	1.488	1.542	-0.054
167.3	47.883	-0.775	-0.279	0	20.99	0	1.489	1.543	-0.054
167.4	47.87	-0.77	-0.233	0	20.32	0	1.489	1.543	-0.054
167.5	47.858	-0.77	-0.713	0	20.32	0	1.49	1.544	-0.054
167.6	47.846	-0.758	-1.105	0	20.31	0	1.49	1.544	-0.054
167.7	47.833	-0.753	-0.646	0	20.3	0	1.491	1.545	-0.054
167.8	47.833	-0.753	-0.766	0	20.3	0	1.492	1.545	-0.054
167.9	47.808	-0.765	-0.932	0	20.28	0	1.492	1.546	-0.054
168	47.79	-0.775	-0.297	0	19.91	0	1.493	1.547	-0.054
168.1	47.777	-0.775	-0.413	0	19.42	0	1.493	1.547	-0.054
168.2	47.759	-0.768	-0.48	0	18.83	0	1.494	1.548	-0.054
168.3	47.746	-0.74	-0.809	0	18.72	0	1.494	1.548	-0.054
168.4	47.728	-0.74	-1.275	0	18.67	0	1.495	1.549	-0.054
168.5	47.715	-0.76	-1.271	0	18.22	0	1.495	1.549	-0.054
168.6	47.696	-0.763	-0.279	0	17.41	0	1.496	1.55	-0.054
168.7	47.678	-0.763	0.092	0	16.58	0	1.496	1.55	-0.054
168.8	47.659	-0.748	-0.904	0	14.85	0	1.497	1.551	-0.054

168.9	47.634	-0.76	-1.035	0	13.76	0	1.497	1.551	-0.054
169	47.609	-0.76	-0.205	0	12.8	0	1.497	1.551	-0.054
169.1	47.585	-0.763	-0.72	0	11.55	0	1.498	1.552	-0.054
169.2	47.554	-0.763	-0.385	0	10.11	0	1.498	1.552	-0.054
169.3	47.522	-0.763	-0.685	0	9.22	0	1.498	1.552	-0.054
169.4	47.485	-0.785	-0.809	0	8.67	0	1.499	1.552	-0.054
169.5	47.454	-0.78	-0.501	0	8.27	0	1.499	1.553	-0.054
169.6	47.417	-0.78	0.007	0	7.69	0	1.499	1.553	-0.054
169.7	47.38	-0.75	-1.526	0	7.14	0	1.499	1.553	-0.054
169.8	47.342	-0.75	-1.42	0	7.08	0	1.499	1.553	-0.054
169.9	47.311	-0.768	-0.48	0	6.7	0	1.5	1.553	-0.054
170	47.268	-0.77	-0.36	0	6.43	0	1.5	1.554	-0.054
170.1	47.23	-0.753	-0.48	0	5.79	0	1.5	1.554	-0.054
170.2	47.193	-0.753	-0.562	0	4.9	0	1.5	1.554	-0.054
170.3	47.15	-0.77	-0.908	0	4.45	0	1.5	1.554	-0.054
170.4	47.106	-0.77	-0.445	0	4.46	0	1.5	1.554	-0.054
170.5	47.069	-0.77	-0.374	0	4.43	0	1.5	1.554	-0.054
170.6	47.025	-0.75	-0.562	0	4.23	0	1.501	1.554	-0.054
170.7	46.982	-0.743	-0.964	0	4.11	0	1.501	1.554	-0.054
170.8	46.938	-0.743	-1.42	0	3.84	0	1.501	1.555	-0.054
170.9	46.895	-0.765	-0.484	0	3.57	0	1.501	1.555	-0.054
171	46.851	-0.765	-0.219	0	3	0	1.501	1.555	-0.054
171.1	46.814	-0.765	-1.201	0	2.63	0	1.501	1.555	-0.054
171.2	46.764	-0.755	-0.918	0	2.35	0	1.501	1.555	-0.054
171.3	46.721	-0.748	-0.562	0	2.34	0	1.501	1.555	-0.054
171.4	46.671	-0.748	-0.833	0	2.34	0	1.501	1.555	-0.054
171.5	46.634	-0.75	-0.752	0	2.34	0	1.501	1.555	-0.054
171.6	46.584	-0.77	-0.872	0	2.33	0	1.501	1.555	-0.054
171.7	46.541	-0.77	-0.021	0	1.62	0	1.501	1.555	-0.054
171.8	46.497	-0.758	-0.678	0	0.71	0	1.501	1.555	-0.054
171.9	46.447	-0.745	-0.961	0	0	0	1.501	1.555	-0.054
172	46.398	-0.745	-0.851	0	0	0	1.501	1.555	-0.054
172.1	46.348	-0.76	-0.752	0	0	0	1.501	1.555	-0.054
172.2	46.298	-0.758	-0.59	0	0	0	1.501	1.555	-0.054
172.3	46.249	-0.758	-0.477	0	0	0	1.501	1.555	-0.054
172.4	46.199	-0.755	-0.932	0	0.94	0	1.501	1.555	-0.054
172.5	46.155	-0.748	-0.667	0	1.24	0	1.501	1.555	-0.054
172.6	46.106	-0.748	-0.72	0	1.86	0	1.502	1.555	-0.054
172.7	46.062	-0.763	-0.265	0	2.77	0	1.502	1.555	-0.054
172.8	46.019	-0.763	-0.06	0	3.91	0	1.502	1.556	-0.054
172.9	45.981	-0.745	-0.982	0	5.13	0	1.502	1.556	-0.054
173	45.944	-0.763	-1.091	0	6.66	0	1.502	1.556	-0.054
173.1	45.907	-0.748	0.021	0	8.08	0	1.502	1.556	-0.054
173.2	45.876	-0.748	-0.788	0	9.72	0	1.503	1.556	-0.054
173.3	45.845	-0.748	-1.049	0	10.15	0	1.503	1.557	-0.054
173.4	45.807	-0.745	-0.547	0	10.12	0	1.503	1.557	-0.054
173.5	45.783	-0.745	-0.445	0	10.14	0	1.503	1.557	-0.054

173.6	45.758	-0.745	-0.3	0	10.24	0	1.504	1.558	-0.054
173.7	45.727	-0.75	-0.851	0	10.92	0	1.504	1.558	-0.054
173.8	45.702	-0.75	-0.752	0	12.78	0	1.504	1.558	-0.054
173.9	45.677	-0.755	-0.706	0	14.15	0	1.505	1.559	-0.054
174	45.658	-0.773	-0.837	0	14.77	0	1.505	1.559	-0.054
174.1	45.634	-0.773	-0.06	0	14.76	0	1.506	1.559	-0.054
174.2	45.615	-0.755	-0.671	0	14.74	0	1.506	1.56	-0.054
174.3	45.596	-0.78	-1.243	0	15.02	0	1.506	1.56	-0.054
174.4	45.578	-0.78	-0.385	0	15.35	0	1.507	1.561	-0.054
174.5	45.559	-0.765	-0.06	0	15.34	0	1.507	1.561	-0.054
174.6	45.54	-0.775	-1.201	0	15.43	0	1.508	1.562	-0.054
174.7	45.522	-0.775	-0.738	0	15.69	0	1.508	1.562	-0.054
174.8	45.503	-0.78	-0.046	0	17.04	0	1.509	1.562	-0.054
174.9	45.484	-0.785	-0.922	0	17.42	0	1.509	1.563	-0.054
175	45.472	-0.785	-0.388	0	17.44	0	1.51	1.563	-0.054
175.1	45.453	-0.788	-0.738	0	17.41	0	1.51	1.564	-0.054
175.2	45.441	-0.76	-0.092	0	17.4	0	1.51	1.564	-0.054
175.3	45.422	-0.76	-0.872	0	17.43	0	1.511	1.565	-0.054
175.4	45.41	-0.775	-1.243	0	17.4	0	1.511	1.565	-0.054
175.5	45.397	-0.755	-0.247	0	17.42	0	1.512	1.566	-0.054
175.6	45.379	-0.755	-0.805	0	17.41	0	1.512	1.566	-0.054
175.7	45.366	-0.75	-0.996	0	17.39	0	1.513	1.567	-0.054
175.8	45.348	-0.75	-0.879	0	17.42	0	1.513	1.567	-0.054
175.9	45.335	-0.765	-0.304	0	17.39	0	1.514	1.568	-0.054
176	45.323	-0.763	-0.431	0	17.28	0	1.514	1.568	-0.054
176.1	45.304	-0.763	-0.706	0	17.22	0	1.515	1.569	-0.054
176.2	45.292	-0.763	-0.872	0	17.18	0	1.515	1.569	-0.054
176.3	45.279	-0.77	-0.932	0	17.21	0	1.516	1.57	-0.054
176.4	45.261	-0.77	-0.576	0	17.18	0	1.516	1.57	-0.054
176.5	45.248	-0.77	-0.47	0	17.16	0	1.517	1.571	-0.054
176.6	45.23	-0.773	-1.119	0	17.21	0	1.517	1.571	-0.054
176.7	45.217	-0.773	-0.59	0	17.15	0	1.518	1.572	-0.054
176.8	45.199	-0.773	-0.371	0	17.18	0	1.518	1.572	-0.054
176.9	45.186	-0.73	-0.918	0	17.18	0	1.519	1.573	-0.054
177	45.167	-0.74	-0.872	0	16.54	0	1.519	1.573	-0.054
177.1	45.155	-0.74	-0.872	0	16.02	0	1.52	1.573	-0.054
177.2	45.136	-0.763	-0.473	0	15.01	0	1.52	1.574	-0.054
177.3	45.118	-0.768	-0.487	0	13.7	0	1.52	1.574	-0.054
177.4	45.093	-0.768	-0.833	0	12.46	0	1.521	1.575	-0.054
177.5	45.074	-0.763	-0.576	0	9.01	0	1.521	1.575	-0.054
177.6	45.043	-0.75	-0.65	0	5.55	0	1.521	1.575	-0.054
177.7	45.006	-0.75	-1.441	0	3.2	0	1.521	1.575	-0.054
177.8	44.969	-0.758	-0.766	0	1.7	0	1.521	1.575	-0.054
177.9	44.919	-0.768	0.17	0	0.66	0	1.521	1.575	-0.054
178	44.882	-0.768	-0.29	0	0	0	1.521	1.575	-0.054
178.1	44.832	-0.758	-1.201	0	0	0	1.521	1.575	-0.054
178.2	44.782	-0.768	-0.918	0	0	0	1.521	1.575	-0.054

178.3	44.733	-0.768	-0.459	0	0	0	1.521	1.575	-0.054
178.4	44.689	-0.763	-0.328	0	0	0	1.521	1.575	-0.054
178.5	44.639	-0.75	-0.791	0	0	0	1.521	1.575	-0.054
178.6	44.59	-0.75	-0.918	0	0	0	1.521	1.575	-0.054
178.7	44.54	-0.76	-0.533	0	0	0	1.521	1.575	-0.054
178.8	44.484	-0.76	-0.657	0	0	0	1.521	1.575	-0.054
178.9	44.428	-0.763	-0.752	0	0	0	1.521	1.575	-0.054
179	44.36	-0.745	-0.385	0	-4.1	0	1.521	1.575	-0.054
179.1	44.285	-0.74	-0.904	0	-7.06	0	1.521	1.575	-0.054
179.2	44.204	-0.74	-0.904	0	-10.61	0	1.521	1.575	-0.054
179.3	44.117	-0.745	-0.576	0	-14.56	0	1.52	1.575	-0.055
179.4	44.006	-0.765	-0.265	0	-17.23	0	1.52	1.575	-0.055
179.5	43.906	-0.765	-0.918	0	-19.62	0	1.519	1.575	-0.056
179.6	43.794	-0.76	-0.777	0	-21.58	0	1.519	1.575	-0.057
179.7	43.676	-0.76	-0.59	0	-21.87	0	1.518	1.575	-0.057
179.8	43.564	-0.76	-1.109	0	-21.82	0	1.517	1.575	-0.058
179.9	43.459	-0.758	-0.403	0	-21.41	0	1.517	1.575	-0.058
180	43.347	-0.75	-0.413	0	-17.04	0	1.516	1.575	-0.059
180.1	43.266	-0.75	-0.858	0	-13.85	0	1.516	1.575	-0.059
180.2	43.179	-0.753	-1.434	0	-13.23	0	1.516	1.575	-0.06
180.3	43.092	-0.765	-0.636	0	-13.31	0	1.515	1.575	-0.06
180.4	42.999	-0.765	0.081	0	-14.92	0	1.515	1.575	-0.06
180.5	42.912	-0.753	-0.611	0	-17.42	0	1.514	1.575	-0.061
180.6	42.812	-0.76	-0.978	0	-18.95	0	1.514	1.575	-0.061
180.7	42.707	-0.76	-0.385	0	-19.06	0	1.513	1.575	-0.062
180.8	42.607	-0.76	-0.692	0	-19.02	0	1.513	1.575	-0.062
180.9	42.502	-0.74	-1.021	0	-18.99	0	1.512	1.575	-0.063
181	42.402	-0.74	-1.024	0	-18.92	0	1.512	1.575	-0.063
181.1	42.297	-0.763	-0.509	0	-18.84	0	1.511	1.575	-0.064
181.2	42.197	-0.765	-0.12	0	-18.79	0	1.511	1.575	-0.064
181.3	42.098	-0.765	-0.569	0	-18.19	0	1.51	1.575	-0.065
181.4	42.005	-0.755	-0.604	0	-14.98	0	1.51	1.575	-0.065
181.5	41.911	-0.753	-0.533	0	-3.3	0	1.51	1.575	-0.066
181.6	41.862	-0.753	-1.183	0	0	0	1.51	1.575	-0.066
181.7	41.812	-0.763	-0.742	0	0	0	1.51	1.575	-0.066
181.8	41.769	-0.763	-0.431	0	0	0	1.51	1.575	-0.066
181.9	41.725	-0.76	-0.42	0	0	0	1.51	1.575	-0.066
182	41.675	-0.768	-0.562	0	0	0	1.51	1.575	-0.066
182.1	41.632	-0.768	-0.611	0	0	0	1.51	1.575	-0.066
182.2	41.588	-0.768	-0.636	0	1.52	0	1.51	1.575	-0.066
182.3	41.545	-0.773	-0.982	0	2.96	0	1.51	1.575	-0.066
182.4	41.501	-0.768	-0.533	0	6.84	0	1.51	1.576	-0.066
182.5	41.477	-0.768	-0.406	0	14.03	0	1.51	1.576	-0.066
182.6	41.464	-0.763	-1.024	0	19.86	0	1.511	1.577	-0.066
182.7	41.464	-0.758	-0.519	0	22.17	0	1.512	1.577	-0.066
182.8	41.464	-0.758	-0.777	0	22.95	0	1.512	1.578	-0.066
182.9	41.464	-0.743	-0.678	0	23.76	0	1.513	1.578	-0.066

183	41.47	-0.755	-0.848	0	27.67	0	1.514	1.579	-0.066
183.1	41.483	-0.755	-0.371	0	33.4	0	1.515	1.58	-0.066
183.2	41.501	-0.758	-0.417	0	35.14	0	1.516	1.581	-0.066
183.3	41.532	-0.755	-0.738	0	37.01	0	1.517	1.582	-0.066
183.4	41.564	-0.755	-0.886	0	38.69	0	1.518	1.583	-0.066
183.5	41.595	-0.738	-1.243	0	38.65	0	1.519	1.584	-0.066
183.6	41.632	-0.745	-0.851	0	38.69	0	1.52	1.585	-0.066
183.7	41.663	-0.745	-0.371	0	38.76	0	1.521	1.586	-0.066
183.8	41.7	-0.75	-0.752	0	39.78	0	1.522	1.588	-0.066
183.9	41.731	-0.768	-0.403	0	39.61	0	1.523	1.589	-0.066
184	41.769	-0.768	-0.452	0	40.05	0	1.524	1.59	-0.066
184.1	41.806	-0.735	-0.254	0	41.4	0	1.525	1.591	-0.066
184.2	41.843	-0.735	-1.515	0	42.55	0	1.527	1.592	-0.066
184.3	41.887	-0.735	-0.982	0	44.53	0	1.528	1.593	-0.066
184.4	41.936	-0.765	-0.576	0	47.26	0	1.529	1.595	-0.066
184.5	41.98	-0.793	-0.558	0	48.14	0	1.53	1.596	-0.066
184.6	42.03	-0.793	-0.032	0	49.76	0	1.532	1.597	-0.066
184.7	42.085	-0.763	-0.191	0	52.08	0	1.533	1.599	-0.066
184.8	42.141	-0.763	-1.515	0	56.82	0	1.535	1.6	-0.066
184.9	42.21	-0.763	-0.939	0	57.27	0	1.536	1.602	-0.066
185	42.278	-0.77	-0.766	0	58.16	0	1.538	1.604	-0.066
185.1	42.346	-0.765	-0.148	0	60.51	0	1.54	1.605	-0.066
185.2	42.415	-0.765	-0.872	0	61.46	0	1.541	1.607	-0.066
185.3	42.489	-0.748	-1.141	0	61.48	0	1.543	1.609	-0.066
185.4	42.57	-0.743	-0.215	0	61.35	0	1.545	1.61	-0.066
185.5	42.638	-0.743	-0.848	0	61.43	0	1.547	1.612	-0.066
185.6	42.713	-0.773	-0.604	0	61.4	0	1.548	1.614	-0.066
185.7	42.788	-0.763	-0.191	0	61.45	0	1.55	1.615	-0.066
185.8	42.862	-0.763	-0.886	0	62.5	0	1.552	1.617	-0.066
185.9	42.937	-0.743	-1.229	0	65.31	0	1.554	1.619	-0.066
186	43.011	-0.748	-0.738	0	65.68	0	1.555	1.621	-0.066
186.1	43.092	-0.748	-0.59	0	65.62	0	1.557	1.623	-0.066
186.2	43.173	-0.78	-0.865	0	65.63	0	1.559	1.625	-0.066
186.3	43.254	-0.773	-0.117	0	65.49	0	1.561	1.626	-0.066
186.4	43.334	-0.773	-0.622	0	65.62	0	1.563	1.628	-0.066
186.5	43.409	-0.74	-0.992	0	65.53	0	1.564	1.63	-0.066
186.6	43.49	-0.755	-1.148	0	65.42	0	1.566	1.632	-0.066
186.7	43.564	-0.755	-0.992	0	62.27	0	1.568	1.634	-0.066
186.8	43.639	-0.778	-0.307	0	53.85	0	1.57	1.635	-0.066
186.9	43.695	-0.765	0.155	0	39.37	0	1.571	1.636	-0.066
187	43.726	-0.765	-0.706	0	27.92	0	1.571	1.637	-0.066
187.1	43.732	-0.735	-1.232	0	20.37	0	1.572	1.637	-0.066
187.2	43.726	-0.753	-1.377	0	19.3	0	1.572	1.638	-0.066
187.3	43.72	-0.753	-0.438	0	18.49	0	1.573	1.638	-0.066
187.4	43.713	-0.768	-0.032	0	18.73	0	1.574	1.639	-0.066
187.5	43.707	-0.733	-0.576	0	19.11	0	1.574	1.64	-0.066
187.6	43.695	-0.733	-1.374	0	18.44	0	1.575	1.64	-0.066

187.7	43.682	-0.758	-0.83	0	17.24	0	1.575	1.641	-0.066
187.8	43.67	-0.758	-0.088	0	16.79	0	1.575	1.641	-0.066
187.9	43.658	-0.745	-0.611	0	16.83	0	1.576	1.641	-0.066
188	43.645	-0.75	-1.335	0	16.79	0	1.576	1.642	-0.066
188.1	43.633	-0.758	-0.675	0	16.81	0	1.577	1.642	-0.066
188.2	43.62	-0.758	-0.293	0	16.82	0	1.577	1.643	-0.066
188.3	43.608	-0.755	-0.946	0	17.04	0	1.578	1.643	-0.066
188.4	43.595	-0.768	-0.678	0	17.61	0	1.578	1.644	-0.066
188.5	43.583	-0.768	-0.265	0	17.6	0	1.579	1.644	-0.066
188.6	43.577	-0.763	-0.618	0	17.04	0	1.579	1.645	-0.066
188.7	43.564	-0.753	-0.742	0	13.85	0	1.58	1.645	-0.066
188.8	43.546	-0.753	-1.137	0	8.8	0	1.58	1.645	-0.066
188.9	43.521	-0.735	-0.742	0	6.16	0	1.58	1.646	-0.066
189	43.49	-0.755	-1.063	0	4.98	0	1.58	1.646	-0.066
189.1	43.452	-0.755	-0.487	0	4.22	0	1.58	1.646	-0.066
189.2	43.415	-0.758	-0.622	0	4.4	0	1.58	1.646	-0.066
189.3	43.378	-0.748	-1.197	0	5.65	0	1.581	1.646	-0.066
189.4	43.341	-0.748	-0.872	0	9.57	0	1.581	1.646	-0.066
189.5	43.316	-0.74	-0.565	0	13.14	0	1.581	1.647	-0.066
189.6	43.297	-0.753	-0.953	0	17.78	0	1.582	1.647	-0.066
189.7	43.285	-0.753	-0.399	0	20.51	0	1.582	1.648	-0.066
189.8	43.279	-0.753	-0.678	0	21.68	0	1.583	1.648	-0.066
189.9	43.279	-0.758	-0.692	0	23.43	0	1.584	1.649	-0.066
190	43.279	-0.758	-0.385	0	25.64	0	1.584	1.65	-0.066
190.1	43.285	-0.748	-1.038	0	27.41	0	1.585	1.651	-0.066
190.2	43.297	-0.748	-1.035	0	27.63	0	1.586	1.651	-0.066
190.3	43.303	-0.748	-0.795	0	27.67	0	1.587	1.652	-0.066
190.4	43.316	-0.748	-0.48	0	27.67	0	1.587	1.653	-0.066
190.5	43.322	-0.76	-1.049	0	28.26	0	1.588	1.654	-0.066
190.6	43.328	-0.76	-0.014	0	29.14	0	1.589	1.654	-0.066
190.7	43.341	-0.763	-0.279	0	29.27	0	1.59	1.655	-0.066
190.8	43.353	-0.763	-0.646	0	30.28	0	1.591	1.656	-0.066
190.9	43.365	-0.748	-1.377	0	31.69	0	1.591	1.657	-0.066
191	43.378	-0.735	-0.918	0	33.1	0	1.592	1.658	-0.066
191.1	43.397	-0.73	-0.667	0	34.81	0	1.593	1.659	-0.066
191.2	43.421	-0.73	-1.003	0	35.58	0	1.594	1.66	-0.066
191.3	43.44	-0.743	-1.003	0	35.47	0	1.595	1.661	-0.066
191.4	43.465	-0.745	-0.473	0	36.11	0	1.596	1.662	-0.066
191.5	43.49	-0.745	-0.607	0	36.33	0	1.597	1.663	-0.066
191.6	43.515	-0.735	-0.622	0	36.2	0	1.598	1.664	-0.066
191.7	43.539	-0.75	-0.872	0	35.35	0	1.599	1.665	-0.066
191.8	43.564	-0.75	-0.59	0	35.37	0	1.6	1.666	-0.066
191.9	43.583	-0.758	-0.265	0	35.39	0	1.601	1.667	-0.066
192	43.608	-0.76	-0.918	0	35.42	0	1.602	1.668	-0.066
192.1	43.633	-0.76	-0.643	0	35.45	0	1.603	1.669	-0.066
192.2	43.658	-0.748	-0.06	0	35.47	0	1.604	1.67	-0.066
192.3	43.676	-0.743	-0.667	0	35.89	0	1.605	1.671	-0.066

192.4	43.701	-0.743	-1.017	0	36.48	0	1.606	1.672	-0.066
192.5	43.726	-0.765	-0.501	0	38.03	0	1.607	1.673	-0.066
192.6	43.751	-0.75	-0.562	0	39.28	0	1.608	1.674	-0.066
192.7	43.782	-0.75	-0.858	0	41.75	0	1.61	1.675	-0.066
192.8	43.813	-0.745	-1.169	0	44.36	0	1.611	1.676	-0.066
192.9	43.85	-0.75	-0.403	0	44.42	0	1.612	1.678	-0.066
193	43.894	-0.75	-0.604	0	45.05	0	1.613	1.679	-0.066
193.1	43.937	-0.75	-0.738	0	45.08	0	1.615	1.68	-0.066
193.2	43.968	-0.743	-0.872	0	45.13	0	1.616	1.681	-0.066
193.3	44.012	-0.743	-0.682	0	45.19	0	1.617	1.683	-0.066
193.4	44.055	-0.753	-1.017	0	44.83	0	1.618	1.684	-0.066
193.5	44.093	-0.75	-0.325	0	44.21	0	1.62	1.685	-0.066
193.6	44.13	-0.75	-0.501	0	44.27	0	1.621	1.686	-0.066
193.7	44.167	-0.74	-1.077	0	44.32	0	1.622	1.687	-0.066
193.8	44.204	-0.74	-1.091	0	44.35	0	1.623	1.689	-0.066
193.9	44.242	-0.76	-0.06	0	44.41	0	1.624	1.69	-0.066
194	44.279	-0.75	-0.516	0	43.52	0	1.626	1.691	-0.066
194.1	44.316	-0.758	-1.243	0	43.44	0	1.627	1.692	-0.066
194.2	44.347	-0.758	-0.766	0	43.26	0	1.628	1.694	-0.066
194.3	44.385	-0.755	-0.706	0	43.27	0	1.629	1.695	-0.066
194.4	44.422	-0.758	-0.678	0	43.29	0	1.63	1.696	-0.066
194.5	44.459	-0.758	-0.576	0	42.87	0	1.632	1.697	-0.066
194.6	44.49	-0.723	-0.872	0	42.54	0	1.633	1.698	-0.066
194.7	44.527	-0.73	-1.031	0	42.6	0	1.634	1.7	-0.066
194.8	44.559	-0.73	-0.946	0	41.6	0	1.635	1.701	-0.066
194.9	44.596	-0.77	-0.194	0	41.58	0	1.636	1.702	-0.066
195	44.621	-0.75	-0.191	0	41.52	0	1.637	1.703	-0.066
195.1	44.652	-0.75	-1.031	0	40.87	0	1.639	1.704	-0.066
195.2	44.683	-0.733	-1.091	0	39.28	0	1.64	1.705	-0.066
195.3	44.714	-0.75	-0.837	0	35.89	0	1.641	1.706	-0.066
195.4	44.739	-0.75	-0.251	0	35.56	0	1.642	1.707	-0.066
195.5	44.757	-0.74	-0.06	0	35.57	0	1.643	1.708	-0.066
195.6	44.776	-0.755	-1.197	0	35.59	0	1.644	1.709	-0.066
195.7	44.795	-0.755	-0.706	0	35.6	0	1.645	1.71	-0.066
195.8	44.813	-0.758	-0.403	0	35.47	0	1.646	1.711	-0.066
195.9	44.838	-0.753	-0.833	0	32.46	0	1.647	1.712	-0.066
196	44.857	-0.753	-0.872	0	23.93	0	1.647	1.713	-0.066
196.1	44.851	-0.748	-0.724	0	20.37	0	1.648	1.713	-0.066
196.2	44.844	-0.753	-0.678	0	20.32	0	1.648	1.714	-0.066
196.3	44.838	-0.753	-0.78	0	20.12	0	1.649	1.714	-0.066
196.4	44.832	-0.748	-0.83	0	20.2	0	1.649	1.715	-0.066
196.5	44.82	-0.765	-0.519	0	20.11	0	1.65	1.716	-0.066
196.6	44.813	-0.765	-0.706	0	19.96	0	1.651	1.716	-0.066
196.7	44.801	-0.748	-0.191	0	17.5	0	1.651	1.717	-0.066
196.8	44.788	-0.748	-1.134	0	14.2	0	1.651	1.717	-0.066
196.9	44.77	-0.745	-1.077	0	12.39	0	1.652	1.717	-0.066
197	44.751	-0.768	-0.59	0	10.35	0	1.652	1.718	-0.066

197.1	44.72	-0.768	-0.219	0	10.14	0	1.652	1.718	-0.066
197.2	44.695	-0.768	-0.727	0	10.14	0	1.653	1.718	-0.066
197.3	44.664	-0.753	-0.752	0	10.73	0	1.653	1.718	-0.066
197.4	44.639	-0.76	-0.791	0	12.93	0	1.653	1.719	-0.066
197.5	44.621	-0.76	-0.738	0	14.93	0	1.654	1.719	-0.066
197.6	44.602	-0.758	-0.399	0	14.8	0	1.654	1.72	-0.066
197.7	44.583	-0.748	-0.569	0	14.01	0	1.655	1.72	-0.066
197.8	44.565	-0.748	-1.257	0	10.57	0	1.655	1.72	-0.066
197.9	44.54	-0.775	-0.706	0	7.34	0	1.655	1.721	-0.066
198	44.509	-0.788	0.109	0	5.9	0	1.655	1.721	-0.066
198.1	44.472	-0.788	-0.547	0	4.57	0	1.655	1.721	-0.066
198.2	44.434	-0.763	-0.872	0	3.53	0	1.655	1.721	-0.066
198.3	44.391	-0.765	-1.006	0	2.99	0	1.656	1.721	-0.066
198.4	44.353	-0.765	-0.791	0	2.5	0	1.656	1.721	-0.066
198.5	44.316	-0.77	-0.664	0	1.54	0	1.656	1.721	-0.066
198.6	44.266	-0.775	-0.622	0	0.69	0	1.656	1.721	-0.066
198.7	44.223	-0.775	-0.918	0	0	0	1.656	1.721	-0.066
198.8	44.173	-0.778	-0.318	0	0	0	1.656	1.721	-0.066
198.9	44.13	-0.77	-0.576	0	0	0	1.656	1.721	-0.066
199	44.08	-0.77	-0.678	0	0	0	1.656	1.721	-0.066
199.1	44.037	-0.733	-0.29	0	0	0	1.656	1.721	-0.066
199.2	43.987	-0.73	-1.003	0	0	0	1.656	1.721	-0.066
199.3	43.943	-0.73	-1.077	0	0	0	1.656	1.721	-0.066
199.4	43.894	-0.7	-0.431	0	0	0	1.656	1.721	-0.066
199.5	43.85	-0.685	-0.477	0	0	0	1.656	1.721	-0.066
199.6	43.8	-0.685	-1.402	0	0.78	0	1.656	1.721	-0.066
199.7	43.757	-0.75	-0.431	0	1.48	0	1.656	1.721	-0.066
199.8	43.713	-0.75	-0.042	0	1.84	0	1.656	1.721	-0.066
199.9	43.67	-0.76	-0.89	0	2.14	0	1.656	1.721	-0.066
200	43.626	-0.755	-0.622	0	2.23	0	1.656	1.721	-0.066
200.1	43.583	-0.765	-0.791	0	2.81	0	1.656	1.722	-0.066
200.2	43.546	-0.765	-0.547	0	4	0	1.656	1.722	-0.066
200.3	43.502	-0.74	-0.477	0	5.5	0	1.656	1.722	-0.066
200.4	43.471	-0.735	-0.946	0	7.22	0	1.656	1.722	-0.066
200.5	43.44	-0.735	-0.918	0	8.95	0	1.657	1.722	-0.066
200.6	43.409	-0.74	-0.463	0	11.3	0	1.657	1.723	-0.066
200.7	43.384	-0.743	-0.466	0	13.07	0	1.657	1.723	-0.066
200.8	43.365	-0.743	-1.197	0	15.13	0	1.658	1.723	-0.066
200.9	43.353	-0.753	-0.124	0	17.49	0	1.658	1.724	-0.066
201	43.341	-0.735	-0.251	0	18.04	0	1.659	1.724	-0.066
201.1	43.334	-0.735	-1.158	0	18.05	0	1.659	1.725	-0.066
201.2	43.322	-0.763	-0.802	0	18.04	0	1.66	1.725	-0.066
201.3	43.316	-0.755	0.194	0	18.06	0	1.66	1.726	-0.066
201.4	43.303	-0.755	-0.66	0	18.56	0	1.661	1.726	-0.066
201.5	43.297	-0.755	-1.36	0	19.61	0	1.661	1.727	-0.066
201.6	43.285	-0.758	-0.59	0	20.12	0	1.662	1.727	-0.066
201.7	43.285	-0.758	-0.35	0	20.09	0	1.662	1.728	-0.066

201.8	43.279	-0.763	-0.636	0	20.06	0	1.663	1.729	-0.066
201.9	43.272	-0.763	-0.777	0	20.08	0	1.664	1.729	-0.066
202	43.266	-0.763	-0.533	0	18.78	0	1.664	1.73	-0.066
202.1	43.254	-0.74	-0.59	0	18.7	0	1.665	1.73	-0.066
202.2	43.247	-0.743	-1.36	0	18.66	0	1.665	1.731	-0.066
202.3	43.235	-0.743	-0.996	0	18.7	0	1.666	1.731	-0.066
202.4	43.229	-0.738	-0.431	0	19.3	0	1.666	1.732	-0.066
202.5	43.223	-0.738	-0.72	0	19.22	0	1.667	1.732	-0.066
202.6	43.216	-0.738	-0.65	0	19.28	0	1.667	1.733	-0.066
202.7	43.21	-0.748	-0.872	0	19.23	0	1.668	1.733	-0.066
202.8	43.204	-0.748	-0.848	0	18.66	0	1.668	1.734	-0.066
202.9	43.192	-0.735	-1.134	0	18.64	0	1.669	1.734	-0.066
203	43.185	-0.76	-0.872	0	18.63	0	1.669	1.735	-0.066
203.1	43.179	-0.758	0.17	0	18.64	0	1.67	1.735	-0.066
203.2	43.173	-0.758	-0.636	0	18.64	0	1.67	1.736	-0.066
203.3	43.16	-0.763	-0.886	0	18.63	0	1.671	1.736	-0.066
203.4	43.154	-0.755	-0.205	0	18.65	0	1.671	1.737	-0.066
203.5	43.148	-0.755	-1.243	0	18.62	0	1.672	1.737	-0.066
203.6	43.136	-0.753	-1.077	0	18.63	0	1.672	1.738	-0.066
203.7	43.129	-0.765	-0.519	0	18.64	0	1.673	1.739	-0.066
203.8	43.123	-0.765	-0.932	0	18.66	0	1.674	1.739	-0.066
203.9	43.111	-0.75	-0.237	0	18.87	0	1.674	1.74	-0.066
204	43.105	-0.728	-0.72	0	18.83	0	1.675	1.74	-0.066
204.1	43.098	-0.728	-1.586	0	18.84	0	1.675	1.741	-0.066
204.2	43.092	-0.755	-0.738	0	18.85	0	1.676	1.741	-0.066
204.3	43.086	-0.775	-0.403	0	18.8	0	1.676	1.742	-0.066
204.4	43.073	-0.775	0.011	0	18.86	0	1.677	1.742	-0.066
204.5	43.067	-0.74	-0.636	0	18.8	0	1.677	1.743	-0.066
204.6	43.061	-0.733	-1.091	0	18.84	0	1.678	1.743	-0.066
204.7	43.049	-0.733	-0.477	0	18.81	0	1.678	1.744	-0.066
204.8	43.042	-0.725	-0.72	0	18.8	0	1.679	1.744	-0.066
204.9	43.036	-0.753	-0.904	0	18.85	0	1.679	1.745	-0.066
205	43.03	-0.753	-0.463	0	19.06	0	1.68	1.745	-0.066
205.1	43.018	-0.74	-0.417	0	20.05	0	1.68	1.746	-0.066
205.2	43.018	-0.74	-1.331	0	20.77	0	1.681	1.746	-0.066
205.3	43.011	-0.74	-0.752	0	21.81	0	1.682	1.747	-0.066
205.4	43.011	-0.74	-0.59	0	22.69	0	1.682	1.748	-0.066
205.5	43.011	-0.73	-0.477	0	24.32	0	1.683	1.748	-0.066
205.6	43.011	-0.73	-1.416	0	25.96	0	1.684	1.749	-0.066
205.7	43.018	-0.73	-0.763	0	27.54	0	1.684	1.75	-0.066
205.8	43.03	-0.73	-0.706	0	28	0	1.685	1.751	-0.066
205.9	43.036	-0.743	-0.177	0	28.97	0	1.686	1.751	-0.066
206	43.049	-0.725	-0.547	0	30.88	0	1.687	1.752	-0.066
206.1	43.061	-0.74	-1.73	0	31.8	0	1.688	1.753	-0.066
206.2	43.08	-0.74	-0.59	0	32.41	0	1.689	1.754	-0.066
206.3	43.098	-0.75	-0.18	0	32.76	0	1.689	1.755	-0.066
206.4	43.117	-0.75	-0.562	0	33.87	0	1.69	1.756	-0.066

206.5	43.136	-0.75	-0.989	0	35.89	0	1.691	1.757	-0.066
206.6	43.16	-0.733	-0.604	0	36.83	0	1.692	1.758	-0.066
206.7	43.185	-0.725	-0.996	0	38.73	0	1.694	1.759	-0.066
206.8	43.216	-0.725	-1.049	0	40.48	0	1.695	1.76	-0.066
206.9	43.247	-0.753	-0.724	0	41.3	0	1.696	1.761	-0.066
207	43.285	-0.755	-0.562	0	42.2	0	1.697	1.762	-0.066
207.1	43.322	-0.755	-0.604	0	42.78	0	1.698	1.764	-0.066
207.2	43.359	-0.735	-0.593	0	42.73	0	1.699	1.765	-0.066
207.3	43.397	-0.74	-0.932	0	42.69	0	1.701	1.766	-0.066
207.4	43.434	-0.74	-0.251	0	42.61	0	1.702	1.767	-0.066
207.5	43.471	-0.743	-0.562	0	43.23	0	1.703	1.768	-0.066
207.6	43.508	-0.74	-0.823	0	43.53	0	1.704	1.77	-0.066
207.7	43.546	-0.74	-0.692	0	43.55	0	1.705	1.771	-0.066
207.8	43.583	-0.733	-1.091	0	43.57	0	1.707	1.772	-0.066
207.9	43.62	-0.75	-0.766	0	43.65	0	1.708	1.773	-0.066
208	43.658	-0.75	-0.124	0	43.51	0	1.709	1.774	-0.066
208.1	43.695	-0.73	-1.01	0	43.29	0	1.71	1.776	-0.066
208.2	43.732	-0.725	-1.091	0	41.66	0	1.711	1.777	-0.066
208.3	43.769	-0.725	-0.918	0	38.69	0	1.712	1.778	-0.066
208.4	43.794	-0.745	-0.335	0	32.73	0	1.713	1.779	-0.066
208.5	43.813	-0.74	-0.448	0	28.12	0	1.714	1.78	-0.066
208.6	43.825	-0.74	-0.519	0	25.93	0	1.715	1.78	-0.066
208.7	43.825	-0.748	-1.257	0	25.33	0	1.715	1.781	-0.066
208.8	43.832	-0.748	-0.692	0	22.7	0	1.716	1.782	-0.066
208.9	43.832	-0.753	-0.194	0	18.11	0	1.717	1.782	-0.066
209	43.819	-0.743	-0.918	0	12.19	0	1.717	1.782	-0.066
209.1	43.8	-0.755	-0.943	0	8.96	0	1.717	1.783	-0.066
209.2	43.776	-0.755	-0.456	0	6.99	0	1.717	1.783	-0.066
209.3	43.745	-0.738	-0.752	0	5.4	0	1.718	1.783	-0.066
209.4	43.707	-0.735	-0.886	0	3.97	0	1.718	1.783	-0.066
209.5	43.67	-0.735	-0.636	0	2.86	0	1.718	1.783	-0.066
209.6	43.633	-0.72	-0.724	0	1.65	0	1.718	1.783	-0.066
209.7	43.589	-0.743	-1.271	0	0.62	0	1.718	1.783	-0.066
209.8	43.546	-0.743	-0.219	0	0	0	1.718	1.783	-0.066
209.9	43.496	-0.74	0.081	0	0	0	1.718	1.783	-0.066
210	43.452	-0.73	-0.72	0	0	0	1.718	1.783	-0.066
210.1	43.403	-0.73	-1.391	0	0	0	1.718	1.783	-0.066
210.2	43.359	-0.76	-0.117	0	0	0	1.718	1.783	-0.066
210.3	43.31	-0.735	0.053	0	0	0	1.718	1.783	-0.066
210.4	43.266	-0.735	-1.102	0	0	0	1.718	1.783	-0.066
210.5	43.216	-0.743	-1.116	0	0	0	1.718	1.783	-0.066
210.6	43.16	-0.755	-0.431	0	0	0	1.718	1.783	-0.066
210.7	43.098	-0.755	-0.148	0	-5.29	0	1.718	1.783	-0.066
210.8	43.024	-0.74	-1.077	0	-12.05	0	1.717	1.783	-0.066
210.9	42.924	-0.733	-1.081	0	-16.63	0	1.717	1.783	-0.066
211	42.819	-0.733	-0.374	0	-17.91	0	1.716	1.783	-0.067
211.1	42.713	-0.755	-1.063	0	-17.94	0	1.716	1.783	-0.067

211.2	42.62	-0.768	-0.399	0	-17.87	0	1.715	1.783	-0.068
211.3	42.52	-0.768	-0.046	0	-17.93	0	1.715	1.783	-0.068
211.4	42.427	-0.75	-1.021	0	-18.01	0	1.714	1.783	-0.069
211.5	42.328	-0.743	-0.946	0	-18.45	0	1.714	1.783	-0.069
211.6	42.222	-0.743	-0.946	0	-18.49	0	1.713	1.783	-0.07
211.7	42.129	-0.745	-0.445	0	-18.47	0	1.713	1.783	-0.07
211.8	42.023	-0.745	-0.124	0	-18.39	0	1.712	1.783	-0.071
211.9	41.918	-0.743	-0.816	0	-18.35	0	1.712	1.783	-0.072
212	41.824	-0.74	-0.692	0	-18.3	0	1.711	1.783	-0.072
212.1	41.731	-0.75	-0.872	0	-18.22	0	1.711	1.783	-0.073
212.2	41.632	-0.75	-0.886	0	-18.2	0	1.71	1.783	-0.073
212.3	41.532	-0.75	-0.233	0	-18.1	0	1.71	1.783	-0.074
212.4	41.439	-0.748	-0.279	0	-18.12	0	1.709	1.783	-0.074
212.5	41.34	-0.748	-0.65	0	-17.99	0	1.709	1.783	-0.075
212.6	41.24	-0.763	-0.886	0	-18.01	0	1.708	1.783	-0.075
212.7	41.135	-0.79	-0.692	0	-17.9	0	1.708	1.783	-0.076
212.8	41.048	-0.79	0.597	0	-17.9	0	1.707	1.783	-0.076
212.9	40.948	-0.728	-0.448	0	-17.11	0	1.707	1.783	-0.077
213	40.861	-0.73	-1.854	0	-14.54	0	1.706	1.783	-0.077
213.1	40.774	-0.73	-1.063	0	-13.8	0	1.706	1.783	-0.077
213.2	40.681	-0.763	0.222	0	-13.48	0	1.706	1.783	-0.078
213.3	40.6	-0.753	-0.279	0	-6.89	0	1.706	1.783	-0.078
213.4	40.532	-0.753	-0.519	0	0	0	1.705	1.783	-0.078
213.5	40.489	-0.738	-0.961	0	0	0	1.705	1.783	-0.078
213.6	40.445	-0.75	-0.78	0	0	0	1.706	1.783	-0.078
213.7	40.402	-0.75	-0.131	0	0	0	1.706	1.783	-0.078
213.8	40.364	-0.76	-0.145	0	0	0	1.706	1.783	-0.078
213.9	40.315	-0.758	-0.706	0	0	0	1.706	1.783	-0.078
214	40.271	-0.758	-0.953	0	0	0	1.706	1.783	-0.078
214.1	40.228	-0.765	-0.646	0	0	0	1.706	1.783	-0.078
214.2	40.184	-0.758	-1.035	0	0	0	1.706	1.783	-0.078
214.3	40.147	-0.758	-0.06	0	0.8	0	1.706	1.783	-0.078
214.4	40.103	-0.763	-1.374	0	3.22	0	1.706	1.784	-0.078
214.5	40.066	-0.755	-0.533	0	10.68	0	1.706	1.784	-0.078
214.6	40.047	-0.755	-0.385	0	20.47	0	1.707	1.784	-0.078
214.7	40.054	-0.758	-1.038	0	25	0	1.707	1.785	-0.078
214.8	40.06	-0.758	-0.71	0	27.28	0	1.708	1.786	-0.078
214.9	40.072	-0.76	-0.456	0	30.36	0	1.709	1.787	-0.078
215	40.091	-0.763	-0.738	0	31.82	0	1.71	1.788	-0.078
215.1	40.116	-0.74	-0.791	0	32.66	0	1.711	1.788	-0.078
215.2	40.141	-0.74	-0.872	0	34.39	0	1.712	1.789	-0.078
215.3	40.165	-0.77	-0.918	0	35.12	0	1.713	1.79	-0.078
215.4	40.197	-0.768	-0.205	0	35.56	0	1.714	1.791	-0.078
215.5	40.228	-0.768	-0.413	0	36.04	0	1.715	1.792	-0.078
215.6	40.265	-0.745	-1.063	0	36.05	0	1.716	1.793	-0.078
215.7	40.296	-0.753	-0.886	0	35.22	0	1.717	1.794	-0.078
215.8	40.327	-0.753	-0.233	0	34.98	0	1.717	1.795	-0.078

215.9	40.358	-0.753	-0.385	0	34.33	0	1.718	1.796	-0.078
216	40.383	-0.753	-0.59	0	34.42	0	1.719	1.797	-0.078
216.1	40.414	-0.753	-0.749	0	35.33	0	1.72	1.798	-0.078
216.2	40.445	-0.775	-1.035	0	36.08	0	1.721	1.799	-0.078
216.3	40.476	-0.74	-0.385	0	39.68	0	1.722	1.8	-0.078
216.4	40.507	-0.74	-0.918	0	48.98	0	1.724	1.802	-0.078
216.5	40.563	-0.743	-0.872	0	53.64	0	1.725	1.803	-0.078
216.6	40.638	-0.748	-0.074	0	55.06	0	1.727	1.805	-0.078
216.7	40.7	-0.748	-0.576	0	55.12	0	1.728	1.806	-0.078
216.8	40.768	-0.75	-0.946	0	55.04	0	1.73	1.808	-0.078
216.9	40.837	-0.673	-0.459	0	55.66	0	1.731	1.809	-0.078
217	40.905	-0.673	-0.671	0	58.04	0	1.733	1.811	-0.078
217.1	40.986	-0.693	-1.119	0	65.24	0	1.735	1.813	-0.078
217.2	41.066	-0.758	-0.901	0	72.42	0	1.737	1.815	-0.078
217.3	41.166	-0.758	-0.219	0	76.63	0	1.739	1.817	-0.078
217.4	41.271	-0.7	0.007	0	77.5	0	1.741	1.819	-0.078
217.5	41.383	-0.703	-0.996	0	77.48	0	1.743	1.821	-0.078
217.6	41.489	-0.703	-0.65	0	77.42	0	1.745	1.823	-0.078
217.7	41.595	-0.753	-0.102	0	77.26	0	1.748	1.826	-0.078
217.8	41.706	-0.753	-0.72	0	76.23	0	1.75	1.828	-0.078
217.9	41.806	-0.748	-0.491	0	72.77	0	1.752	1.83	-0.078
218	41.899	-0.745	-1.162	0	68.89	0	1.754	1.832	-0.078
218.1	41.992	-0.713	-0.886	0	68.81	0	1.756	1.833	-0.078
218.2	42.079	-0.713	-0.459	0	66.59	0	1.757	1.835	-0.078
218.3	42.166	-0.63	-0.576	0	62.5	0	1.759	1.837	-0.078
218.4	42.241	-0.62	-0.431	0	62.12	0	1.761	1.839	-0.078
218.5	42.315	-0.62	-0.71	0	61.93	0	1.763	1.841	-0.078
218.6	42.39	-0.75	-1.003	0	58.8	0	1.764	1.842	-0.078
218.7	42.465	-0.718	-0.286	0	51.69	0	1.766	1.844	-0.078
218.8	42.52	-0.718	-0.466	0	44.67	0	1.767	1.845	-0.078
218.9	42.564	-0.733	-0.833	0	42.54	0	1.768	1.846	-0.078
219	42.601	-0.658	-0.604	0	42.07	0	1.769	1.847	-0.078
219.1	42.638	-0.658	-0.385	0	41.91	0	1.77	1.848	-0.078
219.2	42.676	-0.723	-0.735	0	42.62	0	1.772	1.85	-0.078
219.3	42.713	-0.72	-0.441	0	43.06	0	1.773	1.851	-0.078
219.4	42.757	-0.72	-0.59	0	43.81	0	1.774	1.852	-0.078
219.5	42.794	-0.728	-0.466	0	44.35	0	1.775	1.853	-0.078
219.6	42.831	-0.72	-0.738	0	45.22	0	1.777	1.854	-0.078
219.7	42.881	-0.72	-0.858	0	46.21	0	1.778	1.856	-0.078
219.8	42.924	-0.725	-0.102	0	48.03	0	1.779	1.857	-0.078
219.9	42.968	-0.745	-0.138	0	48.31	0	1.78	1.858	-0.078
220	43.018	-0.745	-1.6	0	48.19	0	1.782	1.86	-0.078
220.1	43.067	-0.74	-0.184	0	46.3	0	1.783	1.861	-0.078
220.2	43.105	-0.763	-0.247	0	40	0	1.784	1.862	-0.078
220.3	43.142	-0.763	-0.622	0	35.83	0	1.785	1.863	-0.078
220.4	43.167	-0.743	-0.554	0	35.82	0	1.786	1.864	-0.078
220.5	43.192	-0.73	-0.72	0	35.62	0	1.787	1.865	-0.078

220.6	43.216	-0.73	-0.664	0	34.33	0	1.788	1.866	-0.078
220.7	43.241	-0.758	-0.509	0	34.12	0	1.789	1.867	-0.078
220.8	43.26	-0.758	-0.237	0	34.14	0	1.79	1.868	-0.078
220.9	43.279	-0.768	-0.625	0	34.32	0	1.791	1.869	-0.078
221	43.297	-0.735	-0.639	0	35.22	0	1.792	1.87	-0.078
221.1	43.322	-0.715	-0.671	0	35.88	0	1.793	1.871	-0.078
221.2	43.347	-0.715	-0.932	0	36.61	0	1.794	1.872	-0.078
221.3	43.372	-0.785	-0.032	0	39.57	0	1.795	1.873	-0.078
221.4	43.403	-0.773	-0.18	0	43.74	0	1.796	1.874	-0.078
221.5	43.44	-0.773	-0.625	0	44.96	0	1.798	1.875	-0.078
221.6	43.484	-0.635	-0.791	0	45.55	0	1.799	1.877	-0.078
221.7	43.521	-0.718	-1.201	0	45.56	0	1.8	1.878	-0.078
221.8	43.564	-0.718	-0.65	0	45.62	0	1.801	1.879	-0.078
221.9	43.608	-0.64	-0.36	0	44.64	0	1.803	1.88	-0.078
222	43.645	-0.708	-0.872	0	44.48	0	1.804	1.882	-0.078
222.1	43.682	-0.708	-0.72	0	44.54	0	1.805	1.883	-0.078
222.2	43.72	-0.728	-0.117	0	45.4	0	1.806	1.884	-0.078
222.3	43.763	-0.7	-0.152	0	45.7	0	1.808	1.885	-0.078
222.4	43.807	-0.7	-0.706	0	45.72	0	1.809	1.887	-0.078
222.5	43.844	-0.738	-0.685	0	45.56	0	1.81	1.888	-0.078
222.6	43.887	-0.753	-0.162	0	45.55	0	1.811	1.889	-0.078
222.7	43.925	-0.753	-0.314	0	45.46	0	1.813	1.891	-0.078
222.8	43.968	-0.7	-0.901	0	45.48	0	1.814	1.892	-0.078
222.9	44.006	-0.763	-0.47	0	45.52	0	1.815	1.893	-0.078
223	44.049	-0.763	-0.886	0	45.45	0	1.816	1.894	-0.078
223.1	44.086	-0.718	-0.636	0	45.46	0	1.818	1.896	-0.078
223.2	44.13	-0.775	-0.618	0	45.5	0	1.819	1.897	-0.078
223.3	44.167	-0.775	-0.66	0	45.54	0	1.82	1.898	-0.078
223.4	44.211	-0.778	-0.074	0	45.59	0	1.822	1.899	-0.078
223.5	44.248	-0.753	-0.749	0	45.61	0	1.823	1.901	-0.078
223.6	44.291	-0.753	-0.961	0	45.47	0	1.824	1.902	-0.078
223.7	44.329	-0.75	-1.091	0	45.51	0	1.825	1.903	-0.078
223.8	44.366	-0.75	-0.117	0	46.34	0	1.827	1.904	-0.078
223.9	44.403	-0.688	-1.374	0	46.36	0	1.828	1.906	-0.078
224	44.447	-0.778	-0.604	0	46.39	0	1.829	1.907	-0.078
224.1	44.49	-0.735	0.046	0	46.31	0	1.83	1.908	-0.078
224.2	44.527	-0.735	-1.091	0	46.32	0	1.832	1.91	-0.078
224.3	44.571	-0.643	-1.215	0	46.36	0	1.833	1.911	-0.078
224.4	44.614	-0.733	-0.378	0	46.41	0	1.834	1.912	-0.078
224.5	44.646	-0.733	-0.219	0	46.43	0	1.836	1.914	-0.078
224.6	44.689	-0.75	-0.72	0	46.36	0	1.837	1.915	-0.078
224.7	44.726	-0.77	-0.696	0	46.26	0	1.838	1.916	-0.078
224.8	44.764	-0.77	0.177	0	46.3	0	1.839	1.917	-0.078
224.9	44.807	-0.768	-0.886	0	46.36	0	1.841	1.919	-0.078
225	44.844	-0.76	-0.964	0	46.37	0	1.842	1.92	-0.078
225.1	44.882	-0.76	-0.523	0	46.39	0	1.843	1.921	-0.078
225.2	44.925	-0.773	-0.886	0	46.28	0	1.845	1.923	-0.078

225.3	44.969	-0.77	-0.562	0	46.32	0	1.846	1.924	-0.078
225.4	45.006	-0.77	0.095	0	46.33	0	1.847	1.925	-0.078
225.5	45.043	-0.755	-0.72	0	46.39	0	1.848	1.926	-0.078
225.6	45.087	-0.75	-1.229	0	46.43	0	1.85	1.928	-0.078
225.7	45.118	-0.75	-0.886	0	46.39	0	1.851	1.929	-0.078
225.8	45.161	-0.753	-0.576	0	46.26	0	1.852	1.93	-0.078
225.9	45.199	-0.79	-0.233	0	46.34	0	1.854	1.932	-0.078
226	45.242	-0.79	-0.427	0	46.35	0	1.855	1.933	-0.078
226.1	45.279	-0.788	-0.604	0	46.39	0	1.856	1.934	-0.078
226.2	45.317	-0.753	-0.735	0	46.46	0	1.858	1.935	-0.078
226.3	45.354	-0.753	-0.78	0	46.32	0	1.859	1.937	-0.078
226.4	45.397	-0.765	-1.063	0	46.24	0	1.86	1.938	-0.078
226.5	45.435	-0.755	-0.597	0	46.3	0	1.861	1.939	-0.078
226.6	45.472	-0.755	-0.78	0	46.3	0	1.863	1.941	-0.078
226.7	45.509	-0.77	-0.279	0	45.5	0	1.864	1.942	-0.078
226.8	45.547	-0.77	-0.562	0	44.45	0	1.865	1.943	-0.078
226.9	45.584	-0.768	-0.851	0	43.83	0	1.866	1.944	-0.078
227	45.615	-0.758	-0.735	0	43.65	0	1.868	1.945	-0.078
227.1	45.646	-0.768	-0.413	0	43.69	0	1.869	1.947	-0.078
227.2	45.677	-0.768	-0.562	0	43.83	0	1.87	1.948	-0.078
227.3	45.714	-0.765	-0.604	0	44.49	0	1.871	1.949	-0.078
227.4	45.745	-0.77	-1.257	0	45.08	0	1.873	1.95	-0.078
227.5	45.783	-0.77	-0.117	0	45.62	0	1.874	1.952	-0.078
227.6	45.814	-0.733	-0.901	0	45.34	0	1.875	1.953	-0.078
227.7	45.851	-0.748	-0.982	0	45.4	0	1.876	1.954	-0.078
227.8	45.888	-0.748	-0.749	0	45.49	0	1.878	1.955	-0.078
227.9	45.926	-0.765	-0.459	0	46.43	0	1.879	1.957	-0.078
228	45.963	-0.755	-0.604	0	46.37	0	1.88	1.958	-0.078
228.1	45.994	-0.755	-0.886	0	46.68	0	1.881	1.959	-0.078
228.2	46.031	-0.748	-0.576	0	49.25	0	1.883	1.961	-0.078
228.3	46.075	-0.748	-0.932	0	51.69	0	1.884	1.962	-0.078
228.4	46.124	-0.748	-0.562	0	52.46	0	1.886	1.964	-0.078
228.5	46.168	-0.753	-0.445	0	53.71	0	1.887	1.965	-0.078
228.6	46.211	-0.75	-0.576	0	54.35	0	1.889	1.967	-0.078
228.7	46.267	-0.75	-0.999	0	55.22	0	1.89	1.968	-0.078
228.8	46.311	-0.753	-0.576	0	56.42	0	1.892	1.97	-0.078
228.9	46.367	-0.758	-0.413	0	56.41	0	1.893	1.971	-0.078
229	46.416	-0.758	-0.735	0	56.36	0	1.895	1.973	-0.078
229.1	46.472	-0.748	-0.576	0	56.33	0	1.896	1.974	-0.078
229.2	46.522	-0.76	-0.932	0	56.39	0	1.898	1.976	-0.078
229.3	46.578	-0.76	-0.374	0	55.7	0	1.9	1.977	-0.078
229.4	46.634	-0.758	-0.237	0	54.25	0	1.901	1.979	-0.078
229.5	46.677	-0.763	-0.932	0	52.5	0	1.903	1.98	-0.078
229.6	46.721	-0.763	-1.105	0	51.29	0	1.904	1.982	-0.078
229.7	46.764	-0.75	-0.618	0	50.39	0	1.905	1.983	-0.078
229.8	46.802	-0.75	-0.819	0	50.07	0	1.907	1.985	-0.078
229.9	46.845	-0.743	-0.735	0	50.12	0	1.908	1.986	-0.078

230	46.882	-0.758	-0.819	0	50.02	0	1.91	1.987	-0.078
230.1	46.926	-0.755	-0.364	0	49.34	0	1.911	1.989	-0.078
230.2	46.963	-0.755	-0.562	0	49.19	0	1.912	1.99	-0.078
230.3	47.001	-0.743	-0.65	0	49.2	0	1.914	1.992	-0.078
230.4	47.044	-0.755	-0.886	0	49.16	0	1.915	1.993	-0.078
230.5	47.081	-0.755	-0.576	0	48.94	0	1.916	1.994	-0.078
230.6	47.119	-0.75	-0.576	0	48.99	0	1.918	1.996	-0.078
230.7	47.156	-0.748	-0.413	0	48.97	0	1.919	1.997	-0.078
230.8	47.199	-0.748	-0.735	0	46.5	0	1.92	1.998	-0.078
230.9	47.23	-0.75	-1.134	0	43.62	0	1.922	1.999	-0.078
231	47.255	-0.758	-0.78	0	41.82	0	1.923	2.001	-0.078
231.1	47.286	-0.758	-0.131	0	40.65	0	1.924	2.002	-0.078
231.2	47.305	-0.753	-0.72	0	39.08	0	1.925	2.003	-0.078
231.3	47.33	-0.758	-1.031	0	38.97	0	1.926	2.004	-0.078
231.4	47.348	-0.758	-0.78	0	38.18	0	1.927	2.005	-0.078
231.5	47.367	-0.745	-0.763	0	36.51	0	1.928	2.006	-0.078
231.6	47.386	-0.743	-0.901	0	33.62	0	1.929	2.007	-0.078
231.7	47.392	-0.743	-1.105	0	30.69	0	1.93	2.008	-0.078
231.8	47.404	-0.758	-0.459	0	29.31	0	1.931	2.009	-0.078
231.9	47.404	-0.765	-0.293	0	28.99	0	1.932	2.009	-0.078
232	47.404	-0.765	-0.618	0	28.57	0	1.932	2.01	-0.078
232.1	47.404	-0.745	-1.063	0	28.63	0	1.933	2.011	-0.078
232.2	47.411	-0.743	-0.463	0	28.56	0	1.934	2.012	-0.078
232.3	47.411	-0.743	-0.766	0	28.6	0	1.935	2.013	-0.078
232.4	47.411	-0.775	-0.233	0	28.57	0	1.936	2.013	-0.078
232.5	47.417	-0.778	-0.247	0	28.57	0	1.936	2.014	-0.078
232.6	47.417	-0.778	-0.533	0	27.67	0	1.937	2.015	-0.078
232.7	47.417	-0.745	-1.063	0	25.64	0	1.938	2.016	-0.078
232.8	47.411	-0.745	-1.063	0	24.94	0	1.938	2.016	-0.078
232.9	47.411	-0.733	-0.978	0	24.88	0	1.939	2.017	-0.078
233	47.404	-0.745	-0.664	0	24.39	0	1.94	2.018	-0.078
233.1	47.398	-0.755	-0.463	0	23.51	0	1.941	2.018	-0.078
233.2	47.392	-0.755	-0.618	0	22.93	0	1.941	2.019	-0.078
233.3	47.386	-0.753	-0.191	0	22.08	0	1.942	2.02	-0.078
233.4	47.373	-0.765	-0.537	0	21.72	0	1.942	2.02	-0.078
233.5	47.367	-0.765	-0.971	0	21.33	0	1.943	2.021	-0.078
233.6	47.355	-0.745	0.067	0	20.76	0	1.944	2.021	-0.078
233.7	47.342	-0.76	-1.091	0	19.95	0	1.944	2.022	-0.078
233.8	47.33	-0.76	-1.105	0	19.42	0	1.945	2.023	-0.078
233.9	47.317	-0.773	0.035	0	18.98	0	1.945	2.023	-0.078
234	47.299	-0.758	-0.283	0	18.99	0	1.946	2.024	-0.078
234.1	47.286	-0.758	-1.105	0	18.98	0	1.946	2.024	-0.078
234.2	47.274	-0.763	-0.604	0	19.11	0	1.947	2.025	-0.078
234.3	47.255	-0.78	-1.031	0	19.95	0	1.947	2.025	-0.078
234.4	47.243	-0.78	0.095	0	20.76	0	1.948	2.026	-0.078
234.5	47.23	-0.785	-0.735	0	20.7	0	1.948	2.026	-0.078
234.6	47.224	-0.778	-0.576	0	20.72	0	1.949	2.027	-0.078

234.7	47.212	-0.778	-0.484	0	20.72	0	1.95	2.027	-0.078
234.8	47.199	-0.773	-0.901	0	20.7	0	1.95	2.028	-0.078
234.9	47.187	-0.758	-0.399	0	20.72	0	1.951	2.029	-0.078
235	47.175	-0.758	-0.819	0	20.68	0	1.951	2.029	-0.078
235.1	47.162	-0.755	-1.024	0	20.69	0	1.952	2.03	-0.078
235.2	47.156	-0.748	-0.53	0	20.7	0	1.952	2.03	-0.078
235.3	47.143	-0.748	-0.901	0	20.67	0	1.953	2.031	-0.078
235.4	47.131	-0.76	-0.318	0	20.68	0	1.954	2.032	-0.078
235.5	47.119	-0.745	-0.494	0	20.67	0	1.954	2.032	-0.078
235.6	47.106	-0.745	-0.636	0	20.66	0	1.955	2.033	-0.078
235.7	47.094	-0.753	-1.229	0	20.68	0	1.955	2.033	-0.078
235.8	47.088	-0.753	-0.088	0	21.07	0	1.956	2.034	-0.078
235.9	47.075	-0.748	-0.562	0	21.3	0	1.957	2.034	-0.078
236	47.069	-0.753	-0.795	0	21.48	0	1.957	2.035	-0.078
236.1	47.063	-0.758	-0.72	0	21.97	0	1.958	2.036	-0.078
236.2	47.05	-0.758	-0.501	0	21.9	0	1.958	2.036	-0.078
236.3	47.038	-0.75	-1.063	0	21.95	0	1.959	2.037	-0.078
236.4	47.032	-0.753	-0.544	0	21.89	0	1.96	2.037	-0.078
236.5	47.025	-0.753	-0.413	0	21.95	0	1.96	2.038	-0.078
236.6	47.019	-0.738	-0.576	0	22.13	0	1.961	2.039	-0.078
236.7	47.007	-0.733	-1.183	0	23.56	0	1.961	2.039	-0.078
236.8	47.001	-0.733	-0.72	0	26.23	0	1.962	2.04	-0.078
236.9	47.001	-0.76	-0.823	0	27.83	0	1.963	2.041	-0.078
237	47.001	-0.785	-0.749	0	28.45	0	1.964	2.042	-0.078
237.1	47.001	-0.785	-0.378	0	28.68	0	1.965	2.042	-0.078
237.2	47.007	-0.758	-0.159	0	28.65	0	1.965	2.043	-0.078
237.3	47.007	-0.75	-1.035	0	28.69	0	1.966	2.044	-0.078
237.4	47.013	-0.75	-0.932	0	28.67	0	1.967	2.045	-0.078
237.5	47.013	-0.755	-0.604	0	28.71	0	1.968	2.046	-0.078
237.6	47.013	-0.755	-0.901	0	28.7	0	1.969	2.046	-0.078
237.7	47.019	-0.755	-0.413	0	28.7	0	1.969	2.047	-0.078
237.8	47.019	-0.738	-1.105	0	28.7	0	1.97	2.048	-0.078
237.9	47.025	-0.753	-0.735	0	28.73	0	1.971	2.049	-0.078
238	47.025	-0.753	-0.293	0	28.71	0	1.972	2.05	-0.078
238.1	47.032	-0.738	-0.653	0	28.56	0	1.972	2.05	-0.078
238.2	47.032	-0.735	-0.946	0	28.6	0	1.973	2.051	-0.078
238.3	47.038	-0.735	-1.031	0	28.54	0	1.974	2.052	-0.078
238.4	47.038	-0.763	-0.088	0	28.58	0	1.975	2.053	-0.078
238.5	47.044	-0.735	-0.233	0	28.51	0	1.976	2.054	-0.078
238.6	47.044	-0.735	-1.271	0	28.57	0	1.976	2.054	-0.078
238.7	47.05	-0.74	-0.946	0	28.54	0	1.977	2.055	-0.078
238.8	47.05	-0.74	-0.378	0	28.56	0	1.978	2.056	-0.078
238.9	47.056	-0.745	-0.618	0	27.71	0	1.979	2.057	-0.078
239	47.056	-0.74	-0.547	0	27.61	0	1.98	2.057	-0.078
239.1	47.063	-0.755	-0.562	0	27.03	0	1.98	2.058	-0.078
239.2	47.063	-0.755	-0.297	0	27.06	0	1.981	2.059	-0.078
239.3	47.063	-0.743	-0.48	0	27.07	0	1.982	2.06	-0.078

239.4	47.063	-0.75	-0.946	0	27.09	0	1.983	2.06	-0.078
239.5	47.063	-0.75	-0.735	0	27.08	0	1.983	2.061	-0.078
239.6	47.063	-0.75	-0.413	0	27.1	0	1.984	2.062	-0.078
239.7	47.063	-0.753	-0.509	0	27.09	0	1.985	2.063	-0.078
239.8	47.063	-0.753	-0.576	0	27.08	0	1.986	2.063	-0.078
239.9	47.063	-0.735	-0.237	0	27.12	0	1.986	2.064	-0.078
240	47.063	-0.745	-1.063	0	27.06	0	1.987	2.065	-0.078
240.1	47.063	-0.745	-0.735	0	27.11	0	1.988	2.066	-0.078
240.2	47.063	-0.753	-0.279	0	27.08	0	1.989	2.066	-0.078
240.3	47.063	-0.758	-0.562	0	27.1	0	1.989	2.067	-0.078
240.4	47.063	-0.758	-0.735	0	27.07	0	1.99	2.068	-0.078
240.5	47.063	-0.748	-0.413	0	27.1	0	1.991	2.069	-0.078
240.6	47.063	-0.745	-0.735	0	27.08	0	1.992	2.069	-0.078
240.7	47.063	-0.745	-0.622	0	27.09	0	1.992	2.07	-0.078
240.8	47.063	-0.753	-0.869	0	27.12	0	1.993	2.071	-0.078
240.9	47.063	-0.745	-0.413	0	27.64	0	1.994	2.072	-0.078
241	47.063	-0.745	-0.989	0	27.71	0	1.995	2.073	-0.078
241.1	47.063	-0.748	-0.946	0	27.69	0	1.995	2.073	-0.078
241.2	47.069	-0.75	-0.766	0	27.69	0	1.996	2.074	-0.078
241.3	47.069	-0.75	-0.523	0	27.69	0	1.997	2.075	-0.078
241.4	47.069	-0.75	-0.939	0	27.7	0	1.998	2.076	-0.078
241.5	47.075	-0.765	-0.579	0	27.69	0	1.999	2.076	-0.078
241.6	47.075	-0.765	0.007	0	27.69	0	1.999	2.077	-0.078
241.7	47.075	-0.755	-0.53	0	27.73	0	2	2.078	-0.078
241.8	47.075	-0.755	-0.78	0	27.69	0	2.001	2.079	-0.078
241.9	47.075	-0.748	-0.72	0	27.71	0	2.002	2.079	-0.078
242	47.081	-0.768	-0.72	0	28	0	2.002	2.08	-0.078
242.1	47.081	-0.76	-0.427	0	28.6	0	2.003	2.081	-0.078
242.2	47.081	-0.76	-0.357	0	28.58	0	2.004	2.082	-0.078
242.3	47.088	-0.76	-1.063	0	28.52	0	2.005	2.083	-0.078
242.4	47.088	-0.755	-0.65	0	27.68	0	2.006	2.083	-0.078
242.5	47.088	-0.755	-0.65	0	27.35	0	2.006	2.084	-0.078
242.6	47.094	-0.763	-0.72	0	27.1	0	2.007	2.085	-0.078
242.7	47.094	-0.75	-0.533	0	27.1	0	2.008	2.086	-0.078
242.8	47.094	-0.75	-0.901	0	27.08	0	2.009	2.086	-0.078
242.9	47.094	-0.748	-0.706	0	27.11	0	2.009	2.087	-0.078
243	47.094	-0.763	-0.78	0	27.1	0	2.01	2.088	-0.078
243.1	47.094	-0.763	-0.074	0	27.12	0	2.011	2.089	-0.078
243.2	47.094	-0.755	-0.886	0	27.32	0	2.012	2.089	-0.078
243.3	47.1	-0.748	-0.851	0	27.84	0	2.012	2.09	-0.078
243.4	47.1	-0.748	-0.413	0	28.98	0	2.013	2.091	-0.078
243.5	47.1	-0.753	-0.901	0	29.82	0	2.014	2.092	-0.078
243.6	47.106	-0.75	-0.516	0	30.51	0	2.015	2.093	-0.078
243.7	47.112	-0.75	-0.074	0	30.82	0	2.016	2.094	-0.078
243.8	47.119	-0.745	-1.215	0	31.08	0	2.017	2.094	-0.078
243.9	47.125	-0.75	-0.819	0	32.24	0	2.017	2.095	-0.078
244	47.137	-0.75	-0.406	0	33.43	0	2.018	2.096	-0.078

244.1	47.143	-0.755	-0.985	0	34.81	0	2.019	2.097	-0.078
244.2	47.162	-0.743	-0.562	0	36.14	0	2.02	2.098	-0.078
244.3	47.181	-0.743	-0.604	0	36.81	0	2.021	2.099	-0.078
244.4	47.193	-0.758	-0.886	0	38.2	0	2.022	2.1	-0.078
244.5	47.212	-0.76	-0.078	0	38.78	0	2.023	2.101	-0.078
244.6	47.237	-0.76	-0.364	0	40.18	0	2.025	2.102	-0.078
244.7	47.255	-0.758	-1.137	0	40.62	0	2.026	2.104	-0.078
244.8	47.28	-0.758	-0.72	0	40.61	0	2.027	2.105	-0.078
244.9	47.305	-0.758	-0.088	0	40.63	0	2.028	2.106	-0.078
245	47.324	-0.755	-1.063	0	40.65	0	2.029	2.107	-0.078
245.1	47.348	-0.753	-0.727	0	40.46	0	2.03	2.108	-0.078
245.2	47.373	-0.753	-0.247	0	40.46	0	2.031	2.109	-0.078
245.3	47.398	-0.748	-1.169	0	40.49	0	2.032	2.11	-0.078
245.4	47.417	-0.74	-0.618	0	40.5	0	2.034	2.111	-0.078
245.5	47.442	-0.74	-0.332	0	40.53	0	2.035	2.113	-0.078
245.6	47.467	-0.733	-0.886	0	40.56	0	2.036	2.114	-0.078
245.7	47.491	-0.753	-0.901	0	41.32	0	2.037	2.115	-0.078
245.8	47.51	-0.753	0.194	0	43.55	0	2.038	2.116	-0.078
245.9	47.535	-0.738	-0.399	0	44.32	0	2.039	2.117	-0.078
246	47.566	-0.758	-1.275	0	44.33	0	2.041	2.119	-0.078
246.1	47.597	-0.758	-0.448	0	46.63	0	2.042	2.12	-0.078
246.2	47.628	-0.73	-0.194	0	49.78	0	2.043	2.121	-0.078
246.3	47.665	-0.743	-1.257	0	49.75	0	2.045	2.123	-0.078
246.4	47.703	-0.743	-0.604	0	49.76	0	2.046	2.124	-0.078
246.5	47.746	-0.758	-0.399	0	48.7	0	2.047	2.125	-0.078
246.6	47.777	-0.743	-0.434	0	47.31	0	2.049	2.127	-0.078
246.7	47.815	-0.743	-0.547	0	45.4	0	2.05	2.128	-0.078
246.8	47.839	-0.743	-1.052	0	43.65	0	2.051	2.129	-0.078
246.9	47.87	-0.748	-0.403	0	42.85	0	2.052	2.13	-0.078
247	47.895	-0.748	-0.886	0	41.66	0	2.054	2.131	-0.078
247.1	47.92	-0.74	-0.413	0	41.52	0	2.055	2.133	-0.078
247.2	47.939	-0.748	-0.72	0	40.56	0	2.056	2.134	-0.078
247.3	47.964	-0.748	-0.872	0	38.07	0	2.057	2.135	-0.078
247.4	47.982	-0.753	-0.399	0	34.7	0	2.058	2.136	-0.078
247.5	47.995	-0.75	-0.562	0	32.46	0	2.059	2.137	-0.078
247.6	48.001	-0.75	-0.65	0	30.69	0	2.06	2.138	-0.078
247.7	48.001	-0.74	-0.908	0	30.02	0	2.06	2.138	-0.078
247.8	48.007	-0.74	-0.971	0	29.43	0	2.061	2.139	-0.078
247.9	48.007	-0.743	-0.886	0	29.34	0	2.062	2.14	-0.078
248	48.007	-0.74	-0.604	0	29.03	0	2.063	2.141	-0.078
248.1	48.007	-0.74	-0.427	0	28.63	0	2.064	2.142	-0.078
248.2	48.013	-0.74	-0.932	0	28.66	0	2.065	2.142	-0.078
248.3	48.013	-0.748	-0.247	0	28.62	0	2.065	2.143	-0.078
248.4	48.013	-0.743	-0.565	0	28.66	0	2.066	2.144	-0.078
248.5	48.013	-0.743	-0.77	0	28.61	0	2.067	2.145	-0.078
248.6	48.013	-0.753	-0.562	0	29.01	0	2.068	2.146	-0.078
248.7	48.02	-0.758	-0.562	0	29.31	0	2.069	2.146	-0.078

248.8	48.02	-0.758	-0.533	0	29.86	0	2.069	2.147	-0.078
248.9	48.02	-0.758	-0.562	0	30.32	0	2.07	2.148	-0.078
249	48.026	-0.748	-0.562	0	30.92	0	2.071	2.149	-0.078
249.1	48.032	-0.748	-1.049	0	31.18	0	2.072	2.15	-0.078
249.2	48.032	-0.748	-0.763	0	31.59	0	2.073	2.151	-0.078
249.3	48.038	-0.755	-0.766	0	31.59	0	2.074	2.152	-0.078
249.4	48.044	-0.755	-0.357	0	31.61	0	2.075	2.152	-0.078
249.5	48.051	-0.77	-0.689	0	31.59	0	2.075	2.153	-0.078
249.6	48.057	-0.765	-0.569	0	31.22	0	2.076	2.154	-0.078
249.7	48.057	-0.765	-0.706	0	30.08	0	2.077	2.155	-0.078
249.8	48.063	-0.74	-1.081	0	28.65	0	2.078	2.156	-0.078
249.9	48.063	-0.745	-1.377	0	27.33	0	2.079	2.157	-0.078
250	48.063	-0.745	-0.72	0	26.69	0	2.079	2.157	-0.078
250.1	48.063	-0.738	-0.074	0	25.9	0	2.08	2.158	-0.078
250.2	48.057	-0.733	-0.562	0	25.79	0	2.081	2.159	-0.078
250.3	48.051	-0.733	-1.229	0	25.79	0	2.082	2.159	-0.078
250.4	48.051	-0.74	-0.562	0	25.77	0	2.082	2.16	-0.078
250.5	48.044	-0.75	-0.791	0	25.42	0	2.083	2.161	-0.078
250.6	48.038	-0.75	-0.872	0	25.13	0	2.084	2.162	-0.078
250.7	48.032	-0.75	-0.593	0	25.12	0	2.084	2.162	-0.078
250.8	48.032	-0.75	-0.886	0	25.08	0	2.085	2.163	-0.078
250.9	48.026	-0.753	-0.805	0	25.1	0	2.086	2.164	-0.078
251	48.02	-0.76	-0.399	0	25.06	0	2.087	2.164	-0.078
251.1	48.013	-0.76	-0.766	0	25.09	0	2.087	2.165	-0.078
251.2	48.013	-0.76	-0.501	0	25.63	0	2.088	2.166	-0.078
251.3	48.007	-0.753	-0.886	0	25.66	0	2.089	2.167	-0.078
251.4	48.001	-0.753	-0.219	0	25.68	0	2.089	2.167	-0.078
251.5	48.001	-0.753	-1.035	0	25.67	0	2.09	2.168	-0.078
251.6	47.995	-0.763	-0.152	0	25.68	0	2.091	2.169	-0.078
251.7	47.988	-0.748	-0.138	0	25.65	0	2.091	2.169	-0.078
251.8	47.982	-0.748	-1.201	0	25.64	0	2.092	2.17	-0.078
251.9	47.982	-0.758	-0.625	0	25.65	0	2.093	2.171	-0.078
252	47.976	-0.748	-0.184	0	25.62	0	2.094	2.171	-0.078
252.1	47.976	-0.748	-0.996	0	25.66	0	2.094	2.172	-0.078
252.2	47.97	-0.755	-0.593	0	25.67	0	2.095	2.173	-0.078
252.3	47.964	-0.773	-0.604	0	26.2	0	2.096	2.174	-0.078
252.4	47.957	-0.773	-0.413	0	26.7	0	2.097	2.174	-0.078
252.5	47.957	-0.76	-0.385	0	27.06	0	2.097	2.175	-0.078
252.6	47.957	-0.765	-1.215	0	27.53	0	2.098	2.176	-0.078
252.7	47.951	-0.765	-0.219	0	28.01	0	2.099	2.177	-0.078
252.8	47.951	-0.75	-0.547	0	28	0	2.1	2.177	-0.078
252.9	47.957	-0.758	-1.119	0	28	0	2.1	2.178	-0.078
253	47.951	-0.758	-0.41	0	28.01	0	2.101	2.179	-0.078
253.1	47.951	-0.763	0.109	0	27.98	0	2.102	2.18	-0.078
253.2	47.951	-0.745	-0.706	0	28.01	0	2.103	2.181	-0.078
253.3	47.951	-0.745	-1.035	0	27.98	0	2.103	2.181	-0.078
253.4	47.951	-0.748	-0.946	0	28	0	2.104	2.182	-0.078

253.5	47.951	-0.75	-0.604	0	27.98	0	2.105	2.183	-0.078
253.6	47.951	-0.75	-0.459	0	27.85	0	2.106	2.184	-0.078
253.7	47.951	-0.745	-0.862	0	27.81	0	2.107	2.184	-0.078
253.8	47.951	-0.745	-0.922	0	27.83	0	2.107	2.185	-0.078
253.9	47.951	-0.765	-0.268	0	27.8	0	2.108	2.186	-0.078
254	47.951	-0.803	-0.632	0	27.8	0	2.109	2.187	-0.078
254.1	47.951	-0.778	0.141	0	27.82	0	2.11	2.188	-0.078
254.2	47.945	-0.778	-0.576	0	27.78	0	2.11	2.188	-0.078
254.3	47.945	-0.735	-2.041	0	27.84	0	2.111	2.189	-0.078
254.4	47.945	-0.753	-0.918	0	27.78	0	2.112	2.19	-0.078
254.5	47.945	-0.753	-0.021	0	27.85	0	2.113	2.191	-0.078
254.6	47.951	-0.763	-0.374	0	27.78	0	2.114	2.191	-0.078
254.7	47.945	-0.763	-0.904	0	27.84	0	2.114	2.192	-0.078
254.8	47.945	-0.763	-0.427	0	27.78	0	2.115	2.193	-0.078
254.9	47.945	-0.753	-0.547	0	27.83	0	2.116	2.194	-0.078
255	47.945	-0.768	-1.063	0	27.8	0	2.117	2.194	-0.078
255.1	47.945	-0.768	-0.219	0	27.82	0	2.117	2.195	-0.078
255.2	47.945	-0.768	-0.932	0	27.76	0	2.118	2.196	-0.078
255.3	47.945	-0.778	-1.038	0	28.17	0	2.119	2.197	-0.078
255.4	47.945	-0.778	-0.219	0	29.08	0	2.12	2.198	-0.078
255.5	47.945	-0.773	-0.208	0	29.66	0	2.121	2.198	-0.078
255.6	47.945	-0.748	-0.692	0	30.24	0	2.121	2.199	-0.078
255.7	47.957	-0.748	-1.303	0	32.34	0	2.122	2.2	-0.078
255.8	47.957	-0.753	-1.229	0	33.35	0	2.123	2.201	-0.078
255.9	47.97	-0.758	-0.29	0	34.45	0	2.124	2.202	-0.078
256	47.982	-0.758	-0.614	0	35.83	0	2.125	2.203	-0.078
256.1	47.995	-0.765	-0.992	0	37.09	0	2.126	2.204	-0.078
256.2	48.013	-0.763	-0.551	0	38.31	0	2.127	2.205	-0.078
256.3	48.026	-0.763	-0.385	0	40.22	0	2.128	2.206	-0.078
256.4	48.051	-0.755	-0.989	0	42.24	0	2.13	2.207	-0.078
256.5	48.075	-0.748	-0.72	0	43.59	0	2.131	2.209	-0.078
256.6	48.1	-0.748	-0.491	0	44.49	0	2.132	2.21	-0.078
256.7	48.125	-0.743	-1.271	0	45.59	0	2.133	2.211	-0.078
256.8	48.156	-0.743	-0.706	0	46.21	0	2.135	2.212	-0.078
256.9	48.187	-0.76	-0.576	0	47.66	0	2.136	2.214	-0.078
257	48.225	-0.763	-0.064	0	50.09	0	2.137	2.215	-0.078
257.1	48.256	-0.758	-0.78	0	52.82	0	2.139	2.217	-0.078
257.2	48.299	-0.758	-0.431	0	54.13	0	2.14	2.218	-0.078
257.3	48.343	-0.763	-0.706	0	55.48	0	2.142	2.22	-0.078
257.4	48.386	-0.763	-0.632	0	55.93	0	2.143	2.221	-0.078
257.5	48.436	-0.763	-0.533	0	55.73	0	2.145	2.223	-0.078
257.6	48.479	-0.753	-0.904	0	55.77	0	2.146	2.224	-0.078
257.7	48.529	-0.758	-0.777	0	55.81	0	2.148	2.226	-0.078
257.8	48.573	-0.758	-0.72	0	55.88	0	2.15	2.227	-0.078
257.9	48.616	-0.765	-0.247	0	55.71	0	2.151	2.229	-0.078
258	48.66	-0.758	-0.858	0	54.99	0	2.153	2.231	-0.078
258.1	48.709	-0.758	-0.692	0	53.69	0	2.154	2.232	-0.078

258.2	48.747	-0.743	-0.466	0	53.63	0	2.156	2.233	-0.078
258.3	48.79	-0.738	-0.533	0	53.51	0	2.157	2.235	-0.078
258.4	48.827	-0.738	-0.886	0	53.58	0	2.159	2.236	-0.078
258.5	48.871	-0.745	-0.371	0	53.62	0	2.16	2.238	-0.078
258.6	48.908	-0.758	-0.576	0	53.64	0	2.162	2.239	-0.078
258.7	48.952	-0.758	-0.618	0	51.34	0	2.163	2.241	-0.078
258.8	48.989	-0.77	-0.562	0	47.51	0	2.164	2.242	-0.078
258.9	49.02	-0.763	-0.162	0	43.14	0	2.166	2.243	-0.078
259	49.045	-0.763	-0.604	0	39.71	0	2.167	2.244	-0.078
259.1	49.057	-0.745	-1.003	0	37.16	0	2.168	2.246	-0.078
259.2	49.076	-0.738	-0.72	0	35.52	0	2.169	2.247	-0.078
259.3	49.082	-0.738	-0.371	0	34.01	0	2.17	2.247	-0.078
259.4	49.095	-0.758	-1.105	0	33.75	0	2.171	2.248	-0.078
259.5	49.101	-0.763	-0.53	0	33.75	0	2.171	2.249	-0.078
259.6	49.107	-0.763	-0.233	0	33.71	0	2.172	2.25	-0.078
259.7	49.107	-0.745	-1.243	0	33.73	0	2.173	2.251	-0.078
259.8	49.119	-0.745	-0.692	0	33.24	0	2.174	2.252	-0.078
259.9	49.126	-0.748	-0.932	0	32.88	0	2.175	2.253	-0.078
260	49.126	-0.758	-0.72	0	31.79	0	2.176	2.254	-0.078
260.1	49.132	-0.743	-0.399	0	31	0	2.177	2.255	-0.078
260.2	49.138	-0.743	-0.904	0	30.73	0	2.178	2.256	-0.078
260.3	49.138	-0.723	-1.077	0	30.74	0	2.179	2.256	-0.078
260.4	49.138	-0.738	-0.491	0	30.77	0	2.179	2.257	-0.078
260.5	49.144	-0.738	-0.576	0	30.77	0	2.18	2.258	-0.078
260.6	49.15	-0.75	0.095	0	30.54	0	2.181	2.259	-0.078
260.7	49.144	-0.745	-0.65	0	29.7	0	2.182	2.26	-0.078
260.8	49.15	-0.745	-1.091	0	28.67	0	2.183	2.261	-0.078
260.9	49.144	-0.75	-0.904	0	27.41	0	2.184	2.261	-0.078
261	49.144	-0.73	-0.562	0	26.52	0	2.184	2.262	-0.078
261.1	49.138	-0.73	-1.289	0	25.67	0	2.185	2.263	-0.078
261.2	49.132	-0.745	-1.031	0	25.65	0	2.186	2.264	-0.078
261.3	49.126	-0.755	-0.431	0	25.63	0	2.186	2.264	-0.078
261.4	49.119	-0.755	-0.547	0	25.61	0	2.187	2.265	-0.078
261.5	49.113	-0.765	-0.932	0	25.63	0	2.188	2.266	-0.078
261.6	49.107	-0.75	-0.403	0	25.56	0	2.189	2.266	-0.078
261.7	49.101	-0.75	-0.971	0	25.62	0	2.189	2.267	-0.078
261.8	49.095	-0.755	-0.886	0	25.56	0	2.19	2.268	-0.078
261.9	49.088	-0.76	-0.399	0	25.6	0	2.191	2.269	-0.078
262	49.082	-0.76	-0.706	0	25.57	0	2.191	2.269	-0.078
262.1	49.076	-0.775	-0.399	0	25.56	0	2.192	2.27	-0.078
262.2	49.07	-0.765	-0.445	0	25.59	0	2.193	2.271	-0.078
262.3	49.07	-0.765	-0.844	0	25.53	0	2.194	2.271	-0.078
262.4	49.063	-0.755	-0.678	0	25.6	0	2.194	2.272	-0.078
262.5	49.057	-0.758	-1.091	0	25.52	0	2.195	2.273	-0.078
262.6	49.045	-0.758	-0.706	0	25.59	0	2.196	2.274	-0.078
262.7	49.045	-0.755	-0.304	0	25.54	0	2.196	2.274	-0.078
262.8	49.039	-0.755	-0.706	0	25.53	0	2.197	2.275	-0.078

262.9	49.032	-0.76	-0.385	0	25.55	0	2.198	2.276	-0.078
263	49.026	-0.76	-0.752	0	25.49	0	2.198	2.276	-0.078
263.1	49.02	-0.753	-0.279	0	25.55	0	2.199	2.277	-0.078
263.2	49.014	-0.753	-1.211	0	25.48	0	2.2	2.278	-0.078
263.3	49.008	-0.765	-0.932	0	25.53	0	2.201	2.279	-0.078
263.4	49.001	-0.778	-0.501	0	25.46	0	2.201	2.279	-0.078
263.5	48.995	-0.778	0.311	0	25.5	0	2.202	2.28	-0.078
263.6	48.989	-0.738	-1.112	0	25.49	0	2.203	2.281	-0.078
263.7	48.983	-0.738	-1.416	0	25.48	0	2.203	2.281	-0.078
263.8	48.976	-0.738	-0.417	0	25.5	0	2.204	2.282	-0.078
263.9	48.97	-0.76	-0.547	0	25.45	0	2.205	2.283	-0.078
264	48.964	-0.76	-0.47	0	25.47	0	2.206	2.283	-0.078
264.1	48.958	-0.76	-0.385	0	25.45	0	2.206	2.284	-0.078
264.2	48.952	-0.745	-0.706	0	25.46	0	2.207	2.285	-0.078
264.3	48.945	-0.76	-1.197	0	25.44	0	2.208	2.286	-0.078
264.4	48.939	-0.76	-0.791	0	25.44	0	2.208	2.286	-0.078
264.5	48.933	-0.763	-0.35	0	25.44	0	2.209	2.287	-0.078
264.6	48.927	-0.758	-0.957	0	24.81	0	2.21	2.288	-0.078
264.7	48.921	-0.758	-0.385	0	23.22	0	2.21	2.288	-0.078
264.8	48.908	-0.733	-1.342	0	21.18	0	2.211	2.289	-0.078
264.9	48.896	-0.768	-1.176	0	17.99	0	2.212	2.289	-0.078
265	48.877	-0.768	-0.06	0	14.66	0	2.212	2.29	-0.078
265.1	48.852	-0.768	-0.858	0	12.19	0	2.212	2.29	-0.078
265.2	48.821	-0.753	-0.788	0	10.65	0	2.213	2.29	-0.078
265.3	48.79	-0.753	-0.547	0	7.97	0	2.213	2.291	-0.078
265.4	48.753	-0.78	-1.116	0	7.27	0	2.213	2.291	-0.078
265.5	48.716	-0.773	-0.385	0	7.27	0	2.213	2.291	-0.078
265.6	48.678	-0.773	-0.385	0	7.26	0	2.213	2.291	-0.078
265.7	48.641	-0.768	-1.088	0	7.56	0	2.214	2.291	-0.078
265.8	48.604	-0.768	-1.017	0	7.73	0	2.214	2.292	-0.078
265.9	48.566	-0.773	-0.205	0	7.24	0	2.214	2.292	-0.078
266	48.529	-0.748	-0.773	0	5.86	0	2.214	2.292	-0.078
266.1	48.486	-0.745	-1.155	0	4.34	0	2.214	2.292	-0.078
266.2	48.448	-0.745	-0.773	0	2.77	0	2.214	2.292	-0.078
266.3	48.399	-0.745	-0.918	0	1.28	0	2.214	2.292	-0.078
266.4	48.343	-0.738	-0.59	0	0	0	2.214	2.292	-0.078
266.5	48.299	-0.738	-0.533	0	0	0	2.214	2.292	-0.078
266.6	48.249	-0.765	-0.996	0	0	0	2.214	2.292	-0.078
266.7	48.194	-0.755	-0.219	0	0	0	2.214	2.292	-0.078
266.8	48.144	-0.755	-0.219	0	0	0	2.214	2.292	-0.078
266.9	48.1	-0.77	-1.162	0	0	0	2.214	2.292	-0.078
267	48.044	-0.765	-0.205	0	0	0	2.214	2.292	-0.078
267.1	47.995	-0.765	-0.343	0	0	0	2.214	2.292	-0.078
267.2	47.939	-0.748	-0.788	0	0	0	2.214	2.292	-0.078
267.3	47.895	-0.74	-0.872	0	0	0	2.214	2.292	-0.078
267.4	47.846	-0.74	-0.872	0	0	0	2.214	2.292	-0.078
267.5	47.796	-0.745	-0.3	0	0	0	2.214	2.292	-0.078

267.6	47.746	-0.738	-0.738	0	0	0	2.214	2.292	-0.078
267.7	47.69	-0.738	-0.957	0	0	0	2.214	2.292	-0.078
267.8	47.647	-0.75	-0.547	0	0	0	2.214	2.292	-0.078
267.9	47.597	-0.755	-0.18	0	0	0	2.214	2.292	-0.078
268	47.541	-0.755	-0.66	0	0	0	2.214	2.292	-0.078
268.1	47.498	-0.74	-1.275	0	0.96	0	2.214	2.292	-0.078
268.2	47.448	-0.755	-0.946	0	1.77	0	2.215	2.292	-0.078
268.3	47.404	-0.755	-0.343	0	3.16	0	2.215	2.293	-0.078
268.4	47.355	-0.75	-0.042	0	3.54	0	2.215	2.293	-0.078
268.5	47.311	-0.748	-0.618	0	3.54	0	2.215	2.293	-0.078
268.6	47.268	-0.748	-0.858	0	3.55	0	2.215	2.293	-0.078
268.7	47.224	-0.74	-0.59	0	3.55	0	2.215	2.293	-0.078
268.8	47.181	-0.74	-0.858	0	3.54	0	2.215	2.293	-0.078
268.9	47.137	-0.75	-0.83	0	3.55	0	2.215	2.293	-0.078
269	47.1	-0.758	-0.59	0	3.55	0	2.215	2.293	-0.078
269.1	47.05	-0.768	-0.943	0	3.54	0	2.215	2.293	-0.078
269.2	47.013	-0.768	-0.675	0	3.55	0	2.216	2.293	-0.078
269.3	46.969	-0.75	-0.06	0	3.44	0	2.216	2.293	-0.078
269.4	46.926	-0.753	-1.197	0	3.37	0	2.216	2.294	-0.078
269.5	46.882	-0.753	-1.003	0	3.34	0	2.216	2.294	-0.078
269.6	46.839	-0.743	-0.385	0	3.3	0	2.216	2.294	-0.078
269.7	46.795	-0.745	-0.858	0	3.31	0	2.216	2.294	-0.078
269.8	46.758	-0.745	-0.985	0	3.31	0	2.216	2.294	-0.078
269.9	46.715	-0.745	-0.417	0	3.3	0	2.216	2.294	-0.078
270	46.671	-0.735	-0.533	0	3.3	0	2.216	2.294	-0.078
270.1	46.628	-0.735	-0.858	0	3.3	0	2.216	2.294	-0.078
270.2	46.584	-0.753	-0.886	0	3.29	0	2.216	2.294	-0.078
270.3	46.541	-0.773	-0.29	0	3.29	0	2.217	2.294	-0.078
270.4	46.497	-0.773	-0.371	0	3.3	0	2.217	2.294	-0.078
270.5	46.454	-0.748	-0.533	0	3.3	0	2.217	2.295	-0.078
270.6	46.416	-0.74	-0.932	0	3.28	0	2.217	2.295	-0.078
270.7	46.373	-0.74	-1.197	0	3.29	0	2.217	2.295	-0.078
270.8	46.329	-0.745	-0.724	0	3.29	0	2.217	2.295	-0.078
270.9	46.286	-0.758	-0.448	0	3.29	0	2.217	2.295	-0.078
271	46.249	-0.758	-0.537	0	3.32	0	2.217	2.295	-0.078
271.1	46.199	-0.775	-0.915	0	3.88	0	2.217	2.295	-0.078
271.2	46.155	-0.778	-0.371	0	4.13	0	2.217	2.295	-0.078
271.3	46.118	-0.778	-0.491	0	4.47	0	2.218	2.295	-0.078
271.4	46.081	-0.765	-0.632	0	4.52	0	2.218	2.296	-0.078
271.5	46.044	-0.74	-0.738	0	4.63	0	2.218	2.296	-0.078
271.6	46.006	-0.74	-0.901	0	5.04	0	2.218	2.296	-0.078
271.7	45.963	-0.743	-1.063	0	5.5	0	2.218	2.296	-0.078
271.8	45.926	-0.743	-0.607	0	5.87	0	2.218	2.296	-0.078
271.9	45.894	-0.75	-0.576	0	6.67	0	2.218	2.296	-0.078
272	45.851	-0.783	-0.533	0	7.47	0	2.219	2.296	-0.078
272.1	45.826	-0.753	-0.042	0	8.49	0	2.219	2.297	-0.078
272.2	45.795	-0.753	-0.886	0	9.47	0	2.219	2.297	-0.078

272.3	45.764	-0.745	-1.374	0	10.96	0	2.219	2.297	-0.078
272.4	45.733	-0.768	-0.417	0	12.89	0	2.22	2.298	-0.078
272.5	45.708	-0.768	-0.12	0	15.37	0	2.22	2.298	-0.078
272.6	45.689	-0.765	0.124	0	16.74	0	2.221	2.299	-0.078
272.7	45.677	-0.768	-1.243	0	17.2	0	2.221	2.299	-0.078
272.8	45.665	-0.768	-0.858	0	17.49	0	2.222	2.3	-0.078
272.9	45.646	-0.758	-0.385	0	17.96	0	2.222	2.3	-0.078
273	45.634	-0.753	-0.798	0	18.31	0	2.223	2.301	-0.078
273.1	45.621	-0.753	-1.197	0	18.68	0	2.223	2.301	-0.078
273.2	45.609	-0.738	-1.031	0	18.61	0	2.224	2.302	-0.078
273.3	45.596	-0.74	-0.533	0	18.48	0	2.224	2.302	-0.078
273.4	45.584	-0.74	-0.491	0	17.85	0	2.225	2.303	-0.078
273.5	45.571	-0.745	-0.205	0	16.77	0	2.225	2.303	-0.078
273.6	45.559	-0.755	-1.183	0	14.97	0	2.226	2.303	-0.078
273.7	45.54	-0.755	-0.491	0	13.5	0	2.226	2.304	-0.078
273.8	45.515	-0.748	-0.233	0	12.67	0	2.226	2.304	-0.078
273.9	45.497	-0.735	-1.183	0	12.41	0	2.227	2.305	-0.078
274	45.472	-0.735	-0.59	0	12.4	0	2.227	2.305	-0.078
274.1	45.447	-0.755	-0.417	0	12.25	0	2.227	2.305	-0.078
274.2	45.422	-0.76	-0.456	0	11.11	0	2.228	2.306	-0.078
274.3	45.397	-0.76	-0.858	0	10.35	0	2.228	2.306	-0.078
274.4	45.373	-0.753	-0.943	0	9.69	0	2.228	2.306	-0.078
274.5	45.341	-0.743	-0.844	0	9.69	0	2.228	2.306	-0.078
274.6	45.317	-0.743	-0.943	0	9.7	0	2.229	2.307	-0.078
274.7	45.286	-0.745	-0.692	0	9.88	0	2.229	2.307	-0.078
274.8	45.254	-0.745	-0.533	0	10.26	0	2.229	2.307	-0.078
274.9	45.23	-0.743	-0.858	0	10.62	0	2.23	2.307	-0.078
275	45.199	-0.773	-0.862	0	10.62	0	2.23	2.308	-0.078
275.1	45.174	-0.765	-0.191	0	10.62	0	2.23	2.308	-0.078
275.2	45.149	-0.765	-0.12	0	11.04	0	2.23	2.308	-0.078
275.3	45.124	-0.75	-1.183	0	11.04	0	2.231	2.309	-0.078
275.4	45.099	-0.758	-0.901	0	11.53	0	2.231	2.309	-0.078
275.5	45.068	-0.758	-0.29	0	11.66	0	2.231	2.309	-0.078
275.6	45.049	-0.76	-0.385	0	12.15	0	2.232	2.31	-0.078
275.7	45.025	-0.763	-0.572	0	12.51	0	2.232	2.31	-0.078
275.8	45	-0.763	-0.487	0	12.46	0	2.232	2.31	-0.078
275.9	44.981	-0.74	-0.357	0	12.44	0	2.233	2.311	-0.078
276	44.956	-0.745	-1.183	0	12.47	0	2.233	2.311	-0.078
276.1	44.931	-0.745	-1.148	0	12.43	0	2.233	2.311	-0.078
276.2	44.906	-0.738	-0.533	0	12.46	0	2.234	2.312	-0.078
276.3	44.882	-0.738	-0.823	0	12.45	0	2.234	2.312	-0.078
276.4	44.863	-0.738	-1.328	0	12.65	0	2.235	2.312	-0.078
276.5	44.838	-0.738	-0.501	0	13.11	0	2.235	2.313	-0.078
276.6	44.82	-0.748	-0.886	0	13.05	0	2.235	2.313	-0.078
276.7	44.801	-0.748	-0.3	0	13.08	0	2.236	2.314	-0.078
276.8	44.776	-0.735	-1.063	0	13.07	0	2.236	2.314	-0.078
276.9	44.757	-0.743	-0.844	0	13.6	0	2.236	2.314	-0.078

277	44.733	-0.743	-0.576	0	13.72	0	2.237	2.315	-0.078
277.1	44.714	-0.76	-0.251	0	13.65	0	2.237	2.315	-0.078
277.2	44.695	-0.758	-0.692	0	13.71	0	2.238	2.315	-0.078
277.3	44.677	-0.758	-1.229	0	13.65	0	2.238	2.316	-0.078
277.4	44.658	-0.755	-0.533	0	13.68	0	2.238	2.316	-0.078
277.5	44.639	-0.753	-0.441	0	13.66	0	2.239	2.317	-0.078
277.6	44.614	-0.753	-0.763	0	13.66	0	2.239	2.317	-0.078
277.7	44.596	-0.75	-0.678	0	13.67	0	2.239	2.317	-0.078
277.8	44.577	-0.75	-0.463	0	13.64	0	2.24	2.318	-0.078
277.9	44.559	-0.733	-1.063	0	13.68	0	2.24	2.318	-0.078
278	44.534	-0.725	-1.3	0	13.62	0	2.241	2.318	-0.078
278.1	44.515	-0.74	-0.399	0	13.66	0	2.241	2.319	-0.078
278.2	44.496	-0.74	-0.678	0	13.67	0	2.241	2.319	-0.078
278.3	44.478	-0.758	-0.646	0	13.86	0	2.242	2.32	-0.078
278.4	44.459	-0.745	-0.692	0	13.87	0	2.242	2.32	-0.078
278.5	44.44	-0.745	-1.017	0	13.81	0	2.242	2.32	-0.078
278.6	44.416	-0.733	-0.692	0	13.85	0	2.243	2.321	-0.078
278.7	44.397	-0.743	-0.886	0	13.79	0	2.243	2.321	-0.078
278.8	44.378	-0.743	-0.823	0	13.83	0	2.244	2.321	-0.078
278.9	44.36	-0.745	-0.205	0	13.22	0	2.244	2.322	-0.078
279	44.341	-0.753	-0.872	0	13.23	0	2.244	2.322	-0.078
279.1	44.322	-0.753	-0.763	0	13.2	0	2.245	2.323	-0.078
279.2	44.298	-0.753	-0.456	0	13.02	0	2.245	2.323	-0.078
279.3	44.279	-0.75	-0.692	0	12.25	0	2.245	2.323	-0.078
279.4	44.254	-0.75	-1.063	0	11.19	0	2.246	2.324	-0.078
279.5	44.235	-0.778	-0.678	0	8.42	0	2.246	2.324	-0.078
279.6	44.204	-0.763	0.124	0	5.3	0	2.246	2.324	-0.078
279.7	44.167	-0.763	-0.901	0	3.04	0	2.246	2.324	-0.078
279.8	44.13	-0.768	-0.985	0	1.54	0	2.246	2.324	-0.078
279.9	44.086	-0.743	-0.749	0	0.59	0	2.246	2.324	-0.078
280	44.043	-0.743	-0.901	0	0	0	2.246	2.324	-0.078
280.1	43.993	-0.753	-0.759	0	0	0	2.246	2.324	-0.078
280.2	43.95	-0.745	-0.533	0	0	0	2.246	2.324	-0.078
280.3	43.9	-0.745	-0.823	0	0	0	2.246	2.324	-0.078
280.4	43.856	-0.75	-0.738	0	0	0	2.246	2.324	-0.078
280.5	43.807	-0.755	-0.562	0	0	0	2.246	2.324	-0.078
280.6	43.763	-0.755	-0.766	0	0	0	2.246	2.324	-0.078
280.7	43.72	-0.753	-0.918	0	0	0	2.246	2.324	-0.078
280.8	43.676	-0.753	-0.929	0	0	0	2.246	2.324	-0.078
280.9	43.626	-0.763	-0.205	0	0	0	2.246	2.324	-0.078
281	43.577	-0.775	-0.191	0	0	0	2.246	2.324	-0.078
281.1	43.533	-0.78	-0.777	0	0	0	2.246	2.324	-0.078
281.2	43.484	-0.78	-0.576	0	0	0	2.246	2.324	-0.078
281.3	43.44	-0.753	-0.516	0	0	0	2.246	2.324	-0.078
281.4	43.397	-0.755	-1.031	0	0	0	2.246	2.324	-0.078
281.5	43.347	-0.755	-1.229	0	0	0	2.246	2.324	-0.078
281.6	43.297	-0.765	0.039	0	0	0	2.246	2.324	-0.078

281.7	43.254	-0.775	-0.692	0	0	0	2.246	2.324	-0.078
281.8	43.21	-0.775	-0.533	0	0	0	2.246	2.324	-0.078
281.9	43.16	-0.73	-0.678	0	0	0	2.246	2.324	-0.078
282	43.111	-0.743	-1.458	0	0	0	2.246	2.324	-0.078
282.1	43.049	-0.743	-0.777	0	-7.46	0	2.246	2.324	-0.078
282.2	42.962	-0.768	-0.23	0	-14.42	0	2.246	2.324	-0.079
282.3	42.862	-0.76	-0.396	0	-17.94	0	2.245	2.324	-0.079
282.4	42.75	-0.76	-0.678	0	-20.14	0	2.245	2.324	-0.08
282.5	42.638	-0.745	-1.049	0	-21.8	0	2.244	2.324	-0.08
282.6	42.533	-0.745	-0.901	0	-23.25	0	2.243	2.324	-0.081
282.7	42.409	-0.745	-0.678	0	-29.38	0	2.243	2.324	-0.082
282.8	42.272	-0.748	-0.682	0	-36.66	0	2.242	2.324	-0.083
282.9	42.117	-0.723	-1.183	0	-43.02	0	2.24	2.324	-0.084
283	41.936	-0.723	-1.148	0	-48.99	0	2.239	2.324	-0.085
283.1	41.75	-0.748	-0.042	0	-52.16	0	2.238	2.324	-0.087
283.2	41.564	-0.758	-0.72	0	-50.78	0	2.236	2.324	-0.088
283.3	41.564	-0.758	-0.844	0	-50.4	0	2.235	2.324	-0.089
283.4	41.178	-0.753	-1.084	0	-50.64	0	2.233	2.324	-0.091
283.5	40.992	-0.743	-0.901	0	-52.13	0	2.232	2.324	-0.092
283.6	40.793	-0.743	-0.487	0	-52.81	0	2.23	2.324	-0.094
283.7	40.6	-0.763	-0.777	0	-52.49	0	2.229	2.324	-0.095
283.8	40.395	-0.763	-0.343	0	-52.2	0	2.228	2.324	-0.097
283.9	40.197	-0.75	-0.844	0	-51.8	0	2.226	2.324	-0.098
284	39.998	-0.758	-0.901	0	-47.67	0	2.225	2.324	-0.099
284.1	39.817	-0.753	-0.901	0	-35.29	0	2.224	2.324	-0.1
284.2	39.668	-0.753	-0.314	0	-26.76	0	2.223	2.324	-0.101
284.3	39.544	-0.758	-0.607	0	-25.11	0	2.222	2.324	-0.102
284.4	39.426	-0.768	-0.516	0	-26.6	0	2.222	2.324	-0.103
284.5	39.308	-0.768	-0.357	0	-30.99	0	2.221	2.324	-0.103
284.6	39.165	-0.76	-0.311	0	-34.48	0	2.22	2.324	-0.104
284.7	39.016	-0.745	-0.844	0	-28.12	0	2.219	2.324	-0.105
284.8	38.892	-0.745	-0.901	0	-20.21	0	2.218	2.324	-0.106
284.9	38.792	-0.75	-0.399	0	-18.54	0	2.218	2.324	-0.106
285	38.693	-0.753	-0.357	0	-18.49	0	2.217	2.324	-0.107
285.1	38.593	-0.753	-0.586	0	-18.47	0	2.217	2.324	-0.107
285.2	38.494	-0.748	-0.487	0	-18.54	0	2.216	2.324	-0.108
285.3	38.395	-0.753	-0.858	0	-20.45	0	2.216	2.324	-0.108
285.4	38.283	-0.753	-0.678	0	-24.66	0	2.215	2.324	-0.109
285.5	38.158	-0.748	-0.66	0	-27.75	0	2.214	2.324	-0.11
285.6	38.028	-0.748	-1.169	0	-30.84	0	2.214	2.324	-0.111
285.7	37.879	-0.748	-0.901	0	-37.79	0	2.212	2.324	-0.112
285.8	37.711	-0.75	-0.275	0	-43.64	0	2.211	2.324	-0.113
285.9	37.518	-0.753	-0.6	0	-44.81	0	2.21	2.324	-0.114
286	37.344	-0.753	-0.487	0	-44.98	0	2.209	2.324	-0.115
286.1	37.152	-0.748	-0.858	0	-45.03	0	2.208	2.324	-0.117
286.2	36.965	-0.748	-0.692	0	-46.65	0	2.206	2.324	-0.118
286.3	36.767	-0.748	-0.286	0	-48.16	0	2.205	2.324	-0.119

286.4	36.561	-0.74	-0.533	0	-49.26	0	2.204	2.324	-0.121
286.5	36.356	-0.738	-0.929	0	-49.32	0	2.202	2.324	-0.122
286.6	36.151	-0.738	-1.144	0	-48.98	0	2.201	2.324	-0.123
286.7	35.94	-0.75	-0.29	0	-48.54	0	2.199	2.324	-0.125
286.8	35.735	-0.75	-0.766	0	-43.17	0	2.198	2.324	-0.126
286.9	35.549	-0.755	-0.576	0	-31.48	0	2.197	2.324	-0.127
287	35.406	-0.745	-0.516	0	-25.18	0	2.197	2.324	-0.128
287.1	35.275	-0.753	-1.063	0	-21.07	0	2.196	2.324	-0.128
287.2	35.17	-0.753	-0.293	0	-16.69	0	2.196	2.324	-0.129
287.3	35.07	-0.735	-0.858	0	-15.72	0	2.195	2.324	-0.129
287.4	34.983	-0.738	-0.678	0	-12.61	0	2.195	2.324	-0.129
287.5	34.902	-0.738	-0.678	0	-10.03	0	2.195	2.324	-0.13
287.6	34.822	-0.735	-0.533	0	-8.07	0	2.194	2.324	-0.13
287.7	34.753	-0.73	-0.763	0	-5.43	0	2.194	2.324	-0.13
287.8	34.685	-0.73	-0.886	0	0	0	2.194	2.324	-0.13
287.9	34.617	-0.733	-1.049	0	-3.88	0	2.194	2.324	-0.13
288	34.554	-0.733	-0.844	0	-4.6	0	2.194	2.324	-0.13
288.1	34.492	-0.733	-0.738	0	-6.34	0	2.194	2.324	-0.131
288.2	34.424	-0.733	-0.823	0	-6.62	0	2.194	2.324	-0.131
288.3	34.362	-0.733	-0.692	0	-6.59	0	2.193	2.324	-0.131
288.4	34.293	-0.733	-0.727	0	-6.55	0	2.193	2.324	-0.131
288.5	34.231	-0.733	-0.692	0	-6.73	0	2.193	2.324	-0.131
288.6	34.157	-0.743	-0.964	0	-7.34	0	2.193	2.324	-0.131
288.7	34.088	-0.743	-0.399	0	-7.74	0	2.193	2.324	-0.132
288.8	34.014	-0.74	-0.533	0	-7.73	0	2.192	2.324	-0.132
288.9	33.946	-0.73	-0.802	0	-7.71	0	2.192	2.324	-0.132
289	33.871	-0.73	-0.858	0	-7.67	0	2.192	2.324	-0.132
289.1	33.803	-0.748	-0.445	0	-7.64	0	2.192	2.324	-0.133
289.2	33.734	-0.76	-0.371	0	-7.63	0	2.192	2.324	-0.133
289.3	33.66	-0.76	-0.516	0	-7.62	0	2.191	2.324	-0.133
289.4	33.585	-0.753	-0.272	0	-7.66	0	2.191	2.324	-0.133
289.5	33.517	-0.753	-0.678	0	-7.94	0	2.191	2.324	-0.133
289.6	33.442	-0.753	-0.487	0	-7.92	0	2.191	2.324	-0.134
289.7	33.374	-0.74	-0.533	0	-7.91	0	2.19	2.324	-0.134
289.8	33.305	-0.74	-0.773	0	-7.88	0	2.19	2.324	-0.134
289.9	33.231	-0.733	-1.063	0	-7.89	0	2.19	2.324	-0.134
290	33.156	-0.748	-0.886	0	-7.83	0	2.19	2.324	-0.134
290.1	33.088	-0.745	-0.148	0	-7.82	0	2.19	2.324	-0.135
290.2	33.02	-0.745	-0.562	0	-7.78	0	2.189	2.324	-0.135
290.3	32.945	-0.733	-0.431	0	-7.9	0	2.189	2.324	-0.135
290.4	32.877	-0.743	-1.105	0	-7.9	0	2.189	2.324	-0.135
290.5	32.802	-0.743	-0.576	0	-7.87	0	2.189	2.324	-0.136
290.6	32.734	-0.728	-0.562	0	-7.87	0	2.188	2.324	-0.136
290.7	32.665	-0.733	-1.215	0	-7.87	0	2.188	2.324	-0.136
290.8	32.591	-0.733	-0.692	0	-7.91	0	2.188	2.324	-0.136
290.9	32.516	-0.738	-0.311	0	-7.86	0	2.188	2.324	-0.136
291	32.442	-0.748	-0.738	0	-8.39	0	2.188	2.324	-0.137

291.1	32.367	-0.748	-0.763	0	-9.49	0	2.187	2.324	-0.137
291.2	32.286	-0.725	-0.533	0	-9.76	0	2.187	2.324	-0.137
291.3	32.206	-0.738	-1.031	0	-10.03	0	2.187	2.324	-0.137
291.4	32.125	-0.738	-1.063	0	-10.02	0	2.187	2.324	-0.138
291.5	32.044	-0.755	-0.251	0	-10.03	0	2.186	2.324	-0.138
291.6	31.97	-0.74	0.124	0	-10.09	0	2.186	2.324	-0.138
291.7	31.889	-0.74	-0.844	0	-10.16	0	2.186	2.324	-0.139
291.8	31.802	-0.74	-0.929	0	-11.44	0	2.185	2.324	-0.139
291.9	31.715	-0.748	-0.533	0	-13.21	0	2.185	2.324	-0.139
292	31.615	-0.748	-0.576	0	-14.09	0	2.185	2.324	-0.14
292.1	31.522	-0.733	-1.003	0	-14.17	0	2.184	2.324	-0.14
292.2	31.429	-0.735	-0.823	0	-14.43	0	2.184	2.324	-0.14
292.3	31.33	-0.735	-0.763	0	-15.06	0	2.183	2.324	-0.141
292.4	31.236	-0.76	-0.777	0	-15.04	0	2.183	2.324	-0.141
292.5	31.137	-0.758	0.124	0	-15.81	0	2.183	2.324	-0.142
292.6	31.031	-0.758	-0.858	0	-18.05	0	2.182	2.324	-0.142
292.7	30.913	-0.76	-0.858	0	-19.78	0	2.181	2.324	-0.143
292.8	30.795	-0.76	-0.417	0	-20.12	0	2.181	2.324	-0.143
292.9	30.677	-0.76	-0.547	0	-20.02	0	2.18	2.324	-0.144
293	30.559	-0.765	-1.003	0	-19.88	0	2.18	2.324	-0.144
293.1	30.441	-0.745	-0.777	0	-19.76	0	2.179	2.324	-0.145
293.2	30.329	-0.745	-0.858	0	-19.69	0	2.179	2.324	-0.146
293.3	30.211	-0.765	-0.844	0	-19.59	0	2.178	2.324	-0.146
293.4	30.093	-0.745	-0.371	0	-19.5	0	2.178	2.324	-0.147
293.5	29.975	-0.745	-0.918	0	-19.44	0	2.177	2.324	-0.147
293.6	29.857	-0.74	-0.918	0	-19.31	0	2.177	2.324	-0.148
293.7	29.739	-0.75	-0.448	0	-18.62	0	2.176	2.324	-0.148
293.8	29.627	-0.75	-0.533	0	-14.83	0	2.176	2.324	-0.149
293.9	29.534	-0.738	-0.371	0	-10.87	0	2.175	2.324	-0.149
294	29.459	-0.733	-0.706	0	-8.44	0	2.175	2.324	-0.149
294.1	29.391	-0.733	-0.982	0	-7.27	0	2.175	2.324	-0.149
294.2	29.316	-0.738	-0.777	0	-5.92	0	2.175	2.324	-0.15
294.3	29.26	-0.728	-0.692	0	-5.77	0	2.175	2.324	-0.15
294.4	29.192	-0.728	-1.296	0	-5.56	0	2.174	2.324	-0.15
294.5	29.13	-0.77	-0.576	0	-5.45	0	2.174	2.324	-0.15
294.6	29.068	-0.75	0.124	0	-5.43	0	2.174	2.324	-0.15
294.7	29.006	-0.75	-1.052	0	-5.45	0	2.174	2.324	-0.15
294.8	28.937	-0.743	-1.031	0	-5.43	0	2.174	2.324	-0.15
294.9	28.881	-0.748	-0.533	0	-5.43	0	2.174	2.324	-0.151
295	28.819	-0.748	-0.533	0	-5.41	0	2.173	2.324	-0.151
295.1	28.751	-0.753	-0.78	0	-5.39	0	2.173	2.324	-0.151
295.2	28.689	-0.753	-0.618	0	-5.39	0	2.173	2.324	-0.151
295.3	28.627	-0.753	-0.886	0	-5.37	0	2.173	2.324	-0.151
295.4	28.558	-0.743	-0.901	0	-5.37	0	2.173	2.324	-0.151
295.5	28.502	-0.745	-0.572	0	-5.23	0	2.173	2.324	-0.152
295.6	28.44	-0.745	-0.777	0	-1.04	0	2.173	2.324	-0.152
295.7	28.397	-0.753	-1.116	0	0	0	2.173	2.324	-0.152

295.8	28.353	-0.753	-0.738	0	0	0	2.173	2.324	-0.152
295.9	28.316	-0.755	-0.59	0	0	0	2.173	2.324	-0.152
296	28.279	-0.753	-0.477	0	0	0	2.173	2.324	-0.152
296.1	28.248	-0.75	-0.487	0	0	0	2.173	2.324	-0.152
296.2	28.216	-0.75	-0.533	0	1.34	0	2.173	2.324	-0.152
296.3	28.185	-0.765	-0.456	0	6.41	0	2.173	2.325	-0.152
296.4	28.167	-0.758	-0.113	0	13.68	0	2.173	2.325	-0.152
296.5	28.173	-0.758	-1.183	0	14.33	0	2.174	2.325	-0.152
296.6	28.179	-0.735	-0.533	0	16.75	0	2.174	2.326	-0.152
296.7	28.198	-0.73	-1.049	0	17.94	0	2.175	2.326	-0.152
296.8	28.216	-0.73	-0.385	0	21.54	0	2.175	2.327	-0.152
296.9	28.241	-0.76	-1.268	0	27.35	0	2.176	2.328	-0.152
297	28.291	-0.758	-0.028	0	30.66	0	2.177	2.328	-0.152
297.1	28.347	-0.758	-0.205	0	34.6	0	2.178	2.329	-0.152
297.2	28.409	-0.733	-1.017	0	36.22	0	2.179	2.33	-0.152
297.3	28.484	-0.75	-1.211	0	37.46	0	2.18	2.331	-0.152
297.4	28.558	-0.75	-0.371	0	40.89	0	2.181	2.333	-0.152
297.5	28.639	-0.743	-0.042	0	43.53	0	2.182	2.334	-0.152
297.6	28.732	-0.755	-1.102	0	49.43	0	2.184	2.335	-0.152
297.7	28.832	-0.755	-0.777	0	52.74	0	2.185	2.337	-0.152
297.8	28.943	-0.75	-0.47	0	54.93	0	2.187	2.338	-0.152
297.9	29.062	-0.728	-1.183	0	59.48	0	2.188	2.34	-0.152
298	29.192	-0.728	-0.901	0	62.38	0	2.19	2.342	-0.152
298.1	29.329	-0.755	-0.219	0	63.11	0	2.192	2.343	-0.152
298.2	29.459	-0.755	-0.219	0	64.69	0	2.194	2.345	-0.152
298.3	29.608	-0.755	-0.191	0	71.19	0	2.196	2.347	-0.152
298.4	29.757	-0.755	-1.197	0	76.48	0	2.198	2.349	-0.152
298.5	29.925	-0.758	-0.901	0	82.1	0	2.2	2.351	-0.152
298.6	30.099	-0.758	-0.576	0	82.52	0	2.202	2.354	-0.152
298.7	30.279	-0.74	-0.516	0	84.1	0	2.205	2.356	-0.152
298.8	30.46	-0.74	-1.049	0	87.05	0	2.207	2.359	-0.152
298.9	30.646	-0.758	-0.06	0	91.74	0	2.21	2.361	-0.152
299	30.851	-0.74	-0.371	0	103.15	0	2.212	2.364	-0.152
299.1	31.075	-0.738	-0.752	0	116.33	0	2.216	2.367	-0.152
299.2	31.323	-0.738	-1.345	0	116.39	0	2.219	2.37	-0.152
299.3	31.566	-0.75	-0.304	0	117.5	0	2.222	2.374	-0.152
299.4	31.814	-0.758	-0.618	0	123.04	0	2.226	2.377	-0.152
299.5	32.075	-0.758	-0.371	0	127.42	0	2.229	2.381	-0.152
299.6	32.342	-0.768	-0.533	0	131.4	0	2.233	2.384	-0.152
299.7	32.616	-0.753	-1.003	0	133.75	0	2.236	2.388	-0.152
299.8	32.883	-0.753	-0.706	0	135.19	0	2.24	2.392	-0.152
299.9	33.156	-0.738	-0.812	0	137.33	0	2.244	2.396	-0.152
300	33.43	-0.748	-0.533	0	137.1	0	2.248	2.399	-0.152
300.1	33.703	-0.748	-0.901	0	136.98	0	2.252	2.403	-0.152
300.2	33.977	-0.763	-0.547	0	133.85	0	2.255	2.407	-0.152
300.3	34.238	-0.76	-0.872	0	129.27	0	2.259	2.41	-0.152
300.4	34.486	-0.76	-0.318	0	119.8	0	2.262	2.414	-0.152

300.5	34.716	-0.768	-1.243	0	108.88	0	2.265	2.417	-0.152
300.6	34.921	-0.76	-0.385	0	102.28	0	2.268	2.42	-0.152
300.7	35.114	-0.76	-0.385	0	96.68	0	2.271	2.422	-0.152
300.8	35.294	-0.748	-1.197	0	93.93	0	2.273	2.425	-0.152
300.9	35.468	-0.738	-0.706	0	94.09	0	2.276	2.428	-0.152
301	35.636	-0.738	-1.077	0	96.33	0	2.279	2.43	-0.152
301.1	35.81	-0.75	-0.918	0	97.76	0	2.281	2.433	-0.152
301.2	35.984	-0.75	-0.533	0	97.6	0	2.284	2.436	-0.152
301.3	36.164	-0.75	-0.547	0	97.44	0	2.287	2.438	-0.152
301.4	36.332	-0.735	-0.667	0	98.2	0	2.29	2.441	-0.152
301.5	36.512	-0.733	-0.576	0	104.45	0	2.292	2.444	-0.152
301.6	36.692	-0.733	-0.858	0	111.1	0	2.296	2.447	-0.152
301.7	36.885	-0.735	-0.547	0	114.87	0	2.299	2.45	-0.152
301.8	37.09	-0.735	-0.946	0	116.82	0	2.302	2.454	-0.152
301.9	37.295	-0.73	-1.031	0	116.14	0	2.305	2.457	-0.152
302	37.494	-0.733	-0.752	0	114.99	0	2.308	2.46	-0.152
302.1	37.692	-0.745	-0.766	0	115.02	0	2.312	2.463	-0.152
302.2	37.891	-0.745	-0.547	0	114.5	0	2.315	2.466	-0.152
302.3	38.09	-0.735	-0.547	0	112.63	0	2.318	2.469	-0.152
302.4	38.283	-0.74	-0.706	0	110.71	0	2.321	2.473	-0.152
302.5	38.469	-0.74	-0.59	0	102.57	0	2.324	2.475	-0.152
302.6	38.637	-0.743	-0.148	0	93.56	0	2.326	2.478	-0.152
302.7	38.792	-0.73	-0.477	0	89.44	0	2.329	2.48	-0.152
302.8	38.935	-0.73	-1.275	0	88.36	0	2.331	2.483	-0.152
302.9	39.078	-0.75	-0.795	0	85.94	0	2.334	2.485	-0.152
303	39.215	-0.75	-0.194	0	81.8	0	2.336	2.488	-0.152
303.1	39.333	-0.75	-0.328	0	77.24	0	2.338	2.49	-0.152
303.2	39.457	-0.74	-0.706	0	77.13	0	2.34	2.492	-0.152
303.3	39.569	-0.755	-0.706	0	77.15	0	2.342	2.494	-0.152
303.4	39.681	-0.755	-0.562	0	77.12	0	2.345	2.496	-0.152
303.5	39.799	-0.738	-0.604	0	77.08	0	2.347	2.498	-0.152
303.6	39.911	-0.738	-0.83	0	77.09	0	2.349	2.5	-0.152
303.7	40.023	-0.738	-0.752	0	77.03	0	2.351	2.503	-0.152
303.8	40.141	-0.733	-0.752	0	77.02	0	2.353	2.505	-0.152
303.9	40.252	-0.775	-0.675	0	76.93	0	2.355	2.507	-0.152
304	40.364	-0.775	-0.304	0	76.89	0	2.357	2.509	-0.152
304.1	40.476	-0.78	0.554	0	76.93	0	2.36	2.511	-0.152
304.2	40.588	-0.765	-0.872	0	76.84	0	2.362	2.513	-0.152
304.3	40.7	-0.765	-1.54	0	76.9	0	2.364	2.515	-0.152
304.4	40.812	-0.743	-0.706	0	76.3	0	2.366	2.518	-0.152
304.5	40.911	-0.758	-1.441	0	72.57	0	2.368	2.52	-0.152
304.6	41.017	-0.758	-0.385	0	64.22	0	2.37	2.521	-0.152
304.7	41.104	-0.75	-0.399	0	55.06	0	2.371	2.523	-0.152
304.8	41.172	-0.75	-0.858	0	52.81	0	2.373	2.524	-0.152
304.9	41.234	-0.75	-0.547	0	52.79	0	2.374	2.526	-0.152
305	41.296	-0.75	-0.72	0	52.73	0	2.376	2.527	-0.152
305.1	41.358	-0.75	-0.946	0	52.7	0	2.377	2.529	-0.152

305.2	41.421	-0.75	-0.646	0	52.72	0	2.379	2.53	-0.152
305.3	41.483	-0.76	-0.562	0	52.67	0	2.38	2.532	-0.152
305.4	41.545	-0.753	-0.431	0	52.71	0	2.382	2.533	-0.152
305.5	41.601	-0.753	-0.872	0	52.56	0	2.383	2.535	-0.152
305.6	41.663	-0.743	-0.791	0	52.58	0	2.384	2.536	-0.152
305.7	41.725	-0.738	-0.886	0	52.58	0	2.386	2.538	-0.152
305.8	41.787	-0.738	-0.477	0	52.47	0	2.387	2.539	-0.152
305.9	41.849	-0.74	-1.049	0	52.52	0	2.389	2.54	-0.152
306	41.905	-0.745	-0.72	0	52.43	0	2.39	2.542	-0.152
306.1	41.974	-0.745	-0.279	0	52.51	0	2.392	2.543	-0.152
306.2	42.03	-0.755	-0.357	0	52.5	0	2.393	2.545	-0.152
306.3	42.085	-0.763	-0.886	0	52.47	0	2.395	2.546	-0.152
306.4	42.148	-0.763	-0.314	0	54.04	0	2.396	2.548	-0.152
306.5	42.21	-0.74	-1.091	0	55.64	0	2.398	2.549	-0.152
306.6	42.266	-0.755	-0.872	0	58.8	0	2.399	2.551	-0.152
306.7	42.328	-0.755	-0.279	0	60.62	0	2.401	2.553	-0.152
306.8	42.384	-0.763	-0.265	0	60.89	0	2.403	2.554	-0.152
306.9	42.433	-0.748	-0.501	0	59.4	0	2.404	2.556	-0.152
307	42.489	-0.748	-0.802	0	47.13	0	2.406	2.557	-0.152
307.1	42.539	-0.758	-0.72	0	47.52	0	2.407	2.559	-0.152
307.2	42.583	-0.768	-0.562	0	47.98	0	2.408	2.56	-0.152
307.3	42.638	-0.768	-0.604	0	48.43	0	2.41	2.561	-0.152
307.4	42.682	-0.755	-0.957	0	48.84	0	2.411	2.563	-0.152
307.5	42.732	-0.758	-0.547	0	48.46	0	2.412	2.564	-0.152
307.6	42.775	-0.758	-0.233	0	48.63	0	2.414	2.565	-0.152
307.7	42.831	-0.743	-1.063	0	50.1	0	2.415	2.567	-0.152
307.8	42.881	-0.743	-0.682	0	49.76	0	2.417	2.568	-0.152
307.9	42.931	-0.725	-1.077	0	49.67	0	2.418	2.569	-0.152
308	42.986	-0.768	-0.484	0	49.77	0	2.419	2.571	-0.152
308.1	43.036	-0.763	0.268	0	49.6	0	2.421	2.572	-0.152
308.2	43.086	-0.763	-0.547	0	49.64	0	2.422	2.574	-0.152
308.3	43.136	-0.74	-0.65	0	49.67	0	2.423	2.575	-0.152
308.4	43.179	-0.74	-1.006	0	49.61	0	2.425	2.576	-0.152
308.5	43.229	-0.74	-0.194	0	48.69	0	2.426	2.578	-0.152
308.6	43.279	-0.745	-1.049	0	47.39	0	2.427	2.579	-0.152
308.7	43.322	-0.745	-0.604	0	46.26	0	2.429	2.58	-0.152
308.8	43.365	-0.745	-0.219	0	44.95	0	2.43	2.582	-0.152
308.9	43.409	-0.728	-1.169	0	44.08	0	2.431	2.583	-0.152
309	43.446	-0.748	-1.091	0	42.54	0	2.432	2.584	-0.152
309.1	43.484	-0.748	-0.233	0	41.91	0	2.434	2.585	-0.152
309.2	43.515	-0.758	-0.247	0	41.02	0	2.435	2.586	-0.152
309.3	43.552	-0.76	-0.805	0	39.77	0	2.436	2.587	-0.152
309.4	43.583	-0.76	-0.477	0	38.79	0	2.437	2.588	-0.152
309.5	43.608	-0.738	-0.706	0	38.59	0	2.438	2.59	-0.152
309.6	43.633	-0.735	-1.049	0	38.68	0	2.439	2.591	-0.152
309.7	43.664	-0.735	-0.932	0	38.82	0	2.44	2.592	-0.152
309.8	43.695	-0.75	-0.646	0	39.82	0	2.441	2.593	-0.152

309.9	43.72	-0.765	0.109	0	41.18	0	2.442	2.594	-0.152
310	43.751	-0.765	-0.72	0	40.9	0	2.444	2.595	-0.152
310.1	43.788	-0.735	-0.901	0	40.96	0	2.445	2.596	-0.152
310.2	43.819	-0.73	-1.091	0	40.92	0	2.446	2.597	-0.152
310.3	43.85	-0.73	-1.049	0	41.14	0	2.447	2.598	-0.152
310.4	43.881	-0.748	-0.36	0	42.75	0	2.448	2.6	-0.152
310.5	43.912	-0.748	-0.788	0	44.16	0	2.449	2.601	-0.152
310.6	43.95	-0.748	-0.6	0	45.43	0	2.451	2.602	-0.152
310.7	43.993	-0.73	-1.049	0	46.11	0	2.452	2.603	-0.152
310.8	44.03	-0.73	-0.901	0	46.57	0	2.453	2.605	-0.152
310.9	44.074	-0.738	-0.72	0	46.36	0	2.454	2.606	-0.152
311	44.117	-0.753	0.095	0	45.78	0	2.456	2.607	-0.152
311.1	44.155	-0.735	-0.413	0	45.63	0	2.457	2.609	-0.152
311.2	44.198	-0.735	-1.296	0	44.64	0	2.458	2.61	-0.152
311.3	44.235	-0.743	-1.021	0	44.66	0	2.46	2.611	-0.152
311.4	44.266	-0.765	-0.233	0	44.67	0	2.461	2.612	-0.152
311.5	44.31	-0.765	-0.332	0	44.65	0	2.462	2.614	-0.152
311.6	44.347	-0.74	-0.646	0	44.56	0	2.463	2.615	-0.152
311.7	44.378	-0.728	-1.172	0	44.62	0	2.464	2.616	-0.152
311.8	44.422	-0.728	-1.091	0	44.67	0	2.466	2.617	-0.152
311.9	44.459	-0.728	-0.872	0	43.91	0	2.467	2.618	-0.152
312	44.49	-0.733	-0.618	0	43.82	0	2.468	2.62	-0.152
312.1	44.527	-0.733	-0.374	0	42.79	0	2.469	2.621	-0.152
312.2	44.559	-0.725	-0.886	0	42.93	0	2.471	2.622	-0.152
312.3	44.596	-0.758	-1.458	0	42.7	0	2.472	2.623	-0.152
312.4	44.627	-0.758	0.583	0	42.62	0	2.473	2.624	-0.152
312.5	44.664	-0.745	-0.304	0	41.81	0	2.474	2.626	-0.152
312.6	44.695	-0.745	-1.434	0	41.96	0	2.475	2.627	-0.152
312.7	44.726	-0.745	-0.102	0	41.94	0	2.476	2.628	-0.152
312.8	44.757	-0.738	-0.72	0	42.04	0	2.478	2.629	-0.152
312.9	44.788	-0.733	-0.946	0	41.97	0	2.479	2.63	-0.152
313	44.82	-0.733	-0.766	0	41.88	0	2.48	2.631	-0.152
313.1	44.851	-0.72	-0.343	0	41.85	0	2.481	2.633	-0.152
313.2	44.882	-0.738	-0.989	0	41.83	0	2.482	2.634	-0.152
313.3	44.913	-0.738	-1.148	0	41.92	0	2.483	2.635	-0.152
313.4	44.944	-0.75	0.424	0	41.92	0	2.485	2.636	-0.152
313.5	44.975	-0.733	-0.809	0	41.97	0	2.486	2.637	-0.152
313.6	45.006	-0.733	-1.349	0	41.94	0	2.487	2.638	-0.152
313.7	45.031	-0.728	-0.576	0	41.96	0	2.488	2.64	-0.152
313.8	45.062	-0.728	-0.576	0	41.79	0	2.489	2.641	-0.152
313.9	45.093	-0.725	-0.533	0	41.79	0	2.49	2.642	-0.152
314	45.124	-0.745	-0.413	0	41.86	0	2.492	2.643	-0.152
314.1	45.155	-0.735	-0.547	0	41.98	0	2.493	2.644	-0.152
314.2	45.186	-0.735	-0.385	0	42.12	0	2.494	2.645	-0.152
314.3	45.217	-0.733	-0.78	0	42.08	0	2.495	2.647	-0.152
314.4	45.248	-0.74	-0.371	0	42.14	0	2.496	2.648	-0.152
314.5	45.279	-0.74	-0.445	0	42.09	0	2.497	2.649	-0.152

314.6	45.304	-0.738	-0.692	0	41.94	0	2.499	2.65	-0.152
314.7	45.335	-0.735	-0.802	0	42.05	0	2.5	2.651	-0.152
314.8	45.366	-0.735	-0.576	0	41.99	0	2.501	2.652	-0.152
314.9	45.397	-0.73	-0.413	0	42.07	0	2.502	2.654	-0.152
315	45.422	-0.738	-0.946	0	42.03	0	2.503	2.655	-0.152
315.1	45.453	-0.738	-0.819	0	42.13	0	2.504	2.656	-0.152
315.2	45.484	-0.73	-0.247	0	42.13	0	2.506	2.657	-0.152
315.3	45.509	-0.733	-0.385	0	42.11	0	2.507	2.658	-0.152
315.4	45.54	-0.733	-0.901	0	41.99	0	2.508	2.659	-0.152
315.5	45.571	-0.753	-0.72	0	42	0	2.509	2.661	-0.152
315.6	45.602	-0.738	-0.413	0	41.58	0	2.51	2.662	-0.152
315.7	45.627	-0.738	-0.576	0	38.42	0	2.511	2.663	-0.152
315.8	45.652	-0.723	-1.063	0	36.45	0	2.512	2.664	-0.152
315.9	45.671	-0.733	-0.946	0	35.95	0	2.513	2.665	-0.152
316	45.689	-0.733	-0.131	0	35.92	0	2.514	2.666	-0.152
316.1	45.708	-0.738	-0.413	0	35.97	0	2.515	2.667	-0.152
316.2	45.727	-0.725	-0.413	0	35.92	0	2.516	2.668	-0.152
316.3	45.745	-0.725	-0.72	0	35.96	0	2.517	2.669	-0.152
316.4	45.764	-0.728	-1.063	0	35.96	0	2.518	2.67	-0.152
316.5	45.776	-0.743	-0.293	0	35.98	0	2.519	2.671	-0.152
316.6	45.795	-0.743	-0.445	0	35.98	0	2.52	2.672	-0.152
316.7	45.814	-0.735	-0.735	0	35.97	0	2.521	2.673	-0.152
316.8	45.832	-0.735	-0.576	0	36.02	0	2.522	2.674	-0.152
316.9	45.845	-0.728	-0.735	0	35.96	0	2.523	2.675	-0.152
317	45.863	-0.753	-0.72	0	36.01	0	2.524	2.676	-0.152
317.1	45.882	-0.75	0.067	0	36.01	0	2.525	2.677	-0.152
317.2	45.901	-0.75	-0.71	0	36	0	2.526	2.678	-0.152
317.3	45.919	-0.748	-1.049	0	36.61	0	2.527	2.679	-0.152
317.4	45.932	-0.723	-0.413	0	36.64	0	2.528	2.68	-0.152
317.5	45.957	-0.723	-1.063	0	36.65	0	2.529	2.681	-0.152
317.6	45.975	-0.745	-0.901	0	36.65	0	2.53	2.682	-0.152
317.7	45.994	-0.738	0.067	0	36.64	0	2.531	2.683	-0.152
317.8	46.013	-0.738	-0.544	0	36.68	0	2.532	2.684	-0.152
317.9	46.031	-0.728	-1.077	0	36.68	0	2.533	2.685	-0.152
318	46.05	-0.743	-0.929	0	36.72	0	2.534	2.686	-0.152
318.1	46.068	-0.743	-0.385	0	36.67	0	2.535	2.687	-0.152
318.2	46.087	-0.75	-0.413	0	36.67	0	2.536	2.688	-0.152
318.3	46.106	-0.745	-0.117	0	36.46	0	2.537	2.689	-0.152
318.4	46.124	-0.745	-0.427	0	36.48	0	2.538	2.69	-0.152
318.5	46.143	-0.72	-0.664	0	36.55	0	2.539	2.691	-0.152
318.6	46.162	-0.723	-0.876	0	36.55	0	2.541	2.692	-0.152
318.7	46.174	-0.723	-0.562	0	36.55	0	2.542	2.693	-0.152
318.8	46.193	-0.733	-0.413	0	36.51	0	2.543	2.694	-0.152
318.9	46.218	-0.735	-0.335	0	36.53	0	2.544	2.695	-0.152
319	46.23	-0.735	-0.427	0	36.56	0	2.545	2.696	-0.152
319.1	46.249	-0.74	-0.692	0	36.55	0	2.546	2.697	-0.152
319.2	46.267	-0.75	-0.946	0	36.71	0	2.547	2.698	-0.152

319.3	46.286	-0.75	-0.371	0	37.53	0	2.548	2.699	-0.152
319.4	46.305	-0.728	-0.413	0	37.52	0	2.549	2.7	-0.152
319.5	46.329	-0.718	-0.858	0	37.5	0	2.55	2.701	-0.152
319.6	46.342	-0.718	-0.848	0	37.74	0	2.551	2.702	-0.152
319.7	46.367	-0.755	-0.459	0	38.27	0	2.552	2.703	-0.152
319.8	46.385	-0.755	-0.004	0	38.23	0	2.553	2.704	-0.152
319.9	46.41	-0.763	-0.162	0	38.23	0	2.554	2.706	-0.152
320	46.429	-0.758	-0.47	0	38.24	0	2.555	2.707	-0.152
320.1	46.454	-0.733	-0.074	0	39.23	0	2.556	2.708	-0.152
320.2	46.472	-0.733	-1.204	0	40.19	0	2.557	2.709	-0.152
320.3	46.503	-0.723	-1.081	0	41.95	0	2.558	2.71	-0.152
320.4	46.528	-0.735	-0.459	0	45.03	0	2.56	2.711	-0.152
320.5	46.559	-0.735	-0.53	0	47.28	0	2.561	2.713	-0.152
320.6	46.597	-0.745	-0.526	0	48.26	0	2.562	2.714	-0.152
320.7	46.634	-0.748	-0.413	0	48.22	0	2.564	2.715	-0.152
320.8	46.671	-0.748	-0.473	0	48.25	0	2.565	2.717	-0.152
320.9	46.708	-0.728	-0.618	0	48.31	0	2.566	2.718	-0.152
321	46.746	-0.74	-1.077	0	48.33	0	2.568	2.719	-0.152
321.1	46.783	-0.74	-0.59	0	48.26	0	2.569	2.721	-0.152
321.2	46.82	-0.733	-0.473	0	48.24	0	2.57	2.722	-0.152
321.3	46.858	-0.735	-0.915	0	48.31	0	2.572	2.723	-0.152
321.4	46.895	-0.735	-0.752	0	49.06	0	2.573	2.725	-0.152
321.5	46.932	-0.748	-0.459	0	49.22	0	2.574	2.726	-0.152
321.6	46.969	-0.74	-0.427	0	50.85	0	2.576	2.727	-0.152
321.7	47.013	-0.74	-0.946	0	52.83	0	2.577	2.729	-0.152
321.8	47.056	-0.745	-0.89	0	56.15	0	2.579	2.73	-0.152
321.9	47.106	-0.73	-0.639	0	57.25	0	2.58	2.732	-0.152
322	47.156	-0.73	-0.886	0	57.53	0	2.582	2.734	-0.152
322.1	47.206	-0.74	-0.795	0	57.91	0	2.584	2.735	-0.152
322.2	47.261	-0.735	-0.562	0	59.71	0	2.585	2.737	-0.152
322.3	47.311	-0.735	-0.403	0	61.75	0	2.587	2.739	-0.152
322.4	47.367	-0.755	-0.83	0	63.79	0	2.589	2.74	-0.152
322.5	47.435	-0.74	0.152	0	63.88	0	2.591	2.742	-0.152
322.6	47.491	-0.74	-0.876	0	63.91	0	2.592	2.744	-0.152
322.7	47.554	-0.75	-1.021	0	63.8	0	2.594	2.746	-0.152
322.8	47.616	-0.75	-0.562	0	63.77	0	2.596	2.747	-0.152
322.9	47.678	-0.755	0.021	0	63.9	0	2.598	2.749	-0.152
323	47.74	-0.743	-1.187	0	63.75	0	2.599	2.751	-0.152
323.1	47.796	-0.748	-0.915	0	63.81	0	2.601	2.753	-0.152
323.2	47.858	-0.748	-0.346	0	64.47	0	2.603	2.755	-0.152
323.3	47.914	-0.748	-0.961	0	64.82	0	2.605	2.756	-0.152
323.4	47.976	-0.743	-0.71	0	64.76	0	2.607	2.758	-0.152
323.5	48.038	-0.743	-0.145	0	64.84	0	2.608	2.76	-0.152
323.6	48.1	-0.735	-0.886	0	65.37	0	2.61	2.762	-0.152
323.7	48.162	-0.733	-0.427	0	65.95	0	2.612	2.764	-0.152
323.8	48.225	-0.733	-0.915	0	65.98	0	2.614	2.765	-0.152
323.9	48.287	-0.753	-0.749	0	65.89	0	2.616	2.767	-0.152

324	48.349	-0.748	-0.102	0	65.95	0	2.618	2.769	-0.152
324.1	48.417	-0.748	-0.833	0	65.79	0	2.619	2.771	-0.152
324.2	48.473	-0.755	-0.749	0	65.87	0	2.621	2.773	-0.152
324.3	48.535	-0.745	-0.251	0	65.85	0	2.623	2.775	-0.152
324.4	48.597	-0.745	-1.285	0	65.83	0	2.625	2.776	-0.152
324.5	48.66	-0.718	-0.72	0	65.9	0	2.627	2.778	-0.152
324.6	48.716	-0.735	-1.049	0	65.82	0	2.629	2.78	-0.152
324.7	48.778	-0.735	-0.279	0	65.81	0	2.63	2.782	-0.152
324.8	48.84	-0.74	-0.399	0	66.1	0	2.632	2.784	-0.152
324.9	48.908	-0.748	-0.749	0	67.02	0	2.634	2.786	-0.152
325	48.958	-0.748	-0.445	0	68.01	0	2.636	2.787	-0.152
325.1	49.02	-0.733	-0.427	0	70.71	0	2.638	2.789	-0.152
325.2	49.088	-0.733	-0.749	0	73.61	0	2.64	2.791	-0.152
325.3	49.163	-0.733	-0.971	0	75.29	0	2.642	2.794	-0.152
325.4	49.237	-0.738	-0.307	0	77.39	0	2.644	2.796	-0.152
325.5	49.312	-0.723	-0.484	0	77.63	0	2.646	2.798	-0.152
325.6	49.393	-0.723	-1.388	0	77.52	0	2.648	2.8	-0.152
325.7	49.474	-0.743	-0.749	0	78.34	0	2.651	2.802	-0.152
325.8	49.542	-0.743	-0.261	0	78.86	0	2.653	2.804	-0.152
325.9	49.623	-0.748	-0.247	0	78.92	0	2.655	2.807	-0.152
326	49.697	-0.728	-0.886	0	78.37	0	2.657	2.809	-0.152
326.1	49.772	-0.73	-1.063	0	77.66	0	2.659	2.811	-0.152
326.2	49.853	-0.73	-0.59	0	76.34	0	2.662	2.813	-0.152
326.3	49.927	-0.745	-0.427	0	75.33	0	2.664	2.815	-0.152
326.4	49.996	-0.74	-0.812	0	75.51	0	2.666	2.817	-0.152
326.5	50.07	-0.74	-0.886	0	75.44	0	2.668	2.819	-0.152
326.6	50.138	-0.74	-0.562	0	75.47	0	2.67	2.821	-0.152
326.7	50.207	-0.745	-0.576	0	75.55	0	2.672	2.824	-0.152
326.8	50.281	-0.745	-0.886	0	75.5	0	2.674	2.826	-0.152
326.9	50.35	-0.758	-0.247	0	75.65	0	2.676	2.828	-0.152
327	50.424	-0.753	-0.427	0	75.44	0	2.678	2.83	-0.152
327.1	50.493	-0.753	-0.403	0	75.57	0	2.68	2.832	-0.152
327.2	50.561	-0.735	-0.622	0	75.57	0	2.682	2.834	-0.152
327.3	50.629	-0.74	-0.901	0	75.43	0	2.685	2.836	-0.152
327.4	50.704	-0.74	-1.176	0	75.53	0	2.687	2.838	-0.152
327.5	50.772	-0.745	-0.233	0	75.39	0	2.689	2.84	-0.152
327.6	50.834	-0.743	-0.399	0	75.47	0	2.691	2.842	-0.152
327.7	50.903	-0.743	-0.735	0	75.29	0	2.693	2.844	-0.152
327.8	50.971	-0.745	-0.823	0	73.95	0	2.695	2.847	-0.152
327.9	51.039	-0.75	-0.869	0	73.51	0	2.697	2.849	-0.152
328	51.102	-0.75	-0.689	0	71.61	0	2.699	2.851	-0.152
328.1	51.164	-0.755	0.095	0	70.21	0	2.701	2.853	-0.152
328.2	51.226	-0.755	-0.72	0	69.48	0	2.703	2.854	-0.152
328.3	51.282	-0.755	-1.063	0	69.4	0	2.705	2.856	-0.152
328.4	51.338	-0.758	-0.735	0	69.56	0	2.707	2.858	-0.152
328.5	51.4	-0.753	-0.441	0	69.57	0	2.709	2.86	-0.152
328.6	51.456	-0.753	-1.049	0	70.22	0	2.711	2.862	-0.152

328.7	51.512	-0.763	-0.431	0	70.69	0	2.713	2.864	-0.152
328.8	51.574	-0.763	-0.59	0	70.57	0	2.715	2.866	-0.152
328.9	51.63	-0.75	-0.805	0	70.55	0	2.717	2.868	-0.152
329	51.692	-0.73	-0.537	0	70.64	0	2.719	2.87	-0.152
329.1	51.748	-0.733	-0.826	0	70.61	0	2.72	2.872	-0.152
329.2	51.804	-0.733	-0.961	0	70.55	0	2.722	2.874	-0.152
329.3	51.866	-0.74	-0.247	0	70.62	0	2.724	2.876	-0.152
329.4	51.922	-0.738	-0.735	0	70.58	0	2.726	2.878	-0.152
329.5	51.984	-0.738	-0.399	0	70.52	0	2.728	2.88	-0.152
329.6	52.04	-0.74	-0.78	0	70.6	0	2.73	2.882	-0.152
329.7	52.096	-0.74	-0.735	0	70.61	0	2.732	2.884	-0.152
329.8	52.152	-0.74	-0.459	0	70.59	0	2.734	2.886	-0.152
329.9	52.208	-0.745	-0.837	0	70.74	0	2.736	2.888	-0.152
330	52.264	-0.74	-0.618	0	71.84	0	2.738	2.89	-0.152
330.1	52.326	-0.74	-1.134	0	73.24	0	2.74	2.892	-0.152
330.2	52.382	-0.738	-0.66	0	74.31	0	2.742	2.894	-0.152
330.3	52.444	-0.738	-0.699	0	75.92	0	2.744	2.896	-0.152
330.4	52.512	-0.738	-0.78	0	77.71	0	2.747	2.898	-0.152
330.5	52.574	-0.763	-0.498	0	79.71	0	2.749	2.9	-0.152
330.6	52.643	-0.765	-0.646	0	80.25	0	2.751	2.903	-0.152
330.7	52.711	-0.765	-0.459	0	80.66	0	2.753	2.905	-0.152
330.8	52.785	-0.753	-0.562	0	81.3	0	2.755	2.907	-0.152
330.9	52.854	-0.74	-0.901	0	81.4	0	2.758	2.909	-0.152
331	52.922	-0.74	-0.77	0	81.31	0	2.76	2.912	-0.152
331.1	52.991	-0.76	-0.78	0	81.34	0	2.762	2.914	-0.152
331.2	53.065	-0.755	-0.247	0	81.41	0	2.765	2.916	-0.152
331.3	53.133	-0.755	-0.247	0	81.43	0	2.767	2.918	-0.152
331.4	53.202	-0.74	-1.148	0	81.41	0	2.769	2.921	-0.152
331.5	53.27	-0.775	-0.985	0	81.35	0	2.771	2.923	-0.152
331.6	53.339	-0.775	0.396	0	81.25	0	2.774	2.925	-0.152
331.7	53.413	-0.76	0.007	0	81.03	0	2.776	2.927	-0.152
331.8	53.475	-0.76	-1.187	0	81.17	0	2.778	2.93	-0.152
331.9	53.544	-0.745	-1.091	0	81.07	0	2.78	2.932	-0.152
332	53.612	-0.745	-0.946	0	81.09	0	2.783	2.934	-0.152
332.1	53.686	-0.753	-0.946	0	81.06	0	2.785	2.936	-0.152
332.2	53.749	-0.753	-0.275	0	81.08	0	2.787	2.939	-0.152
332.3	53.817	-0.745	-0.689	0	81.21	0	2.789	2.941	-0.152
332.4	53.885	-0.745	-1.105	0	81	0	2.792	2.943	-0.152
332.5	53.954	-0.745	-0.593	0	81.18	0	2.794	2.945	-0.152
332.6	54.022	-0.758	-1.003	0	81.11	0	2.796	2.948	-0.152
332.7	54.084	-0.753	-0.247	0	81.15	0	2.798	2.95	-0.152
332.8	54.152	-0.753	-0.604	0	81.14	0	2.801	2.952	-0.152
332.9	54.221	-0.748	-0.576	0	81.04	0	2.803	2.954	-0.152
333	54.283	-0.735	-0.59	0	81.11	0	2.805	2.957	-0.152
333.1	54.345	-0.735	-0.932	0	80.98	0	2.807	2.959	-0.152
333.2	54.413	-0.745	-0.533	0	80.94	0	2.81	2.961	-0.152
333.3	54.482	-0.75	-0.848	0	81.02	0	2.812	2.963	-0.152

333.4	54.544	-0.75	-0.689	0	80.86	0	2.814	2.966	-0.152
333.5	54.612	-0.75	-0.512	0	81.06	0	2.816	2.968	-0.152
333.6	54.674	-0.735	-0.763	0	80.93	0	2.819	2.97	-0.152
333.7	54.737	-0.735	-1.091	0	80.95	0	2.821	2.972	-0.152
333.8	54.805	-0.735	-0.735	0	80.93	0	2.823	2.975	-0.152
333.9	54.867	-0.73	-0.487	0	80.77	0	2.825	2.977	-0.152
334	54.929	-0.73	-0.664	0	80.86	0	2.828	2.979	-0.152
334.1	54.991	-0.76	-0.784	0	80.81	0	2.83	2.981	-0.152
334.2	55.053	-0.753	0.053	0	80.79	0	2.832	2.984	-0.152
334.3	55.116	-0.753	-0.886	0	80.86	0	2.834	2.986	-0.152
334.4	55.178	-0.738	-0.886	0	80.77	0	2.837	2.988	-0.152
334.5	55.24	-0.748	-0.985	0	80.82	0	2.839	2.99	-0.152
334.6	55.302	-0.748	-0.848	0	80.76	0	2.841	2.993	-0.152
334.7	55.364	-0.743	0.081	0	80.64	0	2.843	2.995	-0.152
334.8	55.42	-0.743	-0.664	0	80.81	0	2.846	2.997	-0.152
334.9	55.482	-0.74	-0.971	0	80.59	0	2.848	2.999	-0.152
335	55.544	-0.748	-0.318	0	80.64	0	2.85	3.002	-0.152
335.1	55.6	-0.73	-0.562	0	80.75	0	2.852	3.004	-0.152
335.2	55.662	-0.73	-1.063	0	79.94	0	2.854	3.006	-0.152
335.3	55.725	-0.745	-0.692	0	79.58	0	2.857	3.008	-0.152
335.4	55.78	-0.745	-0.357	0	79.63	0	2.859	3.01	-0.152
335.5	55.836	-0.745	-0.417	0	79.74	0	2.861	3.013	-0.152
335.6	55.899	-0.748	-1.063	0	78.58	0	2.863	3.015	-0.152
335.7	55.954	-0.748	-0.523	0	75.79	0	2.865	3.017	-0.152
335.8	56.004	-0.748	-0.247	0	71.37	0	2.867	3.019	-0.152
335.9	56.054	-0.74	-0.971	0	67.73	0	2.869	3.021	-0.152
336	56.097	-0.743	-0.837	0	66.04	0	2.871	3.023	-0.152
336.1	56.135	-0.743	-0.117	0	64.99	0	2.873	3.024	-0.152
336.2	56.172	-0.73	-0.607	0	62.79	0	2.875	3.026	-0.152
336.3	56.209	-0.763	-1.257	0	61.41	0	2.876	3.028	-0.152
336.4	56.24	-0.763	-0.074	0	61.36	0	2.878	3.03	-0.152
336.5	56.271	-0.75	0.095	0	61.19	0	2.88	3.031	-0.152
336.6	56.302	-0.763	-1.314	0	61.2	0	2.881	3.033	-0.152
336.7	56.334	-0.763	-0.614	0	61.22	0	2.883	3.035	-0.152
336.8	56.365	-0.755	-0.247	0	61.2	0	2.885	3.036	-0.152
336.9	56.396	-0.74	-0.901	0	61.24	0	2.887	3.038	-0.152
337	56.427	-0.74	-1.162	0	60.39	0	2.888	3.04	-0.152
337.1	56.452	-0.758	-0.893	0	59.77	0	2.89	3.041	-0.152
337.2	56.483	-0.763	-0.441	0	58.2	0	2.891	3.043	-0.152
337.3	56.507	-0.763	-0.113	0	58	0	2.893	3.045	-0.152
337.4	56.532	-0.758	-1.014	0	58.04	0	2.895	3.046	-0.152
337.5	56.557	-0.755	-0.233	0	58.13	0	2.896	3.048	-0.152
337.6	56.588	-0.755	-0.576	0	57.87	0	2.898	3.049	-0.152
337.7	56.613	-0.76	-0.749	0	57.87	0	2.9	3.051	-0.152
337.8	56.613	-0.76	-0.646	0	57.91	0	2.901	3.053	-0.152
337.9	56.669	-0.75	-0.579	0	57.95	0	2.903	3.054	-0.152
338	56.694	-0.75	-1.091	0	57.99	0	2.904	3.056	-0.152

338.1	56.719	-0.748	-0.427	0	57.94	0	2.906	3.058	-0.152
338.2	56.75	-0.748	-0.752	0	57.99	0	2.908	3.059	-0.152
338.3	56.768	-0.75	-0.53	0	59	0	2.909	3.061	-0.152
338.4	56.8	-0.75	-0.487	0	59.05	0	2.911	3.062	-0.152
338.5	56.824	-0.75	-0.749	0	59.08	0	2.913	3.064	-0.152
338.6	56.849	-0.748	-1.052	0	59.62	0	2.914	3.066	-0.152
338.7	56.874	-0.76	-0.689	0	60.01	0	2.916	3.067	-0.152
338.8	56.905	-0.76	-0.173	0	60.06	0	2.918	3.069	-0.152
338.9	56.93	-0.743	-0.678	0	60.09	0	2.919	3.071	-0.152
339	56.955	-0.743	-1.204	0	60.06	0	2.921	3.072	-0.152
339.1	56.992	-0.743	-0.999	0	60.18	0	2.923	3.074	-0.152
339.2	57.017	-0.765	-0.53	0	60.15	0	2.924	3.076	-0.152
339.3	57.048	-0.76	-0.533	0	60.19	0	2.926	3.077	-0.152
339.4	57.079	-0.76	-0.505	0	59.84	0	2.928	3.079	-0.152
339.5	57.104	-0.758	-1.314	0	59.12	0	2.929	3.081	-0.152
339.6	57.129	-0.75	-0.915	0	59.01	0	2.931	3.082	-0.152
339.7	57.154	-0.75	-0.692	0	58.87	0	2.932	3.084	-0.152
339.8	57.179	-0.753	-0.766	0	58.91	0	2.934	3.086	-0.152
339.9	57.203	-0.748	-0.399	0	58.91	0	2.936	3.087	-0.152
340	57.235	-0.748	-1.342	0	58.36	0	2.937	3.089	-0.152
340.1	57.259	-0.778	0.335	0	57.9	0	2.939	3.09	-0.152
340.2	57.278	-0.758	0.226	0	57.34	0	2.941	3.092	-0.152
340.3	57.309	-0.758	-1.526	0	56.24	0	2.942	3.094	-0.152
340.4	57.328	-0.748	-1.049	0	53.31	0	2.944	3.095	-0.152
340.5	57.346	-0.755	-0.427	0	50.9	0	2.945	3.097	-0.152
340.6	57.359	-0.755	-0.205	0	50.72	0	2.946	3.098	-0.152
340.7	57.371	-0.758	-0.791	0	50.74	0	2.948	3.099	-0.152
340.8	57.384	-0.758	-0.795	0	50.76	0	2.949	3.101	-0.152
340.9	57.402	-0.75	-0.636	0	50.6	0	2.951	3.102	-0.152
341	57.415	-0.763	-1.063	0	50.51	0	2.952	3.104	-0.152
341.1	57.427	-0.758	-0.261	0	50.53	0	2.953	3.105	-0.152
341.2	57.446	-0.758	-0.484	0	50.55	0	2.955	3.106	-0.152
341.3	57.458	-0.75	-1.285	0	50.57	0	2.956	3.108	-0.152
341.4	57.471	-0.768	-1.162	0	50.69	0	2.958	3.109	-0.152
341.5	57.483	-0.768	0.17	0	51.64	0	2.959	3.111	-0.152
341.6	57.495	-0.773	-1.049	0	51.6	0	2.961	3.112	-0.152
341.7	57.514	-0.775	-0.576	0	51.66	0	2.962	3.113	-0.152
341.8	57.527	-0.775	-0.102	0	51.64	0	2.963	3.115	-0.152
341.9	57.539	-0.783	-0.985	0	51.67	0	2.965	3.116	-0.152
342	57.558	-0.763	-0.576	0	51.66	0	2.966	3.118	-0.152
342.1	57.57	-0.763	-0.795	0	52.26	0	2.968	3.119	-0.152
342.2	57.589	-0.753	-1.243	0	52.77	0	2.969	3.121	-0.152
342.3	57.607	-0.745	-0.261	0	52.6	0	2.971	3.122	-0.152
342.4	57.62	-0.75	-1.243	0	52.59	0	2.972	3.124	-0.152
342.5	57.638	-0.743	-0.749	0	52.55	0	2.974	3.125	-0.152
342.6	57.651	-0.735	-0.749	0	52.56	0	2.975	3.127	-0.152
342.7	57.669	-0.735	-0.72	0	52.6	0	2.976	3.128	-0.152

342.8	57.682	-0.745	-0.59	0	52.61	0	2.978	3.129	-0.152
342.9	57.701	-0.753	-0.385	0	52.62	0	2.979	3.131	-0.152
343	57.713	-0.753	-0.576	0	53.27	0	2.981	3.132	-0.152
343.1	57.732	-0.738	-0.562	0	53.77	0	2.982	3.134	-0.152
343.2	57.75	-0.74	-0.915	0	53.87	0	2.984	3.135	-0.152
343.3	57.769	-0.74	-1.063	0	55.37	0	2.985	3.137	-0.152
343.4	57.788	-0.753	-0.233	0	56.93	0	2.987	3.139	-0.152
343.5	57.806	-0.75	-0.304	0	59.9	0	2.989	3.14	-0.152
343.6	57.831	-0.75	-0.735	0	63.2	0	2.99	3.142	-0.152
343.7	57.862	-0.768	-0.66	0	66.33	0	2.992	3.144	-0.152
343.8	57.899	-0.768	-0.265	0	67.79	0	2.994	3.146	-0.152
343.9	57.93	-0.76	-0.579	0	67.8	0	2.996	3.148	-0.152
344	57.968	-0.743	-1.282	0	67.79	0	2.998	3.149	-0.152
344.1	58.005	-0.753	-1.151	0	67.84	0	3	3.151	-0.152
344.2	58.036	-0.753	-0.618	0	67.67	0	3.002	3.153	-0.152
344.3	58.073	-0.758	-0.636	0	67.76	0	3.004	3.155	-0.152
344.4	58.111	-0.76	-0.533	0	67.77	0	3.005	3.157	-0.152
344.5	58.148	-0.76	-0.749	0	67.82	0	3.007	3.159	-0.152
344.6	58.179	-0.753	-0.692	0	67.74	0	3.009	3.161	-0.152
344.7	58.216	-0.753	-0.371	0	67.8	0	3.011	3.163	-0.152
344.8	58.247	-0.753	-0.749	0	67.89	0	3.013	3.165	-0.152
344.9	58.285	-0.76	-0.901	0	67.79	0	3.015	3.166	-0.152
345	58.322	-0.763	-0.491	0	67.72	0	3.017	3.168	-0.152
345.1	58.353	-0.763	-0.247	0	67.75	0	3.019	3.17	-0.152
345.2	58.39	-0.78	-0.233	0	67.76	0	3.02	3.172	-0.152
345.3	58.421	-0.75	0.106	0	66.69	0	3.022	3.174	-0.152
345.4	58.459	-0.75	-1.314	0	65.37	0	3.024	3.176	-0.152
345.5	58.49	-0.738	-1.554	0	64.59	0	3.026	3.178	-0.152
345.6	58.515	-0.745	-0.618	0	64.42	0	3.028	3.179	-0.152
345.7	58.546	-0.745	-0.431	0	63.26	0	3.03	3.181	-0.152
345.8	58.577	-0.735	-0.675	0	63.36	0	3.031	3.183	-0.152
345.9	58.602	-0.728	-1.021	0	62.51	0	3.033	3.185	-0.152
346	58.626	-0.728	-0.901	0	61.48	0	3.035	3.186	-0.152
346.1	58.651	-0.733	-0.918	0	59.54	0	3.036	3.188	-0.152
346.2	58.67	-0.758	-0.865	0	58.07	0	3.038	3.19	-0.152
346.3	58.695	-0.758	-0.004	0	58.14	0	3.04	3.191	-0.152
346.4	58.713	-0.728	-0.491	0	58.17	0	3.041	3.193	-0.152
346.5	58.738	-0.738	-1.554	0	58.07	0	3.043	3.194	-0.152
346.6	58.757	-0.738	-0.636	0	57.09	0	3.044	3.196	-0.152
346.7	58.776	-0.72	-0.304	0	56.56	0	3.046	3.198	-0.152
346.8	58.794	-0.72	-1.063	0	55.53	0	3.048	3.199	-0.152
346.9	58.807	-0.725	-0.858	0	55.04	0	3.049	3.201	-0.152
347	58.825	-0.738	-0.286	0	55.03	0	3.051	3.202	-0.152
347.1	58.844	-0.74	-0.293	0	54.76	0	3.052	3.204	-0.152
347.2	58.856	-0.74	-0.837	0	54.81	0	3.054	3.205	-0.152
347.3	58.869	-0.745	-0.735	0	54.31	0	3.055	3.207	-0.152
347.4	58.887	-0.748	-0.562	0	53.24	0	3.057	3.208	-0.152

347.5	58.9	-0.748	-0.752	0	52.55	0	3.058	3.21	-0.152
347.6	58.912	-0.733	-0.247	0	51.75	0	3.06	3.211	-0.152
347.7	58.925	-0.71	-0.763	0	51.82	0	3.061	3.212	-0.152
347.8	58.931	-0.71	-1.434	0	51.78	0	3.062	3.214	-0.152
347.9	58.943	-0.738	-0.459	0	51.81	0	3.064	3.215	-0.152
348	58.956	-0.738	-0.088	0	51.85	0	3.065	3.217	-0.152
348.1	58.968	-0.738	-0.47	0	51.83	0	3.067	3.218	-0.152
348.2	58.974	-0.743	-0.901	0	51.81	0	3.068	3.22	-0.152
348.3	58.987	-0.745	-0.399	0	51.86	0	3.07	3.221	-0.152
348.4	59.005	-0.745	-0.459	0	51.84	0	3.071	3.223	-0.152
348.5	59.012	-0.72	-0.978	0	51.57	0	3.072	3.224	-0.152
348.6	59.024	-0.745	-1.254	0	50.58	0	3.074	3.225	-0.152
348.7	59.036	-0.745	0.081	0	49.9	0	3.075	3.227	-0.152
348.8	59.043	-0.753	-0.088	0	48.85	0	3.077	3.228	-0.152
348.9	59.049	-0.738	-0.59	0	48.37	0	3.078	3.229	-0.152
349	59.055	-0.738	-1.063	0	47.77	0	3.079	3.231	-0.152
349.1	59.061	-0.725	-0.706	0	47.22	0	3.081	3.232	-0.152
349.2	59.068	-0.72	-0.735	0	46.64	0	3.082	3.233	-0.152
349.3	59.068	-0.72	-1.024	0	45.45	0	3.083	3.235	-0.152
349.4	59.074	-0.743	-0.459	0	43.83	0	3.084	3.236	-0.152
349.5	59.074	-0.728	-0.42	0	42.23	0	3.086	3.237	-0.152
349.6	59.068	-0.728	-0.978	0	40.81	0	3.087	3.238	-0.152
349.7	59.068	-0.743	-1.091	0	39.28	0	3.088	3.239	-0.152
349.8	59.061	-0.743	-0.735	0	38.02	0	3.089	3.24	-0.152
349.9	59.049	-0.733	-0.459	0	36.4	0	3.09	3.241	-0.152
350	59.043	-0.748	-0.78	0	35.75	0	3.091	3.242	-0.152
350.1	59.03	-0.743	-0.562	0	35.78	0	3.092	3.243	-0.152
350.2	59.024	-0.743	-0.501	0	35.73	0	3.093	3.244	-0.152
350.3	59.012	-0.755	-0.982	0	35.78	0	3.094	3.245	-0.152
350.4	58.999	-0.75	-0.547	0	35.69	0	3.095	3.246	-0.152
350.5	58.993	-0.75	-0.399	0	35.74	0	3.096	3.247	-0.152
350.6	58.981	-0.748	-1.098	0	35.68	0	3.097	3.248	-0.152
350.7	58.968	-0.748	-0.343	0	35.7	0	3.098	3.249	-0.152
350.8	58.962	-0.748	-0.809	0	35.66	0	3.099	3.25	-0.152
350.9	58.949	-0.768	-0.805	0	35.55	0	3.1	3.251	-0.152
351	58.937	-0.77	-0.131	0	34.8	0	3.101	3.252	-0.152
351.1	58.925	-0.77	-0.399	0	34.86	0	3.102	3.253	-0.152
351.2	58.912	-0.748	-1.162	0	34.82	0	3.103	3.254	-0.152
351.3	58.9	-0.755	-1.19	0	34.83	0	3.104	3.255	-0.152
351.4	58.887	-0.755	-0.971	0	34.84	0	3.105	3.256	-0.152
351.5	58.875	-0.74	-0.233	0	34.82	0	3.106	3.257	-0.152
351.6	58.862	-0.733	-0.72	0	34.79	0	3.107	3.258	-0.152
351.7	58.85	-0.733	-1.342	0	34.77	0	3.107	3.259	-0.152
351.8	58.838	-0.758	-0.233	0	34.79	0	3.108	3.26	-0.152
351.9	58.831	-0.753	-0.636	0	34.74	0	3.109	3.261	-0.152
352	58.813	-0.753	-0.802	0	34.79	0	3.11	3.262	-0.152
352.1	58.807	-0.735	-1.257	0	34.73	0	3.111	3.263	-0.152

352.2	58.794	-0.728	-0.901	0	34.76	0	3.112	3.264	-0.152
352.3	58.782	-0.728	-1.049	0	34.7	0	3.113	3.265	-0.152
352.4	58.769	-0.745	-0.544	0	34.75	0	3.114	3.266	-0.152
352.5	58.757	-0.733	-0.279	0	34.7	0	3.115	3.267	-0.152
352.6	58.744	-0.733	-1.049	0	35.07	0	3.116	3.268	-0.152
352.7	58.732	-0.735	-0.848	0	35.01	0	3.117	3.269	-0.152
352.8	58.726	-0.735	-0.445	0	35.04	0	3.118	3.27	-0.152
352.9	58.713	-0.733	-0.445	0	34.52	0	3.119	3.271	-0.152
353	58.701	-0.753	-0.766	0	33.71	0	3.12	3.272	-0.152
353.1	58.689	-0.75	-0.318	0	33.37	0	3.121	3.272	-0.152
353.2	58.676	-0.75	-0.399	0	33.45	0	3.122	3.273	-0.152
353.3	58.664	-0.758	-0.932	0	33.37	0	3.123	3.274	-0.152
353.4	58.651	-0.765	-1.105	0	33.41	0	3.124	3.275	-0.152
353.5	58.639	-0.765	-0.148	0	33.38	0	3.125	3.276	-0.152
353.6	58.62	-0.745	-0.516	0	33.4	0	3.126	3.277	-0.152
353.7	58.608	-0.733	-0.735	0	33.38	0	3.127	3.278	-0.152
353.8	58.602	-0.733	-1.049	0	33.34	0	3.127	3.279	-0.152
353.9	58.583	-0.755	-0.614	0	33.38	0	3.128	3.28	-0.152
354	58.57	-0.748	-0.074	0	33.32	0	3.129	3.281	-0.152
354.1	58.558	-0.748	-0.766	0	33.39	0	3.13	3.282	-0.152
354.2	58.546	-0.72	-1.197	0	33.32	0	3.131	3.283	-0.152
354.3	58.533	-0.735	-1.176	0	33.35	0	3.132	3.284	-0.152
354.4	58.521	-0.735	-0.357	0	33.3	0	3.133	3.285	-0.152
354.5	58.508	-0.753	-0.473	0	33.59	0	3.134	3.285	-0.152
354.6	58.496	-0.763	-0.971	0	33.55	0	3.135	3.286	-0.152
354.7	58.483	-0.763	-0.318	0	33.56	0	3.136	3.287	-0.152
354.8	58.471	-0.735	-0.682	0	33.54	0	3.137	3.288	-0.152
354.9	58.459	-0.745	-1.356	0	33.52	0	3.138	3.289	-0.152
355	58.44	-0.745	-0.498	0	33.54	0	3.139	3.29	-0.152
355.1	58.434	-0.73	-0.562	0	33.49	0	3.14	3.291	-0.152
355.2	58.415	-0.733	-1.116	0	33.54	0	3.14	3.292	-0.152
355.3	58.403	-0.733	-0.604	0	33.48	0	3.141	3.293	-0.152
355.4	58.396	-0.738	-0.918	0	33.53	0	3.142	3.294	-0.152
355.5	58.378	-0.725	-0.576	0	33.47	0	3.143	3.295	-0.152
355.6	58.365	-0.725	-0.752	0	33.51	0	3.144	3.296	-0.152
355.7	58.359	-0.728	-1.091	0	33.49	0	3.145	3.297	-0.152
355.8	58.341	-0.728	-0.562	0	33.18	0	3.146	3.298	-0.152
355.9	58.334	-0.753	-0.233	0	32.21	0	3.147	3.298	-0.152
356	58.322	-0.733	-0.321	0	31.85	0	3.148	3.299	-0.152
356.1	58.297	-0.733	-1.116	0	31.41	0	3.149	3.3	-0.152
356.2	58.285	-0.733	-1.017	0	30.72	0	3.15	3.301	-0.152
356.3	58.272	-0.765	-0.646	0	29.31	0	3.15	3.302	-0.152
356.4	58.254	-0.763	-0.233	0	28.86	0	3.151	3.303	-0.152
356.5	58.235	-0.763	-0.233	0	28.07	0	3.152	3.303	-0.152
356.6	58.21	-0.76	-0.918	0	28.09	0	3.153	3.304	-0.152
356.7	58.191	-0.753	-0.72	0	28.1	0	3.153	3.305	-0.152
356.8	58.173	-0.753	-1.017	0	26.93	0	3.154	3.306	-0.152

356.9	58.148	-0.765	-0.971	0	25.6	0	3.155	3.306	-0.152
357	58.129	-0.753	-0.318	0	25.41	0	3.156	3.307	-0.152
357.1	58.104	-0.753	-1.01	0	25.42	0	3.156	3.308	-0.152
357.2	58.08	-0.753	-1.148	0	25.38	0	3.157	3.309	-0.152
357.3	58.055	-0.745	-0.47	0	24.81	0	3.158	3.309	-0.152
357.4	58.03	-0.745	-0.477	0	22.59	0	3.158	3.31	-0.152
357.5	57.999	-0.73	-0.932	0	21.12	0	3.159	3.311	-0.152
357.6	57.974	-0.745	-1.501	0	21.05	0	3.16	3.311	-0.152
357.7	57.943	-0.745	0.109	0	20.99	0	3.16	3.312	-0.152
357.8	57.906	-0.74	-0.576	0	21	0	3.161	3.312	-0.152
357.9	57.881	-0.735	-0.72	0	21.02	0	3.161	3.313	-0.152
358	57.85	-0.735	-1.197	0	20.95	0	3.162	3.313	-0.152
358.1	57.825	-0.733	-0.766	0	21.4	0	3.162	3.314	-0.152
358.2	57.794	-0.71	-0.501	0	21.7	0	3.163	3.315	-0.152
358.3	57.769	-0.71	-1.289	0	22.14	0	3.164	3.315	-0.152
358.4	57.738	-0.728	-0.766	0	22.93	0	3.164	3.316	-0.152
358.5	57.713	-0.738	-0.399	0	23.08	0	3.165	3.317	-0.152
358.6	57.682	-0.738	-0.682	0	23.48	0	3.166	3.317	-0.152
358.7	57.657	-0.733	-0.53	0	24.22	0	3.166	3.318	-0.152
358.8	57.638	-0.733	-0.932	0	24.9	0	3.167	3.319	-0.152
358.9	57.614	-0.745	-0.872	0	25.21	0	3.168	3.319	-0.152
359	57.582	-0.758	-0.29	0	25.16	0	3.168	3.32	-0.152
359.1	57.564	-0.768	-0.632	0	25.17	0	3.169	3.321	-0.152
359.2	57.539	-0.768	-0.791	0	25.14	0	3.17	3.321	-0.152
359.3	57.52	-0.775	-0.219	0	25.17	0	3.17	3.322	-0.152
359.4	57.502	-0.753	-0.463	0	25.17	0	3.171	3.323	-0.152
359.5	57.471	-0.753	-1.169	0	25.4	0	3.172	3.323	-0.152
359.6	57.452	-0.74	-1.091	0	25.31	0	3.173	3.324	-0.152
359.7	57.427	-0.738	-0.431	0	25.38	0	3.173	3.325	-0.152
359.8	57.402	-0.738	-0.72	0	25.33	0	3.174	3.326	-0.152
359.9	57.384	-0.733	-0.752	0	25.43	0	3.175	3.326	-0.152
360	57.359	-0.72	-0.636	0	25.87	0	3.175	3.327	-0.152
360.1	57.334	-0.72	-1.197	0	26.36	0	3.176	3.328	-0.152
360.2	57.315	-0.74	-0.371	0	26.64	0	3.177	3.328	-0.152
360.3	57.297	-0.73	0.053	0	26.63	0	3.178	3.329	-0.152
360.4	57.278	-0.73	-0.918	0	27.14	0	3.178	3.33	-0.152
360.5	57.259	-0.743	-0.667	0	27.72	0	3.179	3.331	-0.152
360.6	57.241	-0.745	-0.399	0	28.73	0	3.18	3.332	-0.152
360.7	57.222	-0.745	-0.872	0	29.34	0	3.181	3.332	-0.152
360.8	57.203	-0.748	-0.706	0	30.04	0	3.182	3.333	-0.152
360.9	57.191	-0.748	-0.72	0	31.07	0	3.182	3.334	-0.152
361	57.179	-0.748	-0.547	0	31.58	0	3.183	3.335	-0.152
361.1	57.16	-0.78	-0.918	0	32.68	0	3.184	3.336	-0.152
361.2	57.148	-0.76	-0.385	0	32.98	0	3.185	3.337	-0.152
361.3	57.141	-0.76	-0.385	0	33.52	0	3.186	3.338	-0.152
361.4	57.123	-0.745	-1.572	0	33.45	0	3.187	3.339	-0.152
361.5	57.116	-0.733	-0.833	0	33.52	0	3.188	3.34	-0.152

361.6	57.104	-0.733	-0.706	0	33.44	0	3.189	3.34	-0.152
361.7	57.098	-0.75	-1.282	0	33.79	0	3.19	3.341	-0.152
361.8	57.085	-0.75	-0.145	0	34.68	0	3.191	3.342	-0.152
361.9	57.079	-0.748	-0.219	0	35.08	0	3.192	3.343	-0.152
362	57.067	-0.75	-1.374	0	34.99	0	3.193	3.344	-0.152
362.1	57.061	-0.743	-1.006	0	35.03	0	3.194	3.345	-0.152
362.2	57.054	-0.743	-0.304	0	35	0	3.195	3.346	-0.152
362.3	57.048	-0.735	-1.031	0	34.88	0	3.196	3.347	-0.152
362.4	57.042	-0.748	-0.957	0	34.81	0	3.197	3.348	-0.152
362.5	57.029	-0.748	-0.632	0	34.83	0	3.198	3.349	-0.152
362.6	57.023	-0.735	-0.219	0	34.81	0	3.199	3.35	-0.152
362.7	57.017	-0.738	-1.197	0	34.81	0	3.2	3.351	-0.152
362.8	57.005	-0.738	-1.197	0	34.83	0	3.2	3.352	-0.152
362.9	56.998	-0.743	-0.219	0	34.81	0	3.201	3.353	-0.152
363	56.992	-0.745	-0.872	0	34.81	0	3.202	3.354	-0.152
363.1	56.98	-0.745	-0.547	0	34.77	0	3.203	3.355	-0.152
363.2	56.974	-0.73	-0.622	0	34.79	0	3.204	3.356	-0.152
363.3	56.967	-0.723	-1.049	0	34.79	0	3.205	3.357	-0.152
363.4	56.955	-0.723	-0.752	0	34.78	0	3.206	3.358	-0.152
363.5	56.949	-0.74	-0.547	0	34.77	0	3.207	3.359	-0.152
363.6	56.942	-0.743	-0.547	0	34.77	0	3.208	3.36	-0.152
363.7	56.93	-0.743	-0.576	0	34.79	0	3.209	3.361	-0.152
363.8	56.93	-0.74	-0.706	0	34.78	0	3.21	3.362	-0.152
363.9	56.924	-0.733	-0.886	0	34.75	0	3.211	3.363	-0.152
364	56.911	-0.733	-0.59	0	34.77	0	3.212	3.364	-0.152
364.1	56.905	-0.74	-1.031	0	34.78	0	3.213	3.365	-0.152
364.2	56.899	-0.753	-0.463	0	34.76	0	3.214	3.366	-0.152
364.3	56.887	-0.753	-0.219	0	34.75	0	3.215	3.367	-0.152
364.4	56.88	-0.758	-0.219	0	34.72	0	3.216	3.367	-0.152
364.5	56.874	-0.728	-0.791	0	34.74	0	3.217	3.368	-0.152
364.6	56.868	-0.728	-1.402	0	34.72	0	3.218	3.369	-0.152
364.7	56.855	-0.735	-0.636	0	34.8	0	3.219	3.37	-0.152
364.8	56.849	-0.735	-0.06	0	34.9	0	3.22	3.371	-0.152
364.9	56.843	-0.723	-1.127	0	34.89	0	3.221	3.372	-0.152
365	56.837	-0.733	-1.077	0	34.91	0	3.222	3.373	-0.152
365.1	56.824	-0.738	-0.752	0	34.9	0	3.223	3.374	-0.152
365.2	56.818	-0.738	-0.463	0	34.92	0	3.224	3.375	-0.152
365.3	56.812	-0.748	-0.505	0	34.86	0	3.225	3.376	-0.152
365.4	56.806	-0.748	-0.463	0	34.91	0	3.226	3.377	-0.152
365.5	56.793	-0.748	-0.872	0	34.86	0	3.227	3.378	-0.152
365.6	56.787	-0.74	-0.692	0	34.91	0	3.228	3.379	-0.152
365.7	56.787	-0.74	-0.872	0	35.33	0	3.229	3.38	-0.152
365.8	56.775	-0.74	-0.918	0	35.76	0	3.23	3.381	-0.152
365.9	56.768	-0.71	-0.766	0	36.44	0	3.231	3.382	-0.152
366	56.768	-0.723	-1.123	0	36.74	0	3.232	3.383	-0.152
366.1	56.762	-0.723	-0.47	0	37.32	0	3.233	3.384	-0.152
366.2	56.756	-0.725	-0.06	0	37.28	0	3.234	3.385	-0.152

366.3	56.756	-0.725	-0.547	0	37.28	0	3.235	3.386	-0.152
366.4	56.75	-0.725	-1.388	0	37.27	0	3.236	3.387	-0.152
366.5	56.744	-0.743	-0.219	0	37.25	0	3.237	3.388	-0.152
366.6	56.744	-0.74	-0.385	0	37.25	0	3.238	3.389	-0.152
366.7	56.737	-0.74	-0.752	0	37.21	0	3.239	3.39	-0.152
366.8	56.731	-0.758	-0.632	0	37.24	0	3.24	3.391	-0.152
366.9	56.731	-0.753	-0.233	0	37.25	0	3.241	3.392	-0.152
367	56.725	-0.753	-0.692	0	37.27	0	3.242	3.393	-0.152
367.1	56.725	-0.733	-1.031	0	37.26	0	3.243	3.395	-0.152
367.2	56.719	-0.755	-1.282	0	37.26	0	3.244	3.396	-0.152
367.3	56.719	-0.755	-0.547	0	37.29	0	3.245	3.397	-0.152
367.4	56.713	-0.733	-0.219	0	37.27	0	3.246	3.398	-0.152
367.5	56.713	-0.745	-1.43	0	37.26	0	3.247	3.399	-0.152
367.6	56.706	-0.745	-0.576	0	37.29	0	3.248	3.4	-0.152
367.7	56.7	-0.745	-0.562	0	37.26	0	3.249	3.401	-0.152
367.8	56.7	-0.745	-0.547	0	37.24	0	3.25	3.402	-0.152
367.9	56.694	-0.74	-0.632	0	37.24	0	3.251	3.403	-0.152
368	56.694	-0.753	-0.371	0	37.23	0	3.252	3.404	-0.152
368.1	56.688	-0.77	-0.47	0	37.25	0	3.253	3.405	-0.152
368.2	56.688	-0.77	-0.29	0	37.24	0	3.254	3.406	-0.152
368.3	56.681	-0.758	-0.501	0	37.23	0	3.255	3.407	-0.152
368.4	56.675	-0.743	-1.063	0	37.23	0	3.256	3.408	-0.152
368.5	56.675	-0.743	-1.243	0	37.64	0	3.257	3.409	-0.152
368.6	56.669	-0.74	-1.402	0	39.11	0	3.259	3.41	-0.152
368.7	56.669	-0.725	-0.102	0	40.75	0	3.26	3.411	-0.152
368.8	56.669	-0.725	-0.706	0	41.37	0	3.261	3.412	-0.152
368.9	56.669	-0.738	-0.932	0	41.36	0	3.262	3.414	-0.152
369	56.675	-0.743	-0.547	0	41.33	0	3.263	3.415	-0.152
369.1	56.675	-0.743	-0.417	0	41.34	0	3.264	3.416	-0.152
369.2	56.681	-0.743	-1.031	0	41.38	0	3.265	3.417	-0.152
369.3	56.681	-0.735	-1.063	0	41.34	0	3.267	3.418	-0.152
369.4	56.688	-0.735	-0.145	0	41.39	0	3.268	3.419	-0.152
369.5	56.681	-0.728	-1.031	0	41.18	0	3.269	3.42	-0.152
369.6	56.688	-0.748	-1.328	0	41.11	0	3.27	3.422	-0.152
369.7	56.688	-0.748	-0.187	0	41.17	0	3.271	3.423	-0.152
369.8	56.688	-0.743	-0.463	0	41.13	0	3.272	3.424	-0.152
369.9	56.694	-0.743	-1.077	0	41.12	0	3.273	3.425	-0.152
370	56.694	-0.743	-0.632	0	41.14	0	3.275	3.426	-0.152
370.1	56.694	-0.74	-0.265	0	41.15	0	3.276	3.427	-0.152
370.2	56.7	-0.748	-1.031	0	41.12	0	3.277	3.428	-0.152
370.3	56.7	-0.748	-0.346	0	41.13	0	3.278	3.43	-0.152
370.4	56.706	-0.75	-0.385	0	41.13	0	3.279	3.431	-0.152
370.5	56.706	-0.748	-0.968	0	41.11	0	3.28	3.432	-0.152
370.6	56.706	-0.748	-0.35	0	41.13	0	3.281	3.433	-0.152
370.7	56.713	-0.75	-1.077	0	41.16	0	3.283	3.434	-0.152
370.8	56.713	-0.75	-0.692	0	41.14	0	3.284	3.435	-0.152
370.9	56.713	-0.733	-1.031	0	41.15	0	3.285	3.436	-0.152

371	56.719	-0.738	-0.872	0	41.16	0	3.286	3.438	-0.152
371.1	56.719	-0.738	-0.346	0	41.17	0	3.287	3.439	-0.152
371.2	56.719	-0.738	-0.752	0	41.14	0	3.288	3.44	-0.152
371.3	56.725	-0.743	-0.328	0	41.16	0	3.289	3.441	-0.152
371.4	56.725	-0.74	-0.632	0	41.16	0	3.291	3.442	-0.152
371.5	56.731	-0.74	-0.777	0	41.16	0	3.292	3.443	-0.152
371.6	56.731	-0.735	-0.516	0	41.17	0	3.293	3.444	-0.152
371.7	56.731	-0.745	-0.872	0	41.18	0	3.294	3.446	-0.152
371.8	56.731	-0.745	-0.675	0	41.15	0	3.295	3.447	-0.152
371.9	56.737	-0.73	-0.304	0	41.15	0	3.296	3.448	-0.152
372	56.737	-0.725	-1.081	0	41.14	0	3.297	3.449	-0.152
372.1	56.737	-0.725	-1.511	0	41.18	0	3.299	3.45	-0.152
372.2	56.744	-0.748	-0.47	0	41.15	0	3.3	3.451	-0.152
372.3	56.744	-0.735	-0.205	0	41.22	0	3.301	3.452	-0.152
372.4	56.744	-0.735	-0.547	0	41.15	0	3.302	3.454	-0.152
372.5	56.75	-0.708	-1.441	0	41.18	0	3.303	3.455	-0.152
372.6	56.744	-0.733	-1.077	0	41.18	0	3.304	3.456	-0.152
372.7	56.75	-0.733	-0.117	0	41.16	0	3.305	3.457	-0.152
372.8	56.75	-0.738	0.166	0	41.19	0	3.307	3.458	-0.152
372.9	56.756	-0.74	-0.788	0	41.18	0	3.308	3.459	-0.152
373	56.756	-0.74	-0.901	0	41.17	0	3.309	3.46	-0.152
373.1	56.756	-0.743	-0.795	0	41.16	0	3.31	3.462	-0.152
373.2	56.756	-0.753	-0.872	0	41.2	0	3.311	3.463	-0.152
373.3	56.762	-0.753	0.011	0	41.17	0	3.312	3.464	-0.152
373.4	56.762	-0.75	-1.077	0	41.18	0	3.313	3.465	-0.152
373.5	56.768	-0.75	-1.031	0	41.15	0	3.315	3.466	-0.152
373.6	56.768	-0.75	0.268	0	41.2	0	3.316	3.467	-0.152
373.7	56.775	-0.735	-1.36	0	41.19	0	3.317	3.468	-0.152
373.8	56.768	-0.735	-0.759	0	41.19	0	3.318	3.47	-0.152
373.9	56.768	-0.738	-0.265	0	41.18	0	3.319	3.471	-0.152
374	56.781	-0.733	-0.872	0	41.21	0	3.32	3.472	-0.152
374.1	56.781	-0.723	-0.562	0	41.21	0	3.321	3.473	-0.152
374.2	56.781	-0.723	-1.162	0	41.21	0	3.323	3.474	-0.152
374.3	56.781	-0.753	-0.918	0	41.19	0	3.324	3.475	-0.152
374.4	56.787	-0.743	-0.47	0	41.2	0	3.325	3.476	-0.152
374.5	56.787	-0.743	-0.576	0	41.21	0	3.326	3.478	-0.152
374.6	56.787	-0.72	-1.063	0	41.21	0	3.327	3.479	-0.152
374.7	56.793	-0.725	-0.692	0	41.22	0	3.328	3.48	-0.152
374.8	56.793	-0.725	-0.706	0	41.18	0	3.329	3.481	-0.152
374.9	56.793	-0.715	-0.622	0	41.24	0	3.331	3.482	-0.152
375	56.8	-0.728	-0.706	0	41.36	0	3.332	3.483	-0.152
375.1	56.8	-0.728	-0.547	0	41.39	0	3.333	3.484	-0.152
375.2	56.8	-0.745	-0.385	0	41.38	0	3.334	3.486	-0.152
375.3	56.806	-0.748	-0.501	0	41.42	0	3.335	3.487	-0.152
375.4	56.806	-0.748	-0.484	0	41.39	0	3.336	3.488	-0.152
375.5	56.812	-0.74	-0.706	0	41.43	0	3.338	3.489	-0.152
375.6	56.806	-0.733	-0.706	0	41.39	0	3.339	3.49	-0.152

375.7	56.812	-0.733	-1.031	0	41.46	0	3.34	3.491	-0.152
375.8	56.812	-0.71	-0.918	0	41.43	0	3.341	3.493	-0.152
375.9	56.818	-0.713	-0.872	0	41.44	0	3.342	3.494	-0.152
376	56.818	-0.713	-0.918	0	41.41	0	3.343	3.495	-0.152
376.1	56.818	-0.738	-0.59	0	41.43	0	3.344	3.496	-0.152
376.2	56.824	-0.738	-0.72	0	41.27	0	3.346	3.497	-0.152
376.3	56.824	-0.738	-0.632	0	41.25	0	3.347	3.498	-0.152
376.4	56.824	-0.75	-0.646	0	41.25	0	3.348	3.499	-0.152
376.5	56.824	-0.76	-0.427	0	41.29	0	3.349	3.501	-0.152
376.6	56.831	-0.76	-1.176	0	41.23	0	3.35	3.502	-0.152
376.7	56.831	-0.763	-0.088	0	41.24	0	3.351	3.503	-0.152
376.8	56.831	-0.763	-0.77	0	41.26	0	3.352	3.504	-0.152
376.9	56.831	-0.763	-0.872	0	41	0	3.354	3.505	-0.152
377	56.837	-0.76	-0.205	0	40.5	0	3.355	3.506	-0.152
377.1	56.837	-0.74	-0.59	0	40.37	0	3.356	3.507	-0.152
377.2	56.837	-0.74	-1.458	0	39.22	0	3.357	3.508	-0.152
377.3	56.837	-0.745	-0.805	0	38.04	0	3.358	3.51	-0.152
377.4	56.831	-0.728	-0.219	0	36.42	0	3.359	3.511	-0.152
377.5	56.824	-0.728	-0.802	0	34.32	0	3.36	3.511	-0.152
377.6	56.818	-0.728	-0.946	0	31.95	0	3.361	3.512	-0.152
377.7	56.812	-0.728	-0.766	0	29.62	0	3.362	3.513	-0.152
377.8	56.793	-0.728	-0.78	0	27.73	0	3.362	3.514	-0.152
377.9	56.775	-0.708	-0.622	0	27.54	0	3.363	3.515	-0.152
378	56.762	-0.723	-0.932	0	27.47	0	3.364	3.515	-0.152
378.1	56.744	-0.723	-0.562	0	26.68	0	3.365	3.516	-0.152
378.2	56.725	-0.73	-0.134	0	25.67	0	3.365	3.517	-0.152
378.3	56.706	-0.728	-0.706	0	25.36	0	3.366	3.518	-0.152
378.4	56.688	-0.728	-0.918	0	25.38	0	3.367	3.518	-0.152
378.5	56.663	-0.728	-0.385	0	25.33	0	3.368	3.519	-0.152
378.6	56.644	-0.75	-0.66	0	25.35	0	3.368	3.52	-0.152
378.7	56.626	-0.75	-0.357	0	25.34	0	3.369	3.52	-0.152
378.8	56.607	-0.73	0.095	0	25.03	0	3.37	3.521	-0.152
378.9	56.576	-0.73	-1.374	0	24.44	0	3.37	3.522	-0.152
379	56.557	-0.73	-1.031	0	23.7	0	3.371	3.522	-0.152
379.1	56.532	-0.74	0.109	0	23.76	0	3.372	3.523	-0.152
379.2	56.507	-0.718	-0.233	0	23.7	0	3.372	3.524	-0.152
379.3	56.489	-0.718	-1.388	0	23.73	0	3.373	3.524	-0.152
379.4	56.464	-0.74	-0.872	0	23.74	0	3.374	3.525	-0.152
379.5	56.439	-0.735	-0.06	0	23.66	0	3.374	3.526	-0.152
379.6	56.414	-0.735	-0.604	0	23.72	0	3.375	3.526	-0.152
379.7	56.396	-0.75	-1.257	0	24.24	0	3.376	3.527	-0.152
379.8	56.371	-0.75	-0.533	0	24.46	0	3.376	3.528	-0.152
379.9	56.352	-0.753	-0.233	0	25.26	0	3.377	3.529	-0.152
380	56.334	-0.753	-0.791	0	25.19	0	3.378	3.529	-0.152
380.1	56.309	-0.745	-0.72	0	25.72	0	3.378	3.53	-0.152
380.2	56.296	-0.745	-0.399	0	25.6	0	3.379	3.531	-0.152
380.3	56.271	-0.745	-1.112	0	25.79	0	3.38	3.531	-0.152

380.4	56.253	-0.745	-0.632	0	26.65	0	3.381	3.532	-0.152
380.5	56.234	-0.745	-0.547	0	26.81	0	3.381	3.533	-0.152
380.6	56.215	-0.75	-1.031	0	27.11	0	3.382	3.534	-0.152
380.7	56.197	-0.76	-0.399	0	27.88	0	3.383	3.534	-0.152
380.8	56.178	-0.76	-0.279	0	28.54	0	3.384	3.535	-0.152
380.9	56.166	-0.768	-0.646	0	29.42	0	3.384	3.536	-0.152
381	56.153	-0.758	-0.893	0	29.93	0	3.385	3.537	-0.152
381.1	56.141	-0.758	-0.562	0	30.59	0	3.386	3.538	-0.152
381.2	56.128	-0.745	-1.116	0	31.67	0	3.387	3.539	-0.152
381.3	56.116	-0.748	-1.134	0	32.18	0	3.388	3.539	-0.152
381.4	56.104	-0.748	-0.788	0	33.07	0	3.389	3.54	-0.152
381.5	56.097	-0.745	-0.604	0	33.67	0	3.39	3.541	-0.152
381.6	56.091	-0.735	-0.562	0	34.7	0	3.391	3.542	-0.152
381.7	56.085	-0.735	-0.72	0	34.76	0	3.392	3.543	-0.152
381.8	56.079	-0.73	-0.886	0	35.04	0	3.393	3.544	-0.152
381.9	56.073	-0.723	-0.191	0	35.5	0	3.394	3.545	-0.152
382	56.066	-0.723	-1.01	0	35.53	0	3.395	3.546	-0.152
382.1	56.066	-0.735	-0.918	0	35.49	0	3.396	3.547	-0.152
382.2	56.054	-0.74	-0.604	0	35.48	0	3.397	3.548	-0.152
382.3	56.048	-0.74	-0.385	0	35.52	0	3.398	3.549	-0.152
382.4	56.048	-0.723	-0.562	0	36.28	0	3.399	3.55	-0.152
382.5	56.041	-0.708	-0.533	0	36.28	0	3.4	3.551	-0.152
382.6	56.041	-0.708	-1.282	0	36.25	0	3.401	3.552	-0.152
382.7	56.035	-0.733	-0.932	0	36.28	0	3.402	3.553	-0.152
382.8	56.035	-0.733	-0.159	0	36.28	0	3.403	3.554	-0.152
382.9	56.029	-0.738	-0.766	0	36.26	0	3.404	3.555	-0.152
383	56.023	-0.743	-0.791	0	36.28	0	3.405	3.556	-0.152
383.1	56.023	-0.74	-0.791	0	36.51	0	3.406	3.557	-0.152
383.2	56.023	-0.74	-0.547	0	37.02	0	3.407	3.558	-0.152
383.3	56.017	-0.728	-1.134	0	37.21	0	3.408	3.559	-0.152
383.4	56.017	-0.723	-0.932	0	38.43	0	3.409	3.56	-0.152
383.5	56.017	-0.723	-0.445	0	38.69	0	3.41	3.561	-0.152
383.6	56.017	-0.73	-0.72	0	39.78	0	3.411	3.562	-0.152
383.7	56.023	-0.718	-0.36	0	41.31	0	3.412	3.564	-0.152
383.8	56.023	-0.718	-0.735	0	42.63	0	3.413	3.565	-0.152
383.9	56.029	-0.73	-1.091	0	43.87	0	3.414	3.566	-0.152
384	56.035	-0.725	0.095	0	44.52	0	3.416	3.567	-0.152
384.1	56.048	-0.725	-1.045	0	45.6	0	3.417	3.569	-0.152
384.2	56.054	-0.715	-0.689	0	46.76	0	3.418	3.57	-0.152
384.3	56.066	-0.71	-0.932	0	47.35	0	3.42	3.571	-0.152
384.4	56.079	-0.71	-1.091	0	47.88	0	3.421	3.572	-0.152
384.5	56.091	-0.733	-0.72	0	47.87	0	3.422	3.574	-0.152
384.6	56.104	-0.723	-0.233	0	48.06	0	3.424	3.575	-0.152
384.7	56.116	-0.723	-0.562	0	48.7	0	3.425	3.577	-0.152
384.8	56.128	-0.718	-0.901	0	48.75	0	3.426	3.578	-0.152
384.9	56.147	-0.72	-0.576	0	48.65	0	3.428	3.579	-0.152
385	56.16	-0.72	-0.562	0	48.52	0	3.429	3.581	-0.152

385.1	56.178	-0.715	-0.886	0	50	0	3.43	3.582	-0.152
385.2	56.191	-0.73	-0.932	0	52.75	0	3.432	3.583	-0.152
385.3	56.209	-0.73	-0.72	0	53.57	0	3.433	3.585	-0.152
385.4	56.234	-0.725	-0.279	0	53.66	0	3.435	3.586	-0.152
385.5	56.253	-0.725	-0.971	0	53.73	0	3.436	3.588	-0.152
385.6	56.278	-0.725	-0.819	0	54.65	0	3.438	3.589	-0.152
385.7	56.302	-0.715	-0.191	0	54.78	0	3.439	3.591	-0.152
385.8	56.321	-0.715	-1.017	0	55.52	0	3.441	3.592	-0.152
385.9	56.346	-0.728	-0.735	0	56.66	0	3.442	3.594	-0.152
386	56.371	-0.72	0.18	0	56.78	0	3.444	3.596	-0.152
386.1	56.396	-0.715	-1.229	0	56.74	0	3.446	3.597	-0.152
386.2	56.421	-0.715	-1.501	0	56.81	0	3.447	3.599	-0.152
386.3	56.445	-0.72	-0.364	0	56.82	0	3.449	3.6	-0.152
386.4	56.47	-0.72	-0.646	0	56.87	0	3.45	3.602	-0.152
386.5	56.495	-0.72	-1.074	0	56.87	0	3.452	3.604	-0.152
386.6	56.52	-0.72	-0.399	0	56.93	0	3.454	3.605	-0.152
386.7	56.551	-0.73	-1.148	0	56.97	0	3.455	3.607	-0.152
386.8	56.57	-0.73	-0.604	0	57	0	3.457	3.608	-0.152
386.9	56.594	-0.723	-0.576	0	57.07	0	3.458	3.61	-0.152
387	56.619	-0.72	-0.886	0	57.07	0	3.46	3.611	-0.152
387.1	56.644	-0.72	-0.946	0	56.78	0	3.461	3.613	-0.152
387.2	56.669	-0.73	-0.766	0	56.84	0	3.463	3.615	-0.152
387.3	56.694	-0.748	-0.544	0	56.82	0	3.465	3.616	-0.152
387.4	56.719	-0.748	-0.484	0	56.81	0	3.466	3.618	-0.152
387.5	56.744	-0.723	-0.088	0	56.85	0	3.468	3.619	-0.152
387.6	56.768	-0.73	-1.554	0	56.87	0	3.469	3.621	-0.152
387.7	56.793	-0.73	-0.576	0	56.87	0	3.471	3.622	-0.152
387.8	56.812	-0.73	-0.088	0	56.95	0	3.473	3.624	-0.152
387.9	56.837	-0.73	-1.229	0	57.01	0	3.474	3.626	-0.152
388	56.862	-0.73	-0.66	0	56.24	0	3.476	3.627	-0.152
388.1	56.887	-0.705	-0.865	0	55.85	0	3.477	3.629	-0.152
388.2	56.911	-0.713	-1.229	0	55.93	0	3.479	3.63	-0.152
388.3	56.93	-0.713	-0.618	0	55.81	0	3.48	3.632	-0.152
388.4	56.955	-0.708	-0.749	0	55.77	0	3.482	3.633	-0.152
388.5	56.98	-0.725	-1.031	0	55.81	0	3.483	3.635	-0.152
388.6	56.998	-0.725	-0.187	0	55.79	0	3.485	3.637	-0.152
388.7	57.023	-0.738	-0.399	0	55.81	0	3.487	3.638	-0.152
388.8	57.048	-0.738	-0.498	0	54.9	0	3.488	3.64	-0.152
388.9	57.067	-0.74	-0.456	0	54.29	0	3.49	3.641	-0.152
389	57.085	-0.75	-0.692	0	53.73	0	3.491	3.643	-0.152
389.1	57.104	-0.743	-0.809	0	52.78	0	3.493	3.644	-0.152
389.2	57.123	-0.743	-0.72	0	51.65	0	3.494	3.645	-0.152
389.3	57.135	-0.72	-1.063	0	50.55	0	3.495	3.647	-0.152
389.4	57.154	-0.723	-0.858	0	50.6	0	3.497	3.648	-0.152
389.5	57.166	-0.723	-0.505	0	50.62	0	3.498	3.65	-0.152
389.6	57.179	-0.74	-0.735	0	50.63	0	3.5	3.651	-0.152
389.7	57.197	-0.753	-0.247	0	50.64	0	3.501	3.653	-0.152

389.8	57.21	-0.753	-0.413	0	50.6	0	3.502	3.654	-0.152
389.9	57.222	-0.753	-0.59	0	50.36	0	3.504	3.655	-0.152
390	57.241	-0.75	-0.72	0	47.62	0	3.505	3.657	-0.152
390.1	57.253	-0.75	-0.498	0	45.04	0	3.506	3.658	-0.152
390.2	57.259	-0.743	-1.063	0	44.01	0	3.508	3.659	-0.152
390.3	57.266	-0.743	-0.678	0	44.06	0	3.509	3.66	-0.152
390.4	57.266	-0.743	-0.477	0	44.08	0	3.51	3.662	-0.152
390.5	57.272	-0.715	-0.749	0	44.07	0	3.511	3.663	-0.152
390.6	57.278	-0.72	-1.229	0	43.86	0	3.512	3.664	-0.152
390.7	57.278	-0.72	-0.858	0	43.18	0	3.514	3.665	-0.152
390.8	57.284	-0.72	-0.247	0	42.11	0	3.515	3.666	-0.152
390.9	57.29	-0.72	-0.71	0	41.27	0	3.516	3.668	-0.152
391	57.284	-0.72	-1.243	0	40.01	0	3.517	3.669	-0.152
391.1	57.29	-0.728	-0.459	0	39.5	0	3.518	3.67	-0.152
391.2	57.284	-0.738	-1.059	0	39.25	0	3.519	3.671	-0.152
391.3	57.284	-0.738	-0.66	0	38.71	0	3.52	3.672	-0.152
391.4	57.278	-0.73	-0.371	0	38.01	0	3.521	3.673	-0.152
391.5	57.278	-0.728	-0.985	0	37.28	0	3.522	3.674	-0.152
391.6	57.272	-0.728	-1.473	0	36.86	0	3.523	3.675	-0.152
391.7	57.266	-0.733	-0.576	0	35.71	0	3.524	3.676	-0.152
391.8	57.259	-0.733	-0.562	0	34.65	0	3.525	3.677	-0.152
391.9	57.247	-0.718	-1.031	0	34.03	0	3.526	3.678	-0.152
392	57.241	-0.725	-1.063	0	34.15	0	3.527	3.679	-0.152
392.1	57.235	-0.718	-0.618	0	34.15	0	3.528	3.68	-0.152
392.2	57.222	-0.718	-0.59	0	34.16	0	3.529	3.681	-0.152
392.3	57.21	-0.725	-0.83	0	33.91	0	3.53	3.682	-0.152
392.4	57.203	-0.728	-0.219	0	33.32	0	3.531	3.683	-0.152
392.5	57.191	-0.728	-0.501	0	32.96	0	3.532	3.684	-0.152
392.6	57.179	-0.748	-0.735	0	31.95	0	3.533	3.684	-0.152
392.7	57.166	-0.738	-0.328	0	30.78	0	3.534	3.685	-0.152
392.8	57.154	-0.738	-0.706	0	30.02	0	3.535	3.686	-0.152
392.9	57.135	-0.725	-0.992	0	29.7	0	3.535	3.687	-0.152
393	57.123	-0.73	-0.749	0	28.89	0	3.536	3.688	-0.152
393.1	57.104	-0.73	-1.148	0	28.9	0	3.537	3.689	-0.152
393.2	57.085	-0.74	-0.173	0	28.92	0	3.538	3.689	-0.152
393.3	57.073	-0.72	-0.247	0	28.89	0	3.539	3.69	-0.152
393.4	57.054	-0.72	-1.434	0	28.9	0	3.539	3.691	-0.152
393.5	57.042	-0.725	-0.819	0	28.89	0	3.54	3.692	-0.152
393.6	57.023	-0.733	-0.675	0	28.37	0	3.541	3.693	-0.152
393.7	57.005	-0.733	-0.247	0	28.15	0	3.542	3.693	-0.152
393.8	56.986	-0.73	-0.901	0	28.11	0	3.543	3.694	-0.152
393.9	56.974	-0.73	-0.66	0	28.14	0	3.543	3.695	-0.152
394	56.955	-0.73	-0.632	0	28.13	0	3.544	3.696	-0.152
394.1	56.936	-0.733	-0.247	0	28.09	0	3.545	3.696	-0.152
394.2	56.924	-0.748	-0.819	0	28.11	0	3.546	3.697	-0.152
394.3	56.905	-0.748	-0.247	0	28.07	0	3.546	3.698	-0.152
394.4	56.887	-0.725	-0.53	0	28.08	0	3.547	3.699	-0.152

394.5	56.868	-0.718	-1.119	0	27.89	0	3.548	3.7	-0.152
394.6	56.849	-0.718	-0.72	0	26.89	0	3.549	3.7	-0.152
394.7	56.831	-0.723	-0.706	0	26.51	0	3.55	3.701	-0.152
394.8	56.812	-0.723	-0.749	0	26.45	0	3.55	3.702	-0.152
394.9	56.793	-0.725	-0.371	0	25.91	0	3.551	3.703	-0.152
395	56.775	-0.725	-0.915	0	25.43	0	3.552	3.703	-0.152
395.1	56.75	-0.72	-0.53	0	24.69	0	3.552	3.704	-0.152
395.2	56.725	-0.72	-1.077	0	23.31	0	3.553	3.705	-0.152
395.3	56.7	-0.725	-0.604	0	21.4	0	3.554	3.705	-0.152
395.4	56.675	-0.71	-0.749	0	19.22	0	3.554	3.706	-0.152
395.5	56.65	-0.71	-1.19	0	17.75	0	3.555	3.706	-0.152
395.6	56.613	-0.75	-0.399	0	16.2	0	3.555	3.707	-0.152
395.7	56.582	-0.73	0.569	0	13.18	0	3.555	3.707	-0.152
395.8	56.545	-0.73	-0.71	0	12.9	0	3.556	3.707	-0.152
395.9	56.501	-0.735	-1.66	0	12.91	0	3.556	3.708	-0.152
396	56.464	-0.725	0.067	0	12.88	0	3.557	3.708	-0.152
396.1	56.421	-0.725	-0.399	0	13.62	0	3.557	3.708	-0.152
396.2	56.383	-0.72	-0.964	0	14.12	0	3.557	3.709	-0.152
396.3	56.346	-0.73	-0.872	0	14.35	0	3.558	3.709	-0.152
396.4	56.309	-0.73	-0.533	0	15.67	0	3.558	3.71	-0.152
396.5	56.271	-0.71	-0.59	0	21.2	0	3.559	3.71	-0.152
396.6	56.24	-0.723	-1.049	0	26.08	0	3.559	3.711	-0.152
396.7	56.228	-0.723	-0.632	0	29.54	0	3.56	3.712	-0.152
396.8	56.215	-0.74	-0.378	0	29.99	0	3.561	3.713	-0.152
396.9	56.203	-0.723	-0.212	0	31.03	0	3.562	3.713	-0.152
397	56.191	-0.723	-1.077	0	32.99	0	3.563	3.714	-0.152
397.1	56.184	-0.74	-1.204	0	34	0	3.564	3.715	-0.152
397.2	56.172	-0.745	-0.427	0	34.4	0	3.565	3.716	-0.152
397.3	56.172	-0.745	0.067	0	35.66	0	3.566	3.717	-0.152
397.4	56.166	-0.723	-1.568	0	37.13	0	3.567	3.718	-0.152
397.5	56.16	-0.74	-1.215	0	39.7	0	3.568	3.719	-0.152
397.6	56.166	-0.74	-0.074	0	43.76	0	3.569	3.721	-0.152
397.7	56.172	-0.725	-0.946	0	48.15	0	3.57	3.722	-0.152
397.8	56.184	-0.725	-0.939	0	53.19	0	3.572	3.723	-0.152
397.9	56.203	-0.725	-0.685	0	54.98	0	3.573	3.725	-0.152
398	56.228	-0.733	-0.604	0	55.81	0	3.575	3.727	-0.152
398.1	56.247	-0.743	-0.59	0	55.84	0	3.577	3.728	-0.152
398.2	56.271	-0.743	-0.191	0	55.87	0	3.578	3.73	-0.152
398.3	56.296	-0.733	-0.915	0	55.87	0	3.58	3.731	-0.152
398.4	56.321	-0.735	-0.795	0	55.85	0	3.581	3.733	-0.152
398.5	56.346	-0.735	-0.59	0	55.66	0	3.583	3.734	-0.152
398.6	56.371	-0.738	-0.632	0	55.61	0	3.584	3.736	-0.152
398.7	56.389	-0.733	-0.576	0	55.8	0	3.586	3.737	-0.152
398.8	56.414	-0.733	-0.833	0	56.85	0	3.587	3.739	-0.152
398.9	56.445	-0.745	-0.749	0	56.83	0	3.589	3.741	-0.152
399	56.464	-0.728	-0.102	0	56.9	0	3.591	3.742	-0.152
399.1	56.495	-0.728	-0.749	0	57	0	3.592	3.744	-0.152

399.2	56.52	-0.715	-1.243	0	57.02	0	3.594	3.745	-0.152
399.3	56.545	-0.73	-0.929	0	57	0	3.595	3.747	-0.152
399.4	56.57	-0.73	-0.406	0	57.07	0	3.597	3.748	-0.152
399.5	56.594	-0.708	-0.328	0	57.08	0	3.598	3.75	-0.152
399.6	56.619	-0.718	-1.257	0	57.93	0	3.6	3.752	-0.152
399.7	56.644	-0.718	-0.572	0	59.81	0	3.602	3.753	-0.152
399.8	56.669	-0.72	-0.371	0	60.9	0	3.603	3.755	-0.152
399.9	56.706	-0.713	-1.105	0	62.26	0	3.605	3.757	-0.152
400	56.737	-0.713	-0.83	0	64.61	0	3.607	3.759	-0.152
400.1	56.768	-0.735	-0.685	0	64.36	0	3.609	3.76	-0.152
400.2	56.806	-0.725	-0.145	0	64.36	0	3.611	3.762	-0.152
400.3	56.837	-0.725	-0.703	0	64.44	0	3.612	3.764	-0.152
400.4	56.874	-0.723	-0.929	0	64.49	0	3.614	3.766	-0.152
400.5	56.911	-0.733	-0.562	0	64.53	0	3.616	3.767	-0.152
400.6	56.942	-0.733	-0.59	0	64.61	0	3.618	3.769	-0.152
400.7	56.98	-0.725	-0.23	0	64.66	0	3.62	3.771	-0.152
400.8	57.011	-0.725	-0.763	0	65.21	0	3.621	3.773	-0.152
400.9	57.042	-0.723	-0.961	0	65.56	0	3.623	3.775	-0.152
401	57.079	-0.73	-0.487	0	65.58	0	3.625	3.777	-0.152
401.1	57.123	-0.723	-0.427	0	65.64	0	3.627	3.778	-0.152
401.2	57.154	-0.723	-0.749	0	65.66	0	3.629	3.78	-0.152
401.3	57.191	-0.728	-0.999	0	65.7	0	3.63	3.782	-0.152
401.4	57.228	-0.748	-0.618	0	65.78	0	3.632	3.784	-0.152
401.5	57.266	-0.748	0.067	0	65.63	0	3.634	3.786	-0.152
401.6	57.303	-0.728	-0.901	0	65.58	0	3.636	3.787	-0.152
401.7	57.34	-0.74	-1.342	0	65.61	0	3.638	3.789	-0.152
401.8	57.371	-0.74	-0.516	0	65.69	0	3.64	3.791	-0.152
401.9	57.408	-0.743	-0.473	0	65.76	0	3.641	3.793	-0.152
402	57.44	-0.738	-0.879	0	65.79	0	3.643	3.795	-0.152
402.1	57.471	-0.738	-0.996	0	65.8	0	3.645	3.797	-0.152
402.2	57.508	-0.74	-0.562	0	64.83	0	3.647	3.798	-0.152
402.3	57.545	-0.748	-0.261	0	63.16	0	3.649	3.8	-0.152
402.4	57.57	-0.748	-0.999	0	61.24	0	3.65	3.802	-0.152
402.5	57.601	-0.73	-0.261	0	59.62	0	3.652	3.804	-0.152
402.6	57.626	-0.71	-1.021	0	59.26	0	3.654	3.805	-0.152
402.7	57.651	-0.71	-1.243	0	59.02	0	3.655	3.807	-0.152
402.8	57.682	-0.745	-0.427	0	56.2	0	3.657	3.808	-0.152
402.9	57.701	-0.748	-0.247	0	51.65	0	3.658	3.81	-0.152
403	57.713	-0.748	-0.59	0	47.67	0	3.66	3.811	-0.152
403.1	57.725	-0.758	-1.416	0	45.69	0	3.661	3.812	-0.152
403.2	57.732	-0.745	-0.441	0	43.93	0	3.662	3.814	-0.152
403.3	57.732	-0.745	-0.706	0	42.63	0	3.663	3.815	-0.152
403.4	57.738	-0.738	-1.448	0	41.45	0	3.664	3.816	-0.152
403.5	57.738	-0.743	-0.427	0	41.48	0	3.666	3.817	-0.152
403.6	57.738	-0.743	-0.399	0	41.52	0	3.667	3.818	-0.152
403.7	57.738	-0.733	-0.999	0	41.47	0	3.668	3.819	-0.152
403.8	57.738	-0.733	-1.243	0	41.46	0	3.669	3.821	-0.152

403.9	57.738	-0.745	-0.074	0	41.71	0	3.67	3.822	-0.152
404	57.744	-0.725	-0.562	0	42.73	0	3.671	3.823	-0.152
404.1	57.744	-0.725	-0.915	0	43.29	0	3.673	3.824	-0.152
404.2	57.744	-0.725	-0.399	0	43.26	0	3.674	3.825	-0.152
404.3	57.744	-0.765	-0.088	0	43.29	0	3.675	3.827	-0.152
404.4	57.75	-0.75	-0.201	0	44.24	0	3.676	3.828	-0.152
404.5	57.75	-0.75	-0.675	0	44.18	0	3.677	3.829	-0.152
404.6	57.756	-0.745	-1.19	0	44.23	0	3.679	3.83	-0.152
404.7	57.756	-0.755	-0.59	0	44.21	0	3.68	3.831	-0.152
404.8	57.756	-0.755	-0.675	0	44.22	0	3.681	3.833	-0.152
404.9	57.763	-0.763	-0.675	0	44.17	0	3.682	3.834	-0.152
405	57.763	-0.76	-0.749	0	44.25	0	3.684	3.835	-0.152
405.1	57.769	-0.76	-0.72	0	44.2	0	3.685	3.836	-0.152
405.2	57.775	-0.74	-1.257	0	44.22	0	3.686	3.838	-0.152
405.3	57.781	-0.755	-0.915	0	44.22	0	3.687	3.839	-0.152
405.4	57.788	-0.755	-0.576	0	44.25	0	3.688	3.84	-0.152
405.5	57.788	-0.758	-0.689	0	44.23	0	3.69	3.841	-0.152
405.6	57.794	-0.74	-0.618	0	44.25	0	3.691	3.842	-0.152
405.7	57.8	-0.74	-0.678	0	44.22	0	3.692	3.844	-0.152
405.8	57.8	-0.738	-1.077	0	44.22	0	3.693	3.845	-0.152
405.9	57.806	-0.755	-1.063	0	44.1	0	3.695	3.846	-0.152
406	57.812	-0.755	-0.032	0	43.4	0	3.696	3.847	-0.152
406.1	57.812	-0.725	-0.597	0	43.42	0	3.697	3.849	-0.152
406.2	57.819	-0.74	-1.37	0	43.09	0	3.698	3.85	-0.152
406.3	57.819	-0.74	-0.576	0	42.3	0	3.699	3.851	-0.152
406.4	57.819	-0.743	-0.36	0	42.32	0	3.701	3.852	-0.152
406.5	57.819	-0.735	-0.735	0	41.62	0	3.702	3.853	-0.152
406.6	57.825	-0.735	-0.632	0	41.56	0	3.703	3.854	-0.152
406.7	57.825	-0.758	-0.328	0	41.53	0	3.704	3.856	-0.152
406.8	57.825	-0.758	-0.004	0	41.54	0	3.705	3.857	-0.152
406.9	57.825	-0.745	-0.816	0	41.53	0	3.706	3.858	-0.152
407	57.825	-0.76	-0.929	0	41.5	0	3.707	3.859	-0.152
407.1	57.825	-0.748	-0.007	0	41.49	0	3.709	3.86	-0.152
407.2	57.825	-0.748	-0.643	0	41.52	0	3.71	3.861	-0.152
407.3	57.825	-0.74	-1.148	0	41.5	0	3.711	3.862	-0.152
407.4	57.825	-0.753	-0.646	0	41.54	0	3.712	3.864	-0.152
407.5	57.825	-0.753	-0.512	0	41.64	0	3.713	3.865	-0.152
407.6	57.825	-0.748	-0.233	0	41.65	0	3.714	3.866	-0.152
407.7	57.831	-0.738	-0.915	0	41.69	0	3.716	3.867	-0.152
407.8	57.831	-0.738	-1.151	0	41.68	0	3.717	3.868	-0.152
407.9	57.825	-0.738	-0.929	0	41.71	0	3.718	3.869	-0.152
408	57.831	-0.735	-0.406	0	41.65	0	3.719	3.871	-0.152
408.1	57.825	-0.735	-0.692	0	41.65	0	3.72	3.872	-0.152
408.2	57.825	-0.718	-0.576	0	41.68	0	3.721	3.873	-0.152
408.3	57.831	-0.725	-1.176	0	41.7	0	3.723	3.874	-0.152
408.4	57.825	-0.725	-0.858	0	41.74	0	3.724	3.875	-0.152
408.5	57.831	-0.74	-0.261	0	41.71	0	3.725	3.876	-0.152

408.6	57.831	-0.738	-0.332	0	41.72	0	3.726	3.878	-0.152
408.7	57.825	-0.738	-0.904	0	41.75	0	3.727	3.879	-0.152
408.8	57.831	-0.758	-0.547	0	41.65	0	3.728	3.88	-0.152
408.9	57.831	-0.74	-0.247	0	41.59	0	3.729	3.881	-0.152
409	57.831	-0.74	-0.59	0	41.55	0	3.731	3.882	-0.152
409.1	57.831	-0.743	-1.006	0	41.55	0	3.732	3.883	-0.152
409.2	57.831	-0.745	-0.689	0	41.55	0	3.733	3.884	-0.152
409.3	57.831	-0.745	-0.088	0	41.53	0	3.734	3.886	-0.152
409.4	57.837	-0.728	-0.749	0	41.52	0	3.735	3.887	-0.152
409.5	57.831	-0.738	-0.858	0	41.51	0	3.736	3.888	-0.152
409.6	57.831	-0.738	-0.618	0	41.51	0	3.738	3.889	-0.152
409.7	57.831	-0.725	-0.59	0	41.24	0	3.739	3.89	-0.152
409.8	57.831	-0.725	-0.636	0	40.71	0	3.74	3.891	-0.152
409.9	57.825	-0.728	-0.562	0	40.71	0	3.741	3.892	-0.152
410	57.831	-0.735	-0.007	0	40.72	0	3.742	3.894	-0.152
410.1	57.825	-0.748	-0.618	0	40.74	0	3.743	3.895	-0.152
410.2	57.825	-0.748	-0.795	0	40.7	0	3.744	3.896	-0.152
410.3	57.825	-0.76	-0.364	0	40.72	0	3.745	3.897	-0.152
410.4	57.825	-0.75	-0.66	0	40.72	0	3.747	3.898	-0.152
410.5	57.825	-0.75	-0.59	0	40.71	0	3.748	3.899	-0.152
410.6	57.825	-0.748	-1.162	0	40.76	0	3.749	3.9	-0.152
410.7	57.825	-0.758	-0.646	0	40.71	0	3.75	3.902	-0.152
410.8	57.819	-0.758	0.109	0	40.69	0	3.751	3.903	-0.152
410.9	57.819	-0.75	-0.618	0	40.7	0	3.752	3.904	-0.152
411	57.819	-0.743	-1.077	0	40.68	0	3.753	3.905	-0.152
411.1	57.812	-0.743	-0.791	0	40.68	0	3.755	3.906	-0.152
411.2	57.812	-0.723	-1.063	0	40.69	0	3.756	3.907	-0.152
411.3	57.812	-0.723	-0.901	0	40.69	0	3.757	3.908	-0.152
411.4	57.812	-0.723	-0.558	0	40.68	0	3.758	3.909	-0.152
411.5	57.812	-0.748	-0.717	0	40.67	0	3.759	3.911	-0.152
411.6	57.812	-0.755	-0.59	0	40.7	0	3.76	3.912	-0.152
411.7	57.812	-0.755	-0.558	0	40.7	0	3.761	3.913	-0.152
411.8	57.806	-0.785	-0.819	0	40.7	0	3.762	3.914	-0.152
411.9	57.806	-0.753	0.339	0	40.7	0	3.764	3.915	-0.152
412	57.806	-0.753	-1.229	0	40.72	0	3.765	3.916	-0.152
412.1	57.806	-0.743	-1.533	0	40.68	0	3.766	3.917	-0.152
412.2	57.806	-0.745	-0.604	0	40.7	0	3.767	3.919	-0.152
412.3	57.806	-0.745	-0.604	0	40.67	0	3.768	3.92	-0.152
412.4	57.8	-0.758	-0.78	0	40.7	0	3.769	3.921	-0.152
412.5	57.8	-0.75	-0.703	0	40.68	0	3.77	3.922	-0.152
412.6	57.8	-0.75	-0.604	0	40.68	0	3.771	3.923	-0.152
412.7	57.8	-0.75	-1.243	0	40.69	0	3.773	3.924	-0.152
412.8	57.8	-0.75	-0.618	0	40.68	0	3.774	3.925	-0.152
412.9	57.8	-0.758	0.067	0	40.69	0	3.775	3.926	-0.152
413	57.8	-0.745	-1.024	0	41.3	0	3.776	3.928	-0.152
413.1	57.794	-0.745	-0.83	0	41.51	0	3.777	3.929	-0.152
413.2	57.8	-0.745	-0.212	0	41.52	0	3.778	3.93	-0.152

413.3	57.8	-0.755	-0.749	0	41.51	0	3.779	3.931	-0.152
413.4	57.8	-0.755	-0.406	0	42.12	0	3.781	3.932	-0.152
413.5	57.8	-0.755	-0.915	0	42.33	0	3.782	3.933	-0.152
413.6	57.8	-0.755	-0.763	0	42.33	0	3.783	3.935	-0.152
413.7	57.8	-0.753	-0.576	0	42.33	0	3.784	3.936	-0.152
413.8	57.8	-0.753	-0.865	0	42.27	0	3.785	3.937	-0.152
413.9	57.806	-0.75	-0.413	0	42.32	0	3.787	3.938	-0.152
414	57.806	-0.748	-0.604	0	42.99	0	3.788	3.939	-0.152
414.1	57.806	-0.748	-0.675	0	43.4	0	3.789	3.94	-0.152
414.2	57.812	-0.743	-0.961	0	43.41	0	3.79	3.942	-0.152
414.3	57.812	-0.755	-0.735	0	43.36	0	3.791	3.943	-0.152
414.4	57.812	-0.755	-0.763	0	43.34	0	3.793	3.944	-0.152
414.5	57.819	-0.74	-0.562	0	43.63	0	3.794	3.945	-0.152
414.6	57.819	-0.73	-1.067	0	44.29	0	3.795	3.947	-0.152
414.7	57.825	-0.73	-0.381	0	44.99	0	3.796	3.948	-0.152
414.8	57.831	-0.765	-0.724	0	46.11	0	3.798	3.949	-0.152
414.9	57.837	-0.76	0.081	0	46.67	0	3.799	3.95	-0.152
415	57.843	-0.76	-0.562	0	47.8	0	3.8	3.952	-0.152
415.1	57.85	-0.778	-1.314	0	48.03	0	3.801	3.953	-0.152
415.2	57.862	-0.793	-0.346	0	48.92	0	3.803	3.954	-0.152
415.3	57.875	-0.793	0.106	0	50.35	0	3.804	3.956	-0.152
415.4	57.881	-0.75	-0.886	0	52.48	0	3.806	3.957	-0.152
415.5	57.899	-0.76	-1.345	0	53.47	0	3.807	3.959	-0.152
415.6	57.918	-0.76	-0.763	0	53.97	0	3.809	3.96	-0.152
415.7	57.93	-0.81	0.081	0	53.94	0	3.81	3.962	-0.152
415.8	57.949	-0.81	0.212	0	54.94	0	3.812	3.963	-0.152
415.9	57.968	-0.785	-0.901	0	55.51	0	3.813	3.965	-0.152
416	57.986	-0.758	-0.929	0	56.11	0	3.815	3.966	-0.152
416.1	58.005	-0.768	-1.049	0	56.1	0	3.816	3.968	-0.152
416.2	58.024	-0.768	-0.275	0	57.11	0	3.818	3.969	-0.152
416.3	58.048	-0.763	-0.191	0	57.08	0	3.82	3.971	-0.152
416.4	58.067	-0.745	-0.901	0	57.14	0	3.821	3.973	-0.152
416.5	58.086	-0.745	-1.119	0	58.82	0	3.823	3.974	-0.152
416.6	58.111	-0.75	-0.636	0	61.35	0	3.824	3.976	-0.152
416.7	58.135	-0.738	-0.59	0	63.38	0	3.826	3.978	-0.152
416.8	58.167	-0.738	-0.696	0	63.92	0	3.828	3.98	-0.152
416.9	58.191	-0.74	-0.343	0	65.01	0	3.83	3.981	-0.152
417	58.229	-0.745	-0.413	0	67.57	0	3.832	3.983	-0.152
417.1	58.266	-0.745	-0.177	0	68.18	0	3.834	3.985	-0.152
417.2	58.297	-0.753	-0.837	0	68.17	0	3.835	3.987	-0.152
417.3	58.334	-0.78	-0.544	0	68.24	0	3.837	3.989	-0.152
417.4	58.372	-0.78	0.396	0	68.29	0	3.839	3.991	-0.152
417.5	58.403	-0.743	0.095	0	68.26	0	3.841	3.993	-0.152
417.6	58.44	-0.728	-1.243	0	67.97	0	3.843	3.995	-0.152
417.7	58.483	-0.728	-1.134	0	67.98	0	3.845	3.996	-0.152
417.8	58.508	-0.738	-0.275	0	68.04	0	3.847	3.998	-0.152
417.9	58.546	-0.743	-0.604	0	68.05	0	3.849	4	-0.152

418	58.583	-0.743	-0.413	0	68.11	0	3.851	4.002	-0.152
418.1	58.614	-0.72	-0.399	0	68.25	0	3.852	4.004	-0.152
418.2	58.651	-0.723	-0.795	0	68.21	0	3.854	4.006	-0.152
418.3	58.682	-0.723	-0.819	0	68.03	0	3.856	4.008	-0.152
418.4	58.72	-0.753	-0.004	0	67.42	0	3.858	4.01	-0.152
418.5	58.751	-0.753	-0.346	0	66.67	0	3.86	4.012	-0.152
418.6	58.782	-0.753	-0.901	0	65.7	0	3.862	4.013	-0.152
418.7	58.819	-0.743	-0.766	0	64.71	0	3.864	4.015	-0.152
418.8	58.85	-0.743	-1.176	0	64.48	0	3.865	4.017	-0.152
418.9	58.875	-0.745	-0.604	0	64.5	0	3.867	4.019	-0.152
419	58.906	-0.753	-0.901	0	64.53	0	3.869	4.021	-0.152
419.1	58.931	-0.755	-0.357	0	64.62	0	3.871	4.022	-0.152
419.2	58.962	-0.755	-0.763	0	64.62	0	3.873	4.024	-0.152
419.3	58.993	-0.788	-0.498	0	64.63	0	3.874	4.026	-0.152
419.4	59.024	-0.79	-0.526	0	64.68	0	3.876	4.028	-0.152
419.5	59.049	-0.79	-0.332	0	64.57	0	3.878	4.03	-0.152
419.6	59.08	-0.763	-0.901	0	65.84	0	3.88	4.031	-0.152
419.7	59.111	-0.755	-1.077	0	66.84	0	3.882	4.033	-0.152
419.8	59.142	-0.755	-0.886	0	66.82	0	3.884	4.035	-0.152
419.9	59.173	-0.755	-0.413	0	66.84	0	3.885	4.037	-0.152
420	59.204	-0.755	-0.36	0	66.83	0	3.887	4.039	-0.152
420.1	59.235	-0.755	-0.72	0	66.62	0	3.889	4.041	-0.152
420.2	59.266	-0.748	-0.72	0	65.87	0	3.891	4.042	-0.152
420.3	59.297	-0.748	-0.646	0	65.72	0	3.893	4.044	-0.152
420.4	59.329	-0.748	-0.848	0	65.56	0	3.895	4.046	-0.152
420.5	59.353	-0.755	-0.576	0	65.61	0	3.896	4.048	-0.152
420.6	59.384	-0.743	-0.191	0	65.63	0	3.898	4.05	-0.152
420.7	59.416	-0.743	-0.819	0	65.68	0	3.9	4.052	-0.152
420.8	59.44	-0.753	-0.833	0	65.67	0	3.902	4.053	-0.152
420.9	59.478	-0.743	-0.261	0	65.69	0	3.904	4.055	-0.152
421	59.503	-0.743	-1.038	0	64.21	0	3.905	4.057	-0.152
421.1	59.527	-0.75	-1.148	0	63.43	0	3.907	4.059	-0.152
421.2	59.558	-0.758	-0.512	0	63.43	0	3.909	4.061	-0.152
421.3	59.583	-0.758	-0.074	0	63.21	0	3.911	4.062	-0.152
421.4	59.608	-0.73	-1.045	0	63.33	0	3.912	4.064	-0.152
421.5	59.633	-0.723	-0.809	0	63.3	0	3.914	4.066	-0.152
421.6	59.658	-0.723	-0.971	0	63.34	0	3.916	4.068	-0.152
421.7	59.683	-0.748	-0.562	0	63.36	0	3.918	4.069	-0.152
421.8	59.708	-0.748	-0.159	0	63.45	0	3.92	4.071	-0.152
421.9	59.732	-0.753	-0.72	0	63.41	0	3.921	4.073	-0.152
422	59.757	-0.743	-0.576	0	63.43	0	3.923	4.075	-0.152
422.1	59.782	-0.75	-1.035	0	63.53	0	3.925	4.076	-0.152
422.2	59.807	-0.75	-0.675	0	62.98	0	3.927	4.078	-0.152
422.3	59.832	-0.755	-0.247	0	61.57	0	3.928	4.08	-0.152
422.4	59.857	-0.75	-0.763	0	58.82	0	3.93	4.081	-0.152
422.5	59.869	-0.75	-0.72	0	54.68	0	3.931	4.083	-0.152
422.6	59.888	-0.763	-1.014	0	50.32	0	3.933	4.084	-0.152

422.7	59.894	-0.773	-0.646	0	46.34	0	3.934	4.086	-0.152
422.8	59.894	-0.773	-0.145	0	44.32	0	3.935	4.087	-0.152
422.9	59.9	-0.74	-0.848	0	42.23	0	3.937	4.088	-0.152
423	59.894	-0.745	-1.257	0	40.87	0	3.938	4.089	-0.152
423.1	59.888	-0.745	-0.763	0	38.94	0	3.939	4.09	-0.152
423.2	59.882	-0.758	-0.618	0	37.5	0	3.94	4.091	-0.152
423.3	59.869	-0.758	-0.929	0	35.88	0	3.941	4.092	-0.152
423.4	59.857	-0.74	-0.399	0	34.22	0	3.942	4.093	-0.152
423.5	59.844	-0.733	-0.791	0	33.26	0	3.943	4.094	-0.152
423.6	59.826	-0.745	-1.091	0	31.26	0	3.944	4.095	-0.152
423.7	59.807	-0.745	-0.343	0	29.64	0	3.944	4.096	-0.152
423.8	59.782	-0.728	-0.318	0	29.74	0	3.945	4.097	-0.152
423.9	59.763	-0.718	-1.134	0	29.68	0	3.946	4.098	-0.152
424	59.739	-0.718	-0.961	0	29.91	0	3.947	4.098	-0.152
424.1	59.72	-0.75	-0.399	0	30.74	0	3.948	4.099	-0.152
424.2	59.701	-0.735	0.035	0	30.68	0	3.949	4.1	-0.152
424.3	59.683	-0.735	-0.915	0	30.68	0	3.949	4.101	-0.152
424.4	59.664	-0.74	-1.049	0	30.5	0	3.95	4.102	-0.152
424.5	59.639	-0.735	-0.473	0	31.38	0	3.951	4.103	-0.152
424.6	59.621	-0.735	-0.629	0	31.33	0	3.952	4.104	-0.152
424.7	59.602	-0.71	-0.886	0	31.54	0	3.953	4.104	-0.152
424.8	59.583	-0.71	-1.091	0	32.8	0	3.954	4.105	-0.152
424.9	59.571	-0.725	-0.851	0	34.43	0	3.955	4.106	-0.152
425	59.552	-0.753	-0.018	0	34.97	0	3.956	4.107	-0.152
425.1	59.546	-0.73	-0.057	0	35.76	0	3.957	4.108	-0.152
425.2	59.534	-0.73	-1.215	0	35.87	0	3.958	4.109	-0.152
425.3	59.521	-0.743	-0.886	0	36.62	0	3.959	4.11	-0.152
425.4	59.509	-0.74	-0.088	0	37.65	0	3.96	4.111	-0.152
425.5	59.503	-0.74	-1.035	0	38	0	3.961	4.112	-0.152
425.6	59.49	-0.745	-0.388	0	39.42	0	3.962	4.113	-0.152
425.7	59.484	-0.748	-0.749	0	40.77	0	3.963	4.115	-0.152
425.8	59.478	-0.748	-0.837	0	40.76	0	3.964	4.116	-0.152
425.9	59.478	-0.745	-0.805	0	40.75	0	3.965	4.117	-0.152
426	59.471	-0.753	-0.999	0	40.73	0	3.966	4.118	-0.152
426.1	59.465	-0.753	-0.177	0	40.71	0	3.968	4.119	-0.152
426.2	59.459	-0.75	-0.544	0	41.11	0	3.969	4.12	-0.152
426.3	59.459	-0.738	-0.819	0	41.57	0	3.97	4.121	-0.152
426.4	59.453	-0.738	-0.604	0	42.2	0	3.971	4.123	-0.152
426.5	59.453	-0.733	-0.71	0	42.79	0	3.972	4.124	-0.152
426.6	59.453	-0.735	-0.844	0	43.41	0	3.973	4.125	-0.152
426.7	59.453	-0.735	-0.558	0	43.46	0	3.975	4.126	-0.152
426.8	59.453	-0.748	-0.427	0	43.51	0	3.976	4.127	-0.152
426.9	59.447	-0.74	-0.427	0	42.98	0	3.977	4.129	-0.152
427	59.447	-0.74	-0.819	0	40.77	0	3.978	4.13	-0.152
427.1	59.44	-0.755	-1.031	0	37.23	0	3.979	4.131	-0.152
427.2	59.434	-0.738	-0.385	0	34.21	0	3.98	4.132	-0.152
427.3	59.422	-0.738	-0.872	0	32.98	0	3.981	4.133	-0.152

427.4	59.403	-0.745	-0.901	0	32.89	0	3.982	4.134	-0.152
427.5	59.391	-0.738	-0.261	0	32.87	0	3.983	4.134	-0.152
427.6	59.372	-0.738	-1.268	0	32.8	0	3.984	4.135	-0.152
427.7	59.353	-0.738	-0.565	0	32.84	0	3.985	4.136	-0.152
427.8	59.341	-0.738	-0.102	0	32.79	0	3.986	4.137	-0.152
427.9	59.322	-0.74	-1.109	0	32.75	0	3.987	4.138	-0.152
428	59.31	-0.743	-0.576	0	32.79	0	3.987	4.139	-0.152
428.1	59.297	-0.738	-0.77	0	32.73	0	3.988	4.14	-0.152
428.2	59.285	-0.738	-1.063	0	32.71	0	3.989	4.141	-0.152
428.3	59.266	-0.74	-0.675	0	32.7	0	3.99	4.142	-0.152
428.4	59.248	-0.74	-0.72	0	32.68	0	3.991	4.143	-0.152
428.5	59.235	-0.74	-0.717	0	32.76	0	3.992	4.144	-0.152
428.6	59.223	-0.753	-0.837	0	32.73	0	3.993	4.144	-0.152
428.7	59.204	-0.753	-0.618	0	32.73	0	3.994	4.145	-0.152
428.8	59.192	-0.753	-0.413	0	32.7	0	3.995	4.146	-0.152
428.9	59.173	-0.735	-0.946	0	32.68	0	3.996	4.147	-0.152
429	59.161	-0.735	-1.077	0	32.7	0	3.997	4.148	-0.152
429.1	59.148	-0.735	-0.901	0	32.68	0	3.997	4.149	-0.152
429.2	59.13	-0.75	-0.307	0	33.52	0	3.998	4.15	-0.152
429.3	59.123	-0.748	-0.427	0	33.48	0	3.999	4.151	-0.152
429.4	59.105	-0.748	-0.618	0	33.47	0	4	4.152	-0.152
429.5	59.092	-0.753	-0.692	0	33.49	0	4.001	4.153	-0.152
429.6	59.08	-0.753	-0.385	0	33.45	0	4.002	4.154	-0.152
429.7	59.061	-0.753	-0.706	0	32.71	0	4.003	4.155	-0.152
429.8	59.049	-0.733	-0.562	0	32.7	0	4.004	4.155	-0.152
429.9	59.036	-0.723	-0.901	0	32.89	0	4.005	4.156	-0.152
430	59.018	-0.723	-1.077	0	32.64	0	4.006	4.157	-0.152
430.1	59.005	-0.738	-0.491	0	31.77	0	4.007	4.158	-0.152
430.2	58.987	-0.745	-0.576	0	30.95	0	4.007	4.159	-0.152
430.3	58.968	-0.745	-0.427	0	30.48	0	4.008	4.16	-0.152
430.4	58.956	-0.748	-0.413	0	29.59	0	4.009	4.161	-0.152
430.5	58.937	-0.753	-0.696	0	29.57	0	4.01	4.161	-0.152
430.6	58.918	-0.753	-0.735	0	29.57	0	4.011	4.162	-0.152
430.7	58.894	-0.758	-0.66	0	29.64	0	4.012	4.163	-0.152
430.8	58.875	-0.758	-0.576	0	29.57	0	4.012	4.164	-0.152
430.9	58.862	-0.755	-0.985	0	29.6	0	4.013	4.165	-0.152
431	58.838	-0.745	-1.19	0	29.58	0	4.014	4.166	-0.152
431.1	58.819	-0.735	-1.031	0	29.58	0	4.015	4.166	-0.152
431.2	58.807	-0.735	-0.989	0	29.56	0	4.016	4.167	-0.152
431.3	58.782	-0.765	-0.562	0	29.51	0	4.017	4.168	-0.152
431.4	58.763	-0.78	-0.173	0	29.56	0	4.017	4.169	-0.152
431.5	58.751	-0.78	-0.632	0	29.51	0	4.018	4.17	-0.152
431.6	58.726	-0.76	-0.646	0	29.49	0	4.019	4.171	-0.152
431.7	58.713	-0.755	-0.901	0	29.51	0	4.02	4.171	-0.152
431.8	58.689	-0.755	-1.063	0	29.45	0	4.021	4.172	-0.152
431.9	58.67	-0.765	-0.47	0	29.48	0	4.021	4.173	-0.152
432	58.657	-0.763	-0.735	0	29.46	0	4.022	4.174	-0.152

432.1	58.633	-0.763	-0.576	0	30.34	0	4.023	4.175	-0.152
432.2	58.62	-0.74	-0.946	0	30.29	0	4.024	4.175	-0.152
432.3	58.602	-0.735	-0.735	0	30.96	0	4.025	4.176	-0.152
432.4	58.583	-0.735	-0.985	0	31.93	0	4.026	4.177	-0.152
432.5	58.57	-0.755	-0.576	0	32.12	0	4.027	4.178	-0.152
432.6	58.552	-0.75	-0.215	0	32.51	0	4.027	4.179	-0.152
432.7	58.533	-0.75	-0.346	0	32.64	0	4.028	4.18	-0.152
432.8	58.521	-0.748	-1.063	0	32.66	0	4.029	4.181	-0.152
432.9	58.508	-0.743	-0.413	0	32.87	0	4.03	4.182	-0.152
433	58.496	-0.743	-0.53	0	32.81	0	4.031	4.183	-0.152
433.1	58.483	-0.763	-0.413	0	32.8	0	4.032	4.184	-0.152
433.2	58.465	-0.745	-0.332	0	32.8	0	4.033	4.184	-0.152
433.3	58.452	-0.745	-1.229	0	32.81	0	4.034	4.185	-0.152
433.4	58.44	-0.753	-0.819	0	32.84	0	4.035	4.186	-0.152
433.5	58.428	-0.75	-0.706	0	32.82	0	4.036	4.187	-0.152
433.6	58.415	-0.75	-0.562	0	32.84	0	4.037	4.188	-0.152
433.7	58.403	-0.743	-1.176	0	32.8	0	4.038	4.189	-0.152
433.8	58.384	-0.743	-0.858	0	32.79	0	4.038	4.19	-0.152
433.9	58.372	-0.75	-0.028	0	32.82	0	4.039	4.191	-0.152
434	58.359	-0.76	-1.296	0	32.78	0	4.04	4.192	-0.152
434.1	58.341	-0.745	-0.399	0	32.81	0	4.041	4.193	-0.152
434.2	58.334	-0.745	-0.399	0	32.8	0	4.042	4.194	-0.152
434.3	58.316	-0.74	-1.639	0	32.78	0	4.043	4.195	-0.152
434.4	58.303	-0.75	-0.678	0	32.8	0	4.044	4.195	-0.152
434.5	58.291	-0.75	-0.332	0	32.72	0	4.045	4.196	-0.152
434.6	58.278	-0.743	-0.205	0	32.69	0	4.046	4.197	-0.152
434.7	58.266	-0.74	-0.886	0	32.7	0	4.047	4.198	-0.152
434.8	58.254	-0.74	-1.063	0	32.68	0	4.048	4.199	-0.152
434.9	58.235	-0.733	-0.805	0	32.79	0	4.048	4.2	-0.152
435	58.229	-0.74	-1.314	0	34.68	0	4.049	4.201	-0.152
435.1	58.216	-0.74	-0.417	0	37	0	4.05	4.202	-0.152
435.2	58.21	-0.755	-0.562	0	37.71	0	4.051	4.203	-0.152
435.3	58.204	-0.743	-0.646	0	38.31	0	4.053	4.204	-0.152
435.4	58.198	-0.743	-0.901	0	38.76	0	4.054	4.205	-0.152
435.5	58.198	-0.758	-0.72	0	38.73	0	4.055	4.206	-0.152
435.6	58.191	-0.743	-0.131	0	38.8	0	4.056	4.207	-0.152
435.7	58.179	-0.743	-0.706	0	38.78	0	4.057	4.208	-0.152
435.8	58.179	-0.728	-0.872	0	38.27	0	4.058	4.209	-0.152
435.9	58.173	-0.745	-1.19	0	38.01	0	4.059	4.21	-0.152
436	58.167	-0.745	-0.117	0	38.03	0	4.06	4.212	-0.152
436.1	58.167	-0.743	-0.247	0	37.98	0	4.061	4.213	-0.152
436.2	58.16	-0.748	-1.077	0	38.01	0	4.062	4.214	-0.152
436.3	58.154	-0.748	-0.413	0	37.99	0	4.063	4.215	-0.152
436.4	58.148	-0.738	-0.886	0	38.02	0	4.064	4.216	-0.152
436.5	58.142	-0.748	-1.402	0	38.05	0	4.065	4.217	-0.152
436.6	58.135	-0.748	-0.233	0	38.03	0	4.066	4.218	-0.152
436.7	58.135	-0.758	-0.413	0	38.01	0	4.067	4.219	-0.152

436.8	58.129	-0.758	-0.72	0	37.97	0	4.068	4.22	-0.152
436.9	58.123	-0.75	-0.971	0	37.39	0	4.069	4.221	-0.152
437	58.117	-0.743	-0.805	0	36.66	0	4.071	4.222	-0.152
437.1	58.111	-0.723	-0.562	0	36.03	0	4.072	4.223	-0.152
437.2	58.098	-0.723	-1.54	0	35.41	0	4.072	4.224	-0.152
437.3	58.092	-0.738	-0.576	0	34.96	0	4.073	4.225	-0.152
437.4	58.08	-0.728	-0.074	0	34.99	0	4.074	4.226	-0.152
437.5	58.073	-0.728	-0.971	0	34.97	0	4.075	4.227	-0.152
437.6	58.061	-0.743	-1.031	0	35.01	0	4.076	4.228	-0.152
437.7	58.042	-0.74	-0.406	0	35.03	0	4.077	4.229	-0.152
437.8	58.036	-0.74	-0.971	0	35.02	0	4.078	4.23	-0.152
437.9	58.024	-0.743	-0.646	0	35.03	0	4.079	4.231	-0.152
438	58.017	-0.755	-0.629	0	35.01	0	4.08	4.232	-0.152
438.1	58.011	-0.755	-0.562	0	35	0	4.081	4.233	-0.152
438.2	57.993	-0.733	-0.886	0	34.99	0	4.082	4.234	-0.152
438.3	57.986	-0.733	-0.851	0	35	0	4.083	4.235	-0.152
438.4	57.974	-0.733	-0.819	0	34.98	0	4.084	4.236	-0.152
438.5	57.968	-0.738	-0.851	0	35.03	0	4.085	4.237	-0.152
438.6	57.955	-0.733	-0.562	0	35.12	0	4.086	4.238	-0.152
438.7	57.949	-0.733	-0.72	0	35.08	0	4.087	4.239	-0.152
438.8	57.937	-0.725	-0.886	0	35.08	0	4.088	4.24	-0.152
438.9	57.93	-0.738	-0.805	0	35.09	0	4.089	4.241	-0.152
439	57.918	-0.738	-0.501	0	35.12	0	4.09	4.242	-0.152
439.1	57.906	-0.735	-0.766	0	35.12	0	4.091	4.243	-0.152
439.2	57.899	-0.743	-1.211	0	35.11	0	4.092	4.244	-0.152
439.3	57.887	-0.743	-0.72	0	35.52	0	4.093	4.244	-0.152
439.4	57.881	-0.758	-0.233	0	35.86	0	4.094	4.245	-0.152
439.5	57.875	-0.753	-0.632	0	35.87	0	4.095	4.246	-0.152
439.6	57.862	-0.753	-1.116	0	35.89	0	4.096	4.247	-0.152
439.7	57.856	-0.745	-0.837	0	35.88	0	4.097	4.248	-0.152
439.8	57.85	-0.745	-1.031	0	35.83	0	4.098	4.249	-0.152
439.9	57.837	-0.743	-0.805	0	36.71	0	4.099	4.25	-0.152
440	57.831	-0.743	-0.533	0	37.25	0	4.1	4.252	-0.152
440.1	57.831	-0.74	-0.646	0	37.24	0	4.101	4.253	-0.152
440.2	57.825	-0.74	-0.819	0	37.23	0	4.102	4.254	-0.152
440.3	57.819	-0.743	-0.72	0	37.33	0	4.103	4.255	-0.152
440.4	57.812	-0.733	-0.72	0	37.52	0	4.104	4.256	-0.152
440.5	57.806	-0.733	-1.134	0	37.45	0	4.105	4.257	-0.152
440.6	57.8	-0.755	-0.763	0	37.52	0	4.106	4.258	-0.152
440.7	57.8	-0.748	-0.099	0	37.47	0	4.107	4.259	-0.152
440.8	57.794	-0.748	-1.049	0	37.43	0	4.108	4.26	-0.152
440.9	57.781	-0.733	-0.971	0	37.47	0	4.109	4.261	-0.152
441	57.781	-0.73	-0.791	0	37.5	0	4.11	4.262	-0.152
441.1	57.775	-0.73	-1.134	0	37.47	0	4.111	4.263	-0.152
441.2	57.769	-0.768	-0.791	0	37.43	0	4.112	4.264	-0.152
441.3	57.763	-0.758	-0.233	0	37.43	0	4.113	4.265	-0.152
441.4	57.756	-0.758	-0.72	0	37.57	0	4.115	4.266	-0.152

441.5	57.75	-0.76	-1.197	0	38.1	0	4.116	4.267	-0.152
441.6	57.744	-0.773	-0.53	0	38.85	0	4.117	4.268	-0.152
441.7	57.744	-0.773	-0.247	0	38.8	0	4.118	4.269	-0.152
441.8	57.744	-0.76	-0.59	0	38.96	0	4.119	4.27	-0.152
441.9	57.738	-0.743	-0.872	0	39.64	0	4.12	4.271	-0.152
442	57.738	-0.743	-1.105	0	39.6	0	4.121	4.273	-0.152
442.1	57.738	-0.758	-0.886	0	40.1	0	4.122	4.274	-0.152
442.2	57.732	-0.743	-0.484	0	42.01	0	4.123	4.275	-0.152
442.3	57.732	-0.743	-1.243	0	43.36	0	4.125	4.276	-0.152
442.4	57.738	-0.74	-0.72	0	43.38	0	4.126	4.277	-0.152
442.5	57.738	-0.755	-0.547	0	43.86	0	4.127	4.278	-0.152
442.6	57.744	-0.755	-0.088	0	44.48	0	4.128	4.28	-0.152
442.7	57.75	-0.763	-0.47	0	44.48	0	4.129	4.281	-0.152
442.8	57.75	-0.763	-0.646	0	44.49	0	4.131	4.282	-0.152
442.9	57.756	-0.73	-0.95	0	45.07	0	4.132	4.283	-0.152
443	57.763	-0.758	-1.211	0	44.97	0	4.133	4.285	-0.152
443.1	57.763	-0.763	-0.604	0	44.98	0	4.134	4.286	-0.152
443.2	57.769	-0.763	0.109	0	45.01	0	4.136	4.287	-0.152
443.3	57.775	-0.735	-1.183	0	44.97	0	4.137	4.288	-0.152
443.4	57.781	-0.738	-1.091	0	45.01	0	4.138	4.29	-0.152
443.5	57.781	-0.738	-0.918	0	45.01	0	4.139	4.291	-0.152
443.6	57.788	-0.755	-0.724	0	45.05	0	4.141	4.292	-0.152
443.7	57.794	-0.73	-0.385	0	45.07	0	4.142	4.293	-0.152
443.8	57.8	-0.73	-0.932	0	45.03	0	4.143	4.295	-0.152
443.9	57.806	-0.74	-1.077	0	44.99	0	4.144	4.296	-0.152
444	57.812	-0.748	-0.247	0	45.02	0	4.146	4.297	-0.152
444.1	57.819	-0.748	-0.47	0	45.01	0	4.147	4.298	-0.152
444.2	57.825	-0.753	-0.371	0	45.05	0	4.148	4.3	-0.152
444.3	57.825	-0.75	-0.646	0	45.11	0	4.149	4.301	-0.152
444.4	57.831	-0.75	-1.116	0	45.07	0	4.151	4.302	-0.152
444.5	57.837	-0.748	-0.872	0	45.06	0	4.152	4.303	-0.152
444.6	57.837	-0.738	-0.385	0	45.12	0	4.153	4.305	-0.152
444.7	57.843	-0.738	-0.886	0	45.13	0	4.154	4.306	-0.152
444.8	57.85	-0.74	-1.102	0	45.12	0	4.156	4.307	-0.152
444.9	57.856	-0.735	-0.72	0	45.12	0	4.157	4.308	-0.152
445	57.862	-0.735	0.011	0	45.14	0	4.158	4.31	-0.152
445.1	57.862	-0.738	-1.342	0	45.69	0	4.159	4.311	-0.152
445.2	57.868	-0.755	-0.791	0	46.31	0	4.161	4.312	-0.152
445.3	57.875	-0.755	-0.385	0	47.04	0	4.162	4.314	-0.152
445.4	57.881	-0.743	-0.586	0	47.07	0	4.163	4.315	-0.152
445.5	57.887	-0.735	-0.844	0	47.05	0	4.165	4.316	-0.152
445.6	57.899	-0.735	-1.031	0	47.13	0	4.166	4.318	-0.152
445.7	57.906	-0.753	-0.72	0	47.04	0	4.167	4.319	-0.152
445.8	57.918	-0.753	-0.473	0	47.09	0	4.169	4.32	-0.152
445.9	57.918	-0.76	-0.498	0	47.08	0	4.17	4.321	-0.152
446	57.93	-0.733	-1.031	0	47.11	0	4.171	4.323	-0.152
446.1	57.937	-0.74	-1.692	0	47.07	0	4.173	4.324	-0.152

446.2	57.943	-0.74	-0.3	0	47.06	0	4.174	4.325	-0.152
446.3	57.949	-0.748	-0.706	0	46.62	0	4.175	4.327	-0.152
446.4	57.962	-0.755	-0.385	0	46.32	0	4.176	4.328	-0.152
446.5	57.962	-0.755	-0.293	0	46.3	0	4.178	4.329	-0.152
446.6	57.974	-0.745	-0.791	0	46.27	0	4.179	4.331	-0.152
446.7	57.98	-0.745	-1.031	0	46.26	0	4.18	4.332	-0.152
446.8	57.98	-0.745	-0.72	0	46.33	0	4.182	4.333	-0.152
446.9	57.993	-0.748	-0.547	0	46.3	0	4.183	4.334	-0.152
447	57.999	-0.758	-1.487	0	46.12	0	4.184	4.336	-0.152
447.1	58.005	-0.758	-0.343	0	46.07	0	4.185	4.337	-0.152
447.2	58.011	-0.748	-0.487	0	46.09	0	4.187	4.338	-0.152
447.3	58.017	-0.758	-1.444	0	46.14	0	4.188	4.339	-0.152
447.4	58.024	-0.758	-0.501	0	46.15	0	4.189	4.341	-0.152
447.5	58.03	-0.75	-0.791	0	46.14	0	4.191	4.342	-0.152
447.6	58.036	-0.738	-0.932	0	46.12	0	4.192	4.343	-0.152
447.7	58.042	-0.738	-1.003	0	46.11	0	4.193	4.345	-0.152
447.8	58.055	-0.758	-1.017	0	46.15	0	4.194	4.346	-0.152
447.9	58.055	-0.755	-0.304	0	46.19	0	4.196	4.347	-0.152
448	58.061	-0.755	-0.385	0	46.17	0	4.197	4.348	-0.152
448.1	58.073	-0.73	-0.706	0	46.19	0	4.198	4.35	-0.152
448.2	58.073	-0.743	-1.268	0	46.09	0	4.199	4.351	-0.152
448.3	58.08	-0.743	-0.632	0	46.22	0	4.201	4.352	-0.152
448.4	58.086	-0.748	-0.219	0	46.15	0	4.202	4.354	-0.152
448.5	58.092	-0.75	-0.872	0	46.13	0	4.203	4.355	-0.152
448.6	58.098	-0.75	-0.706	0	46.17	0	4.205	4.356	-0.152
448.7	58.104	-0.735	-0.646	0	45.47	0	4.206	4.357	-0.152
448.8	58.111	-0.735	-1.282	0	44.71	0	4.207	4.359	-0.152
448.9	58.117	-0.738	-0.985	0	44.49	0	4.208	4.36	-0.152
449	58.117	-0.73	-0.66	0	43.69	0	4.21	4.361	-0.152
449.1	58.117	-0.738	-1.063	0	43.02	0	4.211	4.362	-0.152
449.2	58.123	-0.738	-0.547	0	41.3	0	4.212	4.363	-0.152
449.3	58.123	-0.74	-0.632	0	39.9	0	4.213	4.365	-0.152
449.4	58.117	-0.743	-0.985	0	39.65	0	4.214	4.366	-0.152
449.5	58.117	-0.743	-0.622	0	39.66	0	4.215	4.367	-0.152
449.6	58.111	-0.745	-0.547	0	39.67	0	4.216	4.368	-0.152
449.7	58.111	-0.73	-0.371	0	39.32	0	4.217	4.369	-0.152
449.8	58.104	-0.73	-0.533	0	38.77	0	4.218	4.37	-0.152
449.9	58.104	-0.743	-1.197	0	38.77	0	4.22	4.371	-0.152
450	58.098	-0.735	-0.145	0	38.78	0	4.221	4.372	-0.152
450.1	58.092	-0.735	-0.533	0	38.32	0	4.222	4.373	-0.152
450.2	58.086	-0.74	-0.943	0	37.98	0	4.223	4.374	-0.152
450.3	58.086	-0.72	0.053	0	37.38	0	4.224	4.375	-0.152
450.4	58.073	-0.72	-0.858	0	36.84	0	4.225	4.376	-0.152
450.5	58.067	-0.748	-1.526	0	35.33	0	4.226	4.377	-0.152
450.6	58.061	-0.775	-0.516	0	34.12	0	4.227	4.378	-0.152
450.7	58.048	-0.775	0.268	0	33.11	0	4.228	4.379	-0.152
450.8	58.036	-0.718	-0.463	0	32.65	0	4.229	4.38	-0.152

450.9	58.03	-0.718	-1.967	0	32.22	0	4.229	4.381	-0.152
451	58.011	-0.718	-0.752	0	32.1	0	4.23	4.382	-0.152
451.1	57.999	-0.738	-0.042	0	32.08	0	4.231	4.383	-0.152
451.2	57.986	-0.73	-0.371	0	32.64	0	4.232	4.384	-0.152
451.3	57.974	-0.73	-1.282	0	33.07	0	4.233	4.385	-0.152
451.4	57.962	-0.733	-0.576	0	33.69	0	4.234	4.386	-0.152
451.5	57.949	-0.735	-0.47	0	34.37	0	4.235	4.387	-0.152
451.6	57.937	-0.735	-0.858	0	34.9	0	4.236	4.387	-0.152
451.7	57.93	-0.74	-0.72	0	34.91	0	4.237	4.388	-0.152
451.8	57.924	-0.74	-0.59	0	35.4	0	4.238	4.389	-0.152
451.9	57.912	-0.733	-0.706	0	35.72	0	4.239	4.39	-0.152
452	57.906	-0.735	-1.257	0	36.49	0	4.24	4.391	-0.152
452.1	57.899	-0.738	-0.547	0	37.34	0	4.241	4.392	-0.152
452.2	57.893	-0.738	-0.385	0	37.53	0	4.242	4.394	-0.152
452.3	57.887	-0.745	-0.735	0	38.12	0	4.243	4.395	-0.152
452.4	57.881	-0.75	-1.031	0	38.09	0	4.244	4.396	-0.152
452.5	57.875	-0.75	-0.547	0	38.07	0	4.245	4.397	-0.152
452.6	57.875	-0.753	-0.547	0	38.07	0	4.246	4.398	-0.152
452.7	57.862	-0.738	-0.629	0	38.11	0	4.247	4.399	-0.152
452.8	57.856	-0.738	-1.201	0	38.08	0	4.248	4.4	-0.152
452.9	57.856	-0.743	-0.791	0	38.09	0	4.249	4.401	-0.152
453	57.85	-0.768	-0.304	0	38.12	0	4.25	4.402	-0.152
453.1	57.843	-0.768	-0.47	0	38.08	0	4.252	4.403	-0.152
453.2	57.843	-0.755	0.124	0	38.1	0	4.253	4.404	-0.152
453.3	57.837	-0.758	-0.943	0	38.06	0	4.254	4.405	-0.152
453.4	57.831	-0.758	-1.183	0	38.04	0	4.255	4.406	-0.152
453.5	57.831	-0.76	-0.29	0	38.07	0	4.256	4.407	-0.152
453.6	57.825	-0.758	-0.731	0	38.14	0	4.257	4.408	-0.152
453.7	57.819	-0.758	-0.632	0	38.06	0	4.258	4.409	-0.152
453.8	57.819	-0.773	-0.957	0	38.05	0	4.259	4.41	-0.152
453.9	57.812	-0.77	-0.456	0	38.1	0	4.26	4.412	-0.152
454	57.806	-0.77	-0.576	0	38.14	0	4.261	4.413	-0.152
454.1	57.8	-0.763	-1.031	0	38.23	0	4.262	4.414	-0.152
454.2	57.794	-0.75	-0.692	0	38.21	0	4.263	4.415	-0.152
454.3	57.794	-0.75	-0.844	0	38.22	0	4.264	4.416	-0.152
454.4	57.788	-0.743	-0.83	0	38.25	0	4.265	4.417	-0.152
454.5	57.788	-0.743	-0.533	0	38.22	0	4.266	4.418	-0.152
454.6	57.781	-0.743	-0.692	0	38.24	0	4.267	4.419	-0.152
454.7	57.775	-0.763	-0.901	0	38.22	0	4.268	4.42	-0.152
454.8	57.769	-0.763	-0.533	0	38.24	0	4.27	4.421	-0.152
454.9	57.769	-0.763	-0.456	0	38.25	0	4.271	4.422	-0.152
455	57.763	-0.743	-0.547	0	38.22	0	4.272	4.423	-0.152
455.1	57.756	-0.73	-1.148	0	38.27	0	4.273	4.424	-0.152
455.2	57.756	-0.73	-1.43	0	38.21	0	4.274	4.425	-0.152
455.3	57.75	-0.755	-0.385	0	38.25	0	4.275	4.426	-0.152
455.4	57.75	-0.753	0.081	0	38.06	0	4.276	4.427	-0.152
455.5	57.744	-0.753	-0.607	0	38.04	0	4.277	4.429	-0.152

455.6	57.738	-0.743	-1.243	0	38.08	0	4.278	4.43	-0.152
455.7	57.732	-0.76	-0.901	0	38.01	0	4.279	4.431	-0.152
455.8	57.732	-0.76	-0.66	0	38.03	0	4.28	4.432	-0.152
455.9	57.725	-0.75	-0.547	0	38.01	0	4.281	4.433	-0.152
456	57.719	-0.748	-0.59	0	38.02	0	4.282	4.434	-0.152
456.1	57.719	-0.748	-1.031	0	38.01	0	4.283	4.435	-0.152
456.2	57.707	-0.768	-0.791	0	38	0	4.284	4.436	-0.152
456.3	57.707	-0.758	-0.371	0	38.03	0	4.285	4.437	-0.152
456.4	57.701	-0.758	-0.547	0	37.98	0	4.286	4.438	-0.152
456.5	57.694	-0.75	-1.102	0	38.02	0	4.288	4.439	-0.152
456.6	57.694	-0.76	-0.646	0	38	0	4.289	4.44	-0.152
456.7	57.688	-0.76	-0.219	0	38	0	4.29	4.441	-0.152
456.8	57.682	-0.758	-0.791	0	38.03	0	4.291	4.442	-0.152
456.9	57.682	-0.748	-0.943	0	39.23	0	4.292	4.443	-0.152
457	57.676	-0.748	-1.102	0	42.33	0	4.293	4.444	-0.152
457.1	57.676	-0.743	-0.533	0	42.55	0	4.294	4.446	-0.152
457.2	57.682	-0.748	-0.918	0	42.6	0	4.295	4.447	-0.152
457.3	57.682	-0.748	-0.371	0	42.56	0	4.296	4.448	-0.152
457.4	57.682	-0.738	-0.456	0	42.62	0	4.298	4.449	-0.152
457.5	57.688	-0.753	-0.957	0	42.55	0	4.299	4.45	-0.152
457.6	57.688	-0.753	-0.456	0	42.62	0	4.3	4.452	-0.152
457.7	57.694	-0.763	-0.417	0	43.31	0	4.301	4.453	-0.152
457.8	57.694	-0.763	-1.345	0	43.75	0	4.302	4.454	-0.152
457.9	57.694	-0.768	-0.47	0	45.77	0	4.304	4.455	-0.152
458	57.701	-0.755	-0.533	0	46.09	0	4.305	4.457	-0.152
458.1	57.713	-0.758	-1.017	0	47	0	4.306	4.458	-0.152
458.2	57.719	-0.758	-1.102	0	46.86	0	4.308	4.459	-0.152
458.3	57.732	-0.76	-0.456	0	46.93	0	4.309	4.46	-0.152
458.4	57.738	-0.735	-0.371	0	46.91	0	4.31	4.462	-0.152
458.5	57.744	-0.735	-1.031	0	46.92	0	4.312	4.463	-0.152
458.6	57.75	-0.74	-1.716	0	46.91	0	4.313	4.464	-0.152
458.7	57.756	-0.743	-0.219	0	47.79	0	4.314	4.466	-0.152
458.8	57.769	-0.743	-0.706	0	48.1	0	4.315	4.467	-0.152
458.9	57.775	-0.75	-0.286	0	48.45	0	4.317	4.468	-0.152
459	57.788	-0.743	-0.692	0	49.97	0	4.318	4.47	-0.152
459.1	57.794	-0.743	-0.858	0	49.91	0	4.32	4.471	-0.152
459.2	57.812	-0.755	-0.385	0	49.82	0	4.321	4.473	-0.152
459.3	57.819	-0.748	-0.706	0	49.76	0	4.322	4.474	-0.152
459.4	57.831	-0.748	-0.371	0	49.84	0	4.324	4.475	-0.152
459.5	57.843	-0.733	-0.773	0	49.87	0	4.325	4.477	-0.152
459.6	57.856	-0.758	-1.328	0	49.9	0	4.327	4.478	-0.152
459.7	57.868	-0.758	-0.219	0	49.89	0	4.328	4.479	-0.152
459.8	57.881	-0.753	-0.088	0	49.91	0	4.329	4.481	-0.152
459.9	57.887	-0.748	-1.116	0	49.88	0	4.331	4.482	-0.152
460	57.899	-0.748	-0.858	0	49.91	0	4.332	4.484	-0.152
460.1	57.912	-0.733	-0.692	0	49.95	0	4.333	4.485	-0.152
460.2	57.924	-0.72	-1.049	0	49.92	0	4.335	4.486	-0.152

460.3	57.937	-0.72	-1.105	0	49.93	0	4.336	4.488	-0.152
460.4	57.949	-0.728	-0.286	0	49.93	0	4.338	4.489	-0.152
460.5	57.962	-0.718	-0.491	0	50.01	0	4.339	4.491	-0.152
460.6	57.974	-0.718	-1.275	0	49.96	0	4.34	4.492	-0.152
460.7	57.986	-0.728	-1.077	0	49.98	0	4.342	4.493	-0.152
460.8	57.993	-0.728	-0.385	0	50.17	0	4.343	4.495	-0.152
460.9	58.005	-0.733	-0.858	0	50.85	0	4.345	4.496	-0.152
461	58.017	-0.748	-0.23	0	50.87	0	4.346	4.498	-0.152
461.1	58.03	-0.74	-0.607	0	50.89	0	4.347	4.499	-0.152
461.2	58.042	-0.74	-0.735	0	50.92	0	4.349	4.5	-0.152
461.3	58.055	-0.72	-0.946	0	50.94	0	4.35	4.502	-0.152
461.4	58.067	-0.735	-0.533	0	50.74	0	4.352	4.503	-0.152
461.5	58.08	-0.735	-0.752	0	49.76	0	4.353	4.505	-0.152
461.6	58.092	-0.718	-0.59	0	49.13	0	4.354	4.506	-0.152
461.7	58.104	-0.73	-1.091	0	48.9	0	4.356	4.507	-0.152
461.8	58.111	-0.73	-0.385	0	48.93	0	4.357	4.509	-0.152
461.9	58.123	-0.73	-0.604	0	48.93	0	4.358	4.51	-0.152
462	58.129	-0.738	-0.872	0	48.93	0	4.36	4.511	-0.152
462.1	58.142	-0.738	-0.29	0	48.89	0	4.361	4.513	-0.152
462.2	58.148	-0.733	-0.622	0	48.91	0	4.363	4.514	-0.152
462.3	58.16	-0.723	-0.706	0	48.95	0	4.364	4.515	-0.152
462.4	58.167	-0.723	-1.271	0	48.97	0	4.365	4.517	-0.152
462.5	58.179	-0.74	-0.35	0	49.01	0	4.367	4.518	-0.152
462.6	58.191	-0.735	-0.371	0	49.03	0	4.368	4.52	-0.152
462.7	58.198	-0.735	-0.812	0	48.78	0	4.369	4.521	-0.152
462.8	58.21	-0.728	-0.78	0	48.72	0	4.371	4.522	-0.152
462.9	58.216	-0.715	-0.371	0	48.74	0	4.372	4.524	-0.152
463	58.229	-0.715	-1.197	0	48.76	0	4.373	4.525	-0.152
463.1	58.235	-0.738	-0.777	0	48.74	0	4.375	4.526	-0.152
463.2	58.247	-0.728	-0.205	0	48.29	0	4.376	4.528	-0.152
463.3	58.254	-0.728	-1.229	0	47.89	0	4.377	4.529	-0.152
463.4	58.266	-0.75	-1.003	0	47.4	0	4.379	4.53	-0.152
463.5	58.272	-0.748	-0.06	0	45.67	0	4.38	4.532	-0.152
463.6	58.278	-0.748	-0.501	0	43.98	0	4.381	4.533	-0.152
463.7	58.278	-0.735	-0.918	0	43.45	0	4.382	4.534	-0.152
463.8	58.285	-0.735	-0.985	0	43.49	0	4.384	4.535	-0.152
463.9	58.285	-0.733	-0.692	0	43.57	0	4.385	4.536	-0.152
464	58.285	-0.733	-0.533	0	42.99	0	4.386	4.538	-0.152
464.1	58.285	-0.728	-1.049	0	42.45	0	4.387	4.539	-0.152
464.2	58.285	-0.728	-0.858	0	42.2	0	4.388	4.54	-0.152
464.3	58.285	-0.74	-0.618	0	41.63	0	4.39	4.541	-0.152
464.4	58.285	-0.733	-0.618	0	41.72	0	4.391	4.542	-0.152
464.5	58.285	-0.733	-1.063	0	41.66	0	4.392	4.543	-0.152
464.6	58.285	-0.718	-0.872	0	41.66	0	4.393	4.545	-0.152
464.7	58.285	-0.72	-0.766	0	41.67	0	4.394	4.546	-0.152
464.8	58.285	-0.72	-0.777	0	41.66	0	4.395	4.547	-0.152
464.9	58.285	-0.718	-1.003	0	41.67	0	4.397	4.548	-0.152

465	58.285	-0.713	-0.562	0	41.64	0	4.398	4.549	-0.152
465.1	58.285	-0.713	-0.205	0	41.68	0	4.399	4.55	-0.152
465.2	58.285	-0.723	-1.211	0	41.68	0	4.4	4.552	-0.152
465.3	58.278	-0.735	-0.533	0	41.66	0	4.401	4.553	-0.152
465.4	58.285	-0.735	-0.29	0	41.66	0	4.402	4.554	-0.152
465.5	58.278	-0.735	-0.872	0	39.6	0	4.403	4.555	-0.152
465.6	58.278	-0.72	-0.692	0	37.18	0	4.404	4.556	-0.152
465.7	58.272	-0.72	-1.017	0	35.28	0	4.405	4.557	-0.152
465.8	58.26	-0.725	-0.766	0	35.13	0	4.406	4.558	-0.152
465.9	58.254	-0.738	-0.314	0	35.18	0	4.407	4.559	-0.152
466	58.241	-0.738	-0.791	0	35.19	0	4.408	4.56	-0.152
466.1	58.235	-0.755	-0.219	0	35.17	0	4.409	4.561	-0.152
466.2	58.222	-0.735	-0.749	0	35.14	0	4.41	4.562	-0.152
466.3	58.216	-0.735	-0.731	0	35.19	0	4.411	4.563	-0.152
466.4	58.204	-0.733	-1.314	0	36.02	0	4.412	4.564	-0.152
466.5	58.198	-0.728	-0.547	0	36.8	0	4.413	4.565	-0.152
466.6	58.185	-0.728	-0.66	0	36.75	0	4.414	4.566	-0.152
466.7	58.179	-0.758	-0.777	0	36.7	0	4.415	4.567	-0.152
466.8	58.179	-0.758	-0.042	0	36.75	0	4.416	4.568	-0.152
466.9	58.167	-0.74	-0.706	0	36.71	0	4.417	4.569	-0.152
467	58.16	-0.73	-1.282	0	36.32	0	4.418	4.57	-0.152
467.1	58.154	-0.74	-1.116	0	35.83	0	4.419	4.571	-0.152
467.2	58.142	-0.74	-0.219	0	35.69	0	4.42	4.572	-0.152
467.3	58.135	-0.733	-0.632	0	35.02	0	4.421	4.573	-0.152
467.4	58.129	-0.73	-1.059	0	34.37	0	4.422	4.574	-0.152
467.5	58.117	-0.73	-0.59	0	33.53	0	4.423	4.575	-0.152
467.6	58.111	-0.73	-0.83	0	32.8	0	4.424	4.576	-0.152
467.7	58.092	-0.728	-0.788	0	32.61	0	4.425	4.577	-0.152
467.8	58.08	-0.728	-0.872	0	32.17	0	4.426	4.578	-0.152
467.9	58.067	-0.738	-1.243	0	32.16	0	4.427	4.578	-0.152
468	58.055	-0.745	-0.205	0	32.16	0	4.428	4.579	-0.152
468.1	58.036	-0.745	-0.219	0	32.14	0	4.429	4.58	-0.152
468.2	58.03	-0.733	-0.692	0	32.12	0	4.43	4.581	-0.152
468.3	58.011	-0.745	-0.752	0	32.09	0	4.43	4.582	-0.152
468.4	57.999	-0.745	-0.385	0	32.11	0	4.431	4.583	-0.152
468.5	57.986	-0.745	0.014	0	32.12	0	4.432	4.584	-0.152
468.6	57.968	-0.74	-0.547	0	32.08	0	4.433	4.585	-0.152
468.7	57.962	-0.74	-1.197	0	32.07	0	4.434	4.586	-0.152
468.8	57.949	-0.735	-0.3	0	32.05	0	4.435	4.586	-0.152
468.9	57.93	-0.743	-0.858	0	32.05	0	4.436	4.587	-0.152
469	57.918	-0.743	-0.819	0	32.04	0	4.437	4.588	-0.152
469.1	57.906	-0.738	-0.371	0	32.04	0	4.438	4.589	-0.152
469.2	57.893	-0.733	-0.886	0	32.03	0	4.438	4.59	-0.152
469.3	57.881	-0.733	-1.183	0	32.04	0	4.439	4.591	-0.152
469.4	57.862	-0.735	-0.667	0	32	0	4.44	4.592	-0.152
469.5	57.85	-0.735	-0.533	0	32.06	0	4.441	4.593	-0.152
469.6	57.837	-0.735	-0.692	0	32.17	0	4.442	4.594	-0.152

469.7	57.825	-0.748	-0.872	0	32.17	0	4.443	4.594	-0.152
469.8	57.812	-0.748	-0.177	0	32.16	0	4.444	4.595	-0.152
469.9	57.8	-0.733	-0.646	0	31.98	0	4.445	4.596	-0.152
470	57.781	-0.74	-1.317	0	30.99	0	4.446	4.597	-0.152
470.1	57.769	-0.75	0.042	0	28.87	0	4.446	4.598	-0.152
470.2	57.75	-0.75	-0.102	0	28.47	0	4.447	4.599	-0.152
470.3	57.732	-0.73	-0.918	0	28.52	0	4.448	4.599	-0.152
470.4	57.713	-0.73	-1.091	0	28.52	0	4.449	4.6	-0.152
470.5	57.694	-0.73	-0.417	0	28.53	0	4.45	4.601	-0.152
470.6	57.676	-0.723	-0.47	0	28.51	0	4.45	4.602	-0.152
470.7	57.657	-0.73	-0.932	0	28.48	0	4.451	4.603	-0.152
470.8	57.638	-0.73	-0.501	0	28.53	0	4.452	4.603	-0.152
470.9	57.62	-0.748	-0.219	0	28.37	0	4.453	4.604	-0.152
471	57.607	-0.74	-0.042	0	28.24	0	4.453	4.605	-0.152
471.1	57.582	-0.74	-0.971	0	28.24	0	4.454	4.606	-0.152
471.2	57.57	-0.735	-0.943	0	28.24	0	4.455	4.607	-0.152
471.3	57.551	-0.733	-0.371	0	28.26	0	4.456	4.607	-0.152
471.4	57.533	-0.733	-0.858	0	28.23	0	4.457	4.608	-0.152
471.5	57.514	-0.738	-0.59	0	28.23	0	4.457	4.609	-0.152
471.6	57.495	-0.74	-0.445	0	28.03	0	4.458	4.61	-0.152
471.7	57.477	-0.74	-0.823	0	27.01	0	4.459	4.61	-0.152
471.8	57.458	-0.748	-0.304	0	23.73	0	4.46	4.611	-0.152
471.9	57.433	-0.753	-0.399	0	19.5	0	4.46	4.612	-0.152
472	57.402	-0.753	-1.282	0	16.53	0	4.461	4.612	-0.152
472.1	57.365	-0.78	-0.456	0	14.65	0	4.461	4.613	-0.152
472.2	57.328	-0.753	-0.06	0	14.2	0	4.461	4.613	-0.152
472.3	57.29	-0.753	-1.155	0	14.19	0	4.462	4.613	-0.152
472.4	57.247	-0.735	-1.197	0	14.18	0	4.462	4.614	-0.152
472.5	57.216	-0.733	-0.791	0	14.17	0	4.463	4.614	-0.152
472.6	57.172	-0.733	-0.632	0	14.14	0	4.463	4.614	-0.152
472.7	57.135	-0.723	-0.872	0	14.15	0	4.463	4.615	-0.152
472.8	57.092	-0.723	-0.371	0	14.14	0	4.464	4.615	-0.152
472.9	57.061	-0.718	-1.285	0	14.12	0	4.464	4.616	-0.152
473	57.017	-0.74	-0.36	0	14.13	0	4.465	4.616	-0.152
473.1	56.98	-0.745	-0.134	0	13.85	0	4.465	4.616	-0.152
473.2	56.942	-0.745	-0.399	0	12.6	0	4.465	4.617	-0.152
473.3	56.899	-0.743	-0.463	0	11.27	0	4.466	4.617	-0.152
473.4	56.862	-0.75	-0.872	0	10.51	0	4.466	4.617	-0.152
473.5	56.818	-0.75	-0.102	0	9.4	0	4.466	4.618	-0.152
473.6	56.775	-0.713	-1.049	0	8.6	0	4.466	4.618	-0.152
473.7	56.725	-0.728	-1.402	0	8.43	0	4.467	4.618	-0.152
473.8	56.681	-0.728	-0.219	0	8.41	0	4.467	4.618	-0.152
473.9	56.632	-0.728	-0.431	0	8.41	0	4.467	4.619	-0.152
474	56.588	-0.73	-0.872	0	8.47	0	4.467	4.619	-0.152
474.1	56.539	-0.73	-0.816	0	8.66	0	4.468	4.619	-0.152
474.2	56.495	-0.728	-0.547	0	8.93	0	4.468	4.619	-0.152
474.3	56.452	-0.733	-0.886	0	10.07	0	4.468	4.62	-0.152

474.4	56.408	-0.733	-0.59	0	12.95	0	4.468	4.62	-0.152
474.5	56.365	-0.733	-0.547	0	15.58	0	4.469	4.62	-0.152
474.6	56.334	-0.738	-0.971	0	17.84	0	4.469	4.621	-0.152
474.7	56.296	-0.738	-0.805	0	20.2	0	4.47	4.621	-0.152
474.8	56.265	-0.715	-0.304	0	22.25	0	4.471	4.622	-0.152
474.9	56.247	-0.718	-1.031	0	25.9	0	4.471	4.623	-0.152
475	56.228	-0.718	-1.049	0	28.36	0	4.472	4.624	-0.152
475.1	56.209	-0.7	-0.233	0	28.94	0	4.473	4.624	-0.152
475.2	56.197	-0.718	-1.24	0	29.29	0	4.474	4.625	-0.152
475.3	56.184	-0.718	-0.304	0	29.3	0	4.474	4.626	-0.152
475.4	56.172	-0.725	-0.251	0	29.33	0	4.475	4.627	-0.152
475.5	56.153	-0.733	-0.872	0	29.31	0	4.476	4.628	-0.152
475.6	56.141	-0.733	-0.636	0	29.2	0	4.477	4.628	-0.152
475.7	56.128	-0.738	-0.413	0	28.14	0	4.478	4.629	-0.152
475.8	56.11	-0.738	-0.547	0	26.16	0	4.478	4.63	-0.152
475.9	56.097	-0.728	-1.243	0	22.93	0	4.479	4.631	-0.152
476	56.073	-0.74	-1.031	0	21.66	0	4.48	4.631	-0.152
476.1	56.048	-0.725	-0.219	0	20.94	0	4.48	4.632	-0.152
476.2	56.023	-0.725	-0.692	0	20.95	0	4.481	4.632	-0.152
476.3	55.998	-0.725	-1.42	0	20.98	0	4.481	4.633	-0.152
476.4	55.967	-0.733	-0.646	0	20.93	0	4.482	4.634	-0.152
476.5	55.942	-0.733	-0.632	0	20.93	0	4.483	4.634	-0.152
476.6	55.917	-0.75	-0.59	0	20.95	0	4.483	4.635	-0.152
476.7	55.892	-0.76	-0.876	0	20.88	0	4.484	4.635	-0.152
476.8	55.861	-0.76	-0.127	0	20.92	0	4.484	4.636	-0.152
476.9	55.843	-0.728	-0.547	0	20.91	0	4.485	4.636	-0.152
477	55.818	-0.725	-1.36	0	20.85	0	4.485	4.637	-0.152
477.1	55.793	-0.725	-1.077	0	20.88	0	4.486	4.638	-0.152
477.2	55.762	-0.738	-0.445	0	20.84	0	4.487	4.638	-0.152
477.3	55.737	-0.718	-0.219	0	20.88	0	4.487	4.639	-0.152
477.4	55.712	-0.718	-1.36	0	20.84	0	4.488	4.639	-0.152
477.5	55.681	-0.713	-1.091	0	20.8	0	4.488	4.64	-0.152
477.6	55.662	-0.718	-0.516	0	20.87	0	4.489	4.64	-0.152
477.7	55.631	-0.718	-0.533	0	20.81	0	4.49	4.641	-0.152
477.8	55.607	-0.718	-0.279	0	20.79	0	4.49	4.642	-0.152
477.9	55.582	-0.708	-0.72	0	20.82	0	4.491	4.642	-0.152
478	55.551	-0.708	-0.72	0	21.4	0	4.491	4.643	-0.152
478.1	55.532	-0.725	-0.766	0	21.82	0	4.492	4.643	-0.152
478.2	55.507	-0.738	-0.35	0	22.76	0	4.493	4.644	-0.152
478.3	55.482	-0.738	-0.399	0	22.87	0	4.493	4.645	-0.152
478.4	55.457	-0.715	-0.6	0	23.62	0	4.494	4.645	-0.152
478.5	55.439	-0.72	-1.197	0	23.7	0	4.494	4.646	-0.152
478.6	55.42	-0.72	-0.971	0	23.95	0	4.495	4.647	-0.152
478.7	55.401	-0.72	-0.279	0	23.84	0	4.496	4.647	-0.152
478.8	55.377	-0.72	-0.805	0	23.87	0	4.496	4.648	-0.152
478.9	55.358	-0.715	-0.865	0	23.87	0	4.497	4.649	-0.152
479	55.339	-0.72	-0.932	0	23.49	0	4.498	4.649	-0.152

479.1	55.314	-0.73	-0.562	0	22.9	0	4.498	4.65	-0.152
479.2	55.296	-0.73	-0.562	0	22.25	0	4.499	4.651	-0.152
479.3	55.271	-0.73	-0.385	0	22.28	0	4.5	4.651	-0.152
479.4	55.252	-0.72	-0.72	0	22.28	0	4.5	4.652	-0.152
479.5	55.227	-0.72	-0.929	0	22.25	0	4.501	4.652	-0.152
479.6	55.203	-0.713	-1.017	0	22.24	0	4.501	4.653	-0.152
479.7	55.184	-0.713	-0.445	0	22.94	0	4.502	4.654	-0.152
479.8	55.159	-0.713	-1.342	0	23	0	4.503	4.654	-0.152
479.9	55.134	-0.73	-0.498	0	23.01	0	4.503	4.655	-0.152
480	55.122	-0.728	-0.399	0	23.02	0	4.504	4.656	-0.152
480.1	55.097	-0.728	-0.72	0	23.9	0	4.505	4.656	-0.152
480.2	55.072	-0.738	-0.819	0	25.53	0	4.505	4.657	-0.152
480.3	55.06	-0.733	-0.233	0	26.99	0	4.506	4.658	-0.152
480.4	55.041	-0.733	-0.562	0	28.73	0	4.507	4.659	-0.152
480.5	55.029	-0.72	-1.282	0	29.98	0	4.508	4.659	-0.152
480.6	55.016	-0.708	-0.848	0	30.76	0	4.509	4.66	-0.152
480.7	55.01	-0.708	-0.766	0	32.12	0	4.51	4.661	-0.152
480.8	54.998	-0.718	-1.148	0	33.18	0	4.51	4.662	-0.152
480.9	54.991	-0.705	-0.117	0	34.67	0	4.511	4.663	-0.152
481	54.991	-0.705	-0.562	0	35.27	0	4.512	4.664	-0.152
481.1	54.985	-0.723	-0.766	0	35.73	0	4.513	4.665	-0.152
481.2	54.985	-0.728	-0.399	0	35.72	0	4.514	4.666	-0.152
481.3	54.979	-0.728	-0.72	0	35.76	0	4.515	4.667	-0.152
481.4	54.979	-0.735	-0.498	0	35.77	0	4.516	4.668	-0.152
481.5	54.979	-0.728	-0.72	0	35.72	0	4.517	4.669	-0.152
481.6	54.973	-0.728	-0.646	0	35.73	0	4.518	4.67	-0.152
481.7	54.973	-0.723	-1.229	0	35.75	0	4.519	4.671	-0.152
481.8	54.973	-0.723	-0.72	0	35.78	0	4.52	4.672	-0.152
481.9	54.973	-0.74	0.095	0	35.73	0	4.521	4.673	-0.152
482	54.966	-0.713	-0.477	0	35.78	0	4.522	4.674	-0.152
482.1	54.966	-0.73	-1.211	0	35.74	0	4.523	4.675	-0.152
482.2	54.966	-0.73	-0.6	0	35.72	0	4.524	4.676	-0.152
482.3	54.966	-0.733	-0.159	0	35.09	0	4.525	4.677	-0.152
482.4	54.96	-0.72	-0.576	0	33.82	0	4.526	4.678	-0.152
482.5	54.954	-0.72	-1.388	0	33.48	0	4.527	4.679	-0.152
482.6	54.954	-0.743	-1.116	0	33.49	0	4.528	4.68	-0.152
482.7	54.948	-0.745	-0.357	0	33.56	0	4.529	4.681	-0.152
482.8	54.942	-0.745	-0.413	0	33.52	0	4.53	4.682	-0.152
482.9	54.935	-0.765	-0.318	0	33.48	0	4.531	4.682	-0.152
483	54.929	-0.75	-0.233	0	33.49	0	4.532	4.683	-0.152
483.1	54.923	-0.75	-0.678	0	33.47	0	4.533	4.684	-0.152
483.2	54.923	-0.735	-1.314	0	33.47	0	4.534	4.685	-0.152
483.3	54.917	-0.728	-0.886	0	32.6	0	4.535	4.686	-0.152
483.4	54.904	-0.728	-0.576	0	30.13	0	4.535	4.687	-0.152
483.5	54.898	-0.728	-0.618	0	26.41	0	4.536	4.688	-0.152
483.6	54.88	-0.725	-0.456	0	23.73	0	4.537	4.688	-0.152
483.7	54.861	-0.725	-0.971	0	22.74	0	4.537	4.689	-0.152

483.8	54.842	-0.743	-0.618	0	22.65	0	4.538	4.69	-0.152
483.9	54.817	-0.73	0.141	0	22.7	0	4.539	4.69	-0.152
484	54.799	-0.73	-1.229	0	22.97	0	4.539	4.691	-0.152
484.1	54.774	-0.71	-0.547	0	24.49	0	4.54	4.692	-0.152
484.2	54.755	-0.723	-0.989	0	25.78	0	4.541	4.692	-0.152
484.3	54.743	-0.723	-1.059	0	28.52	0	4.542	4.693	-0.152
484.4	54.73	-0.73	-0.117	0	30.41	0	4.542	4.694	-0.152
484.5	54.718	-0.713	-0.562	0	30.64	0	4.543	4.695	-0.152
484.6	54.712	-0.713	-1.211	0	31.41	0	4.544	4.696	-0.152
484.7	54.706	-0.748	-0.819	0	31.92	0	4.545	4.697	-0.152
484.8	54.699	-0.748	0.155	0	33.78	0	4.546	4.697	-0.152
484.9	54.699	-0.753	-0.735	0	34.59	0	4.547	4.698	-0.152
485	54.693	-0.733	-0.901	0	35.07	0	4.548	4.699	-0.152
485.1	54.687	-0.723	-0.886	0	35.2	0	4.549	4.7	-0.152
485.2	54.687	-0.723	-0.886	0	35.22	0	4.55	4.701	-0.152
485.3	54.687	-0.723	-0.576	0	35.27	0	4.551	4.702	-0.152
485.4	54.681	-0.715	-0.576	0	35.41	0	4.552	4.703	-0.152
485.5	54.674	-0.715	-0.915	0	35.38	0	4.553	4.704	-0.152
485.6	54.674	-0.725	-1.049	0	35.47	0	4.554	4.705	-0.152
485.7	54.668	-0.73	-0.247	0	35.49	0	4.555	4.706	-0.152
485.8	54.668	-0.73	-0.735	0	35.55	0	4.556	4.707	-0.152
485.9	54.668	-0.75	-0.664	0	35.49	0	4.557	4.708	-0.152
486	54.668	-0.753	-0.247	0	35.5	0	4.558	4.709	-0.152
486.1	54.668	-0.753	-0.576	0	35.53	0	4.559	4.71	-0.152
486.2	54.656	-0.73	-0.735	0	35.77	0	4.56	4.711	-0.152
486.3	54.656	-0.725	-1.063	0	36.37	0	4.561	4.712	-0.152
486.4	54.662	-0.725	-0.72	0	36.28	0	4.562	4.713	-0.152
486.5	54.656	-0.723	-1.031	0	36.16	0	4.563	4.714	-0.152
486.6	54.656	-0.743	-0.735	0	36.13	0	4.564	4.715	-0.152
486.7	54.656	-0.743	-0.042	0	36.16	0	4.565	4.716	-0.152
486.8	54.656	-0.723	-0.413	0	36.13	0	4.566	4.717	-0.152
486.9	54.656	-0.72	-1.229	0	36.12	0	4.567	4.718	-0.152
487	54.656	-0.72	-0.696	0	36.12	0	4.568	4.719	-0.152
487.1	54.656	-0.728	-0.985	0	36.11	0	4.569	4.72	-0.152
487.2	54.656	-0.743	-0.72	0	36.14	0	4.57	4.721	-0.152
487.3	54.656	-0.743	0.081	0	36.07	0	4.571	4.722	-0.152
487.4	54.65	-0.725	-0.901	0	36.12	0	4.572	4.723	-0.152
487.5	54.65	-0.728	-0.72	0	36.09	0	4.573	4.724	-0.152
487.6	54.65	-0.728	-0.692	0	36.13	0	4.574	4.725	-0.152
487.7	54.65	-0.72	-0.576	0	36.1	0	4.575	4.726	-0.152
487.8	54.65	-0.72	-1.105	0	36.11	0	4.576	4.727	-0.152
487.9	54.643	-0.725	-0.78	0	36.13	0	4.577	4.728	-0.152
488	54.65	-0.718	-0.66	0	36.1	0	4.578	4.729	-0.152
488.1	54.643	-0.708	-0.999	0	36.11	0	4.579	4.73	-0.152
488.2	54.643	-0.708	-0.413	0	36.08	0	4.58	4.731	-0.152
488.3	54.643	-0.73	-1.031	0	36.11	0	4.581	4.732	-0.152
488.4	54.643	-0.725	-0.247	0	36.11	0	4.582	4.733	-0.152

488.5	54.643	-0.725	-0.247	0	36.12	0	4.583	4.734	-0.152
488.6	54.643	-0.73	-0.915	0	36.14	0	4.584	4.735	-0.152
488.7	54.643	-0.743	-0.604	0	36.13	0	4.585	4.736	-0.152
488.8	54.637	-0.743	-0.576	0	36.14	0	4.586	4.737	-0.152
488.9	54.643	-0.723	-0.332	0	36.11	0	4.587	4.738	-0.152
489	54.637	-0.703	-0.999	0	36.08	0	4.588	4.739	-0.152
489.1	54.643	-0.703	-1.148	0	36.11	0	4.589	4.74	-0.152
489.2	54.637	-0.745	-0.985	0	36.09	0	4.59	4.741	-0.152
489.3	54.637	-0.738	-0.018	0	36.13	0	4.591	4.742	-0.152
489.4	54.637	-0.738	-0.498	0	36.12	0	4.592	4.743	-0.152
489.5	54.637	-0.738	-1.229	0	36.11	0	4.593	4.744	-0.152
489.6	54.637	-0.735	-0.498	0	36.14	0	4.594	4.745	-0.152
489.7	54.637	-0.735	-0.735	0	36.11	0	4.595	4.746	-0.152
489.8	54.637	-0.718	-0.66	0	36.13	0	4.596	4.747	-0.152
489.9	54.631	-0.725	-0.749	0	36.15	0	4.597	4.748	-0.152
490	54.637	-0.725	-0.66	0	36.1	0	4.598	4.749	-0.152
490.1	54.637	-0.705	-0.777	0	36.11	0	4.599	4.75	-0.152
490.2	54.637	-0.723	-1.109	0	35.29	0	4.6	4.751	-0.152
490.3	54.637	-0.723	-0.604	0	35.3	0	4.601	4.752	-0.152
490.4	54.631	-0.745	0.226	0	35.29	0	4.602	4.753	-0.152
490.5	54.625	-0.718	-0.399	0	35.32	0	4.603	4.754	-0.152
490.6	54.625	-0.718	-1.038	0	35.32	0	4.604	4.755	-0.152
490.7	54.625	-0.715	-1.561	0	35.28	0	4.605	4.756	-0.152
490.8	54.625	-0.715	-0.65	0	35.31	0	4.606	4.757	-0.152
490.9	54.625	-0.715	-0.427	0	35.3	0	4.607	4.758	-0.152
491	54.619	-0.718	-0.915	0	35.67	0	4.608	4.759	-0.152
491.1	54.619	-0.73	-0.427	0	36.13	0	4.609	4.76	-0.152
491.2	54.619	-0.73	-0.413	0	36.12	0	4.61	4.761	-0.152
491.3	54.619	-0.725	-0.371	0	36.59	0	4.611	4.762	-0.152
491.4	54.619	-0.728	-0.735	0	36.82	0	4.612	4.763	-0.152
491.5	54.619	-0.728	-0.427	0	36.82	0	4.613	4.764	-0.152
491.6	54.619	-0.723	-0.749	0	36.86	0	4.614	4.765	-0.152
491.7	54.625	-0.728	-0.618	0	36.81	0	4.615	4.766	-0.152
491.8	54.619	-0.728	-0.293	0	36.86	0	4.616	4.767	-0.152
491.9	54.625	-0.738	-0.59	0	36.81	0	4.617	4.768	-0.152
492	54.625	-0.753	-1.045	0	36.81	0	4.618	4.769	-0.152
492.1	54.625	-0.753	-0.413	0	36.83	0	4.619	4.77	-0.152
492.2	54.631	-0.743	-0.498	0	36.81	0	4.62	4.771	-0.152
492.3	54.631	-0.728	-1.059	0	36.8	0	4.621	4.772	-0.152
492.4	54.625	-0.728	-1.077	0	36.82	0	4.622	4.773	-0.152
492.5	54.625	-0.708	-0.519	0	36.87	0	4.623	4.774	-0.152
492.6	54.631	-0.715	-0.749	0	37	0	4.624	4.776	-0.152
492.7	54.631	-0.715	-0.385	0	38.9	0	4.625	4.777	-0.152
492.8	54.637	-0.728	-0.328	0	44.54	0	4.626	4.778	-0.152
492.9	54.65	-0.735	-0.692	0	47.62	0	4.628	4.779	-0.152
493	54.662	-0.735	-0.59	0	47.43	0	4.629	4.78	-0.152
493.1	54.662	-0.73	-0.427	0	47.49	0	4.63	4.782	-0.152

493.2	54.699	-0.72	-0.915	0	47.48	0	4.632	4.783	-0.152
493.3	54.712	-0.72	-0.961	0	47.52	0	4.633	4.784	-0.152
493.4	54.724	-0.73	-0.985	0	47.52	0	4.634	4.786	-0.152
493.5	54.737	-0.733	-0.512	0	47.58	0	4.636	4.787	-0.152
493.6	54.755	-0.733	-0.833	0	47.53	0	4.637	4.788	-0.152
493.7	54.774	-0.73	-0.879	0	47.66	0	4.638	4.79	-0.152
493.8	54.786	-0.73	-0.59	0	47.63	0	4.64	4.791	-0.152
493.9	54.805	-0.713	-1.3	0	47.4	0	4.641	4.792	-0.152
494	54.824	-0.728	-0.971	0	45.92	0	4.642	4.794	-0.152
494.1	54.836	-0.738	-0.247	0	44.77	0	4.643	4.795	-0.152
494.2	54.842	-0.738	-0.117	0	43.52	0	4.645	4.796	-0.152
494.3	54.855	-0.77	-0.59	0	42.92	0	4.646	4.797	-0.152
494.4	54.867	-0.755	-0.145	0	40.38	0	4.647	4.798	-0.152
494.5	54.867	-0.755	-0.261	0	37.73	0	4.648	4.799	-0.152
494.6	54.867	-0.733	-1.706	0	34.88	0	4.649	4.8	-0.152
494.7	54.867	-0.725	-0.65	0	33.14	0	4.65	4.801	-0.152
494.8	54.861	-0.725	-0.102	0	33.12	0	4.651	4.802	-0.152
494.9	54.855	-0.733	-1.045	0	33.08	0	4.652	4.803	-0.152
495	54.848	-0.748	-0.261	0	33.07	0	4.653	4.804	-0.152
495.1	54.842	-0.748	-0.261	0	33.06	0	4.653	4.805	-0.152
495.2	54.836	-0.735	-0.752	0	33.05	0	4.654	4.806	-0.152
495.3	54.83	-0.738	-0.749	0	33.05	0	4.655	4.807	-0.152
495.4	54.824	-0.743	-0.59	0	32.98	0	4.656	4.808	-0.152
495.5	54.824	-0.743	-0.427	0	33.03	0	4.657	4.809	-0.152
495.6	54.817	-0.743	-0.547	0	33	0	4.658	4.81	-0.152
495.7	54.805	-0.743	-0.604	0	33.02	0	4.659	4.811	-0.152
495.8	54.805	-0.73	-0.625	0	33.43	0	4.66	4.811	-0.152
495.9	54.799	-0.735	-0.512	0	33.71	0	4.661	4.812	-0.152
496	54.793	-0.735	-0.999	0	33.71	0	4.662	4.813	-0.152
496.1	54.793	-0.715	-0.498	0	33.74	0	4.663	4.814	-0.152
496.2	54.786	-0.713	-0.957	0	33.72	0	4.664	4.815	-0.152
496.3	54.78	-0.713	-1.37	0	33.75	0	4.665	4.816	-0.152
496.4	54.774	-0.738	-0.261	0	33.71	0	4.666	4.817	-0.152
496.5	54.774	-0.733	-0.102	0	33.72	0	4.666	4.818	-0.152
496.6	54.768	-0.733	-0.749	0	33.71	0	4.667	4.819	-0.152
496.7	54.761	-0.725	-1.162	0	33.73	0	4.668	4.82	-0.152
496.8	54.761	-0.725	-0.915	0	33.7	0	4.669	4.821	-0.152
496.9	54.755	-0.735	-0.632	0	33.68	0	4.67	4.822	-0.152
497	54.749	-0.73	-0.622	0	33.7	0	4.671	4.823	-0.152
497.1	54.743	-0.725	-0.809	0	33.33	0	4.672	4.824	-0.152
497.2	54.743	-0.725	-0.717	0	32.97	0	4.673	4.825	-0.152
497.3	54.737	-0.745	-0.59	0	32.78	0	4.674	4.825	-0.152
497.4	54.73	-0.735	-0.261	0	32.14	0	4.675	4.826	-0.152
497.5	54.724	-0.735	-0.544	0	32.19	0	4.676	4.827	-0.152
497.6	54.718	-0.728	-0.706	0	32.13	0	4.677	4.828	-0.152
497.7	54.712	-0.738	-0.833	0	31.97	0	4.677	4.829	-0.152
497.8	54.706	-0.738	-0.59	0	31.26	0	4.678	4.83	-0.152

497.9	54.693	-0.72	-0.59	0	30.65	0	4.679	4.831	-0.152
498	54.687	-0.723	-0.999	0	30	0	4.68	4.832	-0.152
498.1	54.674	-0.723	-0.512	0	29.92	0	4.681	4.832	-0.152
498.2	54.668	-0.735	-0.385	0	29.91	0	4.682	4.833	-0.152
498.3	54.656	-0.723	-0.516	0	29.94	0	4.683	4.834	-0.152
498.4	54.643	-0.723	-1.091	0	29.77	0	4.683	4.835	-0.152
498.5	54.637	-0.725	-0.932	0	29.09	0	4.684	4.836	-0.152
498.6	54.625	-0.743	-0.618	0	29.26	0	4.685	4.837	-0.152
498.7	54.612	-0.743	-0.675	0	29.3	0	4.686	4.837	-0.152
498.8	54.6	-0.745	-0.141	0	29.37	0	4.687	4.838	-0.152
498.9	54.594	-0.74	-0.915	0	30.12	0	4.687	4.839	-0.152
499	54.587	-0.74	-0.763	0	30.46	0	4.688	4.84	-0.152
499.1	54.575	-0.73	-0.763	0	31.06	0	4.689	4.841	-0.152
499.2	54.563	-0.73	-0.632	0	31.05	0	4.69	4.842	-0.152
499.3	54.556	-0.73	-0.689	0	31.02	0	4.691	4.842	-0.152
499.4	54.55	-0.733	-1.091	0	31.02	0	4.692	4.843	-0.152
499.5	54.544	-0.735	-0.689	0	31.01	0	4.693	4.844	-0.152
499.6	54.532	-0.735	-0.915	0	31.03	0	4.693	4.845	-0.152
499.7	54.525	-0.718	-0.632	0	30.99	0	4.694	4.846	-0.152
499.8	54.519	-0.718	-1.314	0	31.02	0	4.695	4.847	-0.152
499.9	54.513	-0.72	-0.809	0	30.34	0	4.696	4.848	-0.152
500	54.5	-0.725	0.032	0	30.26	0	4.697	4.848	-0.152
500.1	54.494	-0.73	-0.763	0	30.12	0	4.698	4.849	-0.152
500.2	54.482	-0.73	-0.604	0	30.04	0	4.699	4.85	-0.152
500.3	54.469	-0.723	-0.66	0	30.1	0	4.699	4.851	-0.152
500.4	54.463	-0.728	-1.035	0	30.05	0	4.7	4.852	-0.152
500.5	54.457	-0.728	-0.848	0	30.08	0	4.701	4.853	-0.152
500.6	54.445	-0.72	-0.675	0	30.03	0	4.702	4.853	-0.152
500.7	54.432	-0.728	-0.795	0	30.03	0	4.703	4.854	-0.152
500.8	54.426	-0.728	-0.809	0	30.02	0	4.704	4.855	-0.152
500.9	54.42	-0.725	-0.275	0	29.97	0	4.704	4.856	-0.152
501	54.407	-0.733	-1.134	0	30.03	0	4.705	4.857	-0.152
501.1	54.401	-0.733	-0.763	0	30	0	4.706	4.858	-0.152
501.2	54.389	-0.733	-0.473	0	29.99	0	4.707	4.858	-0.152
501.3	54.382	-0.74	-1.006	0	30.02	0	4.708	4.859	-0.152
501.4	54.37	-0.768	-0.731	0	29.77	0	4.709	4.86	-0.152
501.5	54.364	-0.753	-0.215	0	29.21	0	4.709	4.861	-0.152
501.6	54.351	-0.735	-0.643	0	28.99	0	4.71	4.862	-0.152
501.7	54.345	-0.735	-1.416	0	28.51	0	4.711	4.862	-0.152
501.8	54.326	-0.745	-0.59	0	27.8	0	4.712	4.863	-0.152
501.9	54.32	-0.75	-0.675	0	27.68	0	4.712	4.864	-0.152
502	54.308	-0.75	-0.833	0	27.7	0	4.713	4.865	-0.152
502.1	54.295	-0.743	-0.614	0	27.67	0	4.714	4.866	-0.152
502.2	54.283	-0.75	-0.929	0	28.34	0	4.715	4.866	-0.152
502.3	54.271	-0.75	-1.119	0	29.08	0	4.716	4.867	-0.152
502.4	54.264	-0.753	-0.512	0	29.13	0	4.716	4.868	-0.152
502.5	54.252	-0.743	-0.72	0	29.16	0	4.717	4.869	-0.152

502.6	54.233	-0.743	-0.558	0	29.17	0	4.718	4.87	-0.152
502.7	54.233	-0.743	-0.752	0	29.12	0	4.719	4.87	-0.152
502.8	54.221	-0.743	-0.399	0	29.95	0	4.72	4.871	-0.152
502.9	54.208	-0.73	-1.215	0	31.04	0	4.721	4.872	-0.152
503	54.202	-0.73	-1.024	0	31.95	0	4.721	4.873	-0.152
503.1	54.196	-0.713	-0.618	0	33.13	0	4.722	4.874	-0.152
503.2	54.19	-0.713	-0.59	0	33.08	0	4.723	4.875	-0.152
503.3	54.19	-0.733	-1.137	0	33.41	0	4.724	4.876	-0.152
503.4	54.184	-0.73	-0.275	0	33.85	0	4.725	4.877	-0.152
503.5	54.184	-0.73	-0.706	0	33.98	0	4.726	4.878	-0.152
503.6	54.177	-0.745	-0.646	0	34.58	0	4.727	4.879	-0.152
503.7	54.177	-0.743	-0.427	0	34.7	0	4.728	4.88	-0.152
503.8	54.177	-0.743	-0.576	0	35.34	0	4.729	4.881	-0.152
503.9	54.171	-0.743	-0.872	0	35.31	0	4.73	4.882	-0.152
504	54.171	-0.75	-0.819	0	35.35	0	4.731	4.882	-0.152
504.1	54.171	-0.75	-0.117	0	35.22	0	4.732	4.883	-0.152
504.2	54.171	-0.74	-1.063	0	34.55	0	4.733	4.884	-0.152
504.3	54.171	-0.75	-0.738	0	34.55	0	4.734	4.885	-0.152
504.4	54.165	-0.75	0.095	0	34.53	0	4.735	4.886	-0.152
504.5	54.165	-0.73	-0.858	0	34.57	0	4.736	4.887	-0.152
504.6	54.165	-0.715	-0.749	0	34.58	0	4.737	4.888	-0.152
504.7	54.165	-0.715	-1.229	0	34.59	0	4.738	4.889	-0.152
504.8	54.165	-0.728	-0.646	0	34.53	0	4.739	4.89	-0.152
504.9	54.152	-0.723	-0.159	0	34.6	0	4.74	4.891	-0.152
505	54.159	-0.723	-0.562	0	34.59	0	4.741	4.892	-0.152
505.1	54.159	-0.715	-1.162	0	34.51	0	4.742	4.893	-0.152
505.2	54.152	-0.713	-0.763	0	33.82	0	4.742	4.894	-0.152
505.3	54.146	-0.713	-0.604	0	33.85	0	4.743	4.895	-0.152
505.4	54.146	-0.75	-0.498	0	33.86	0	4.744	4.896	-0.152
505.5	54.146	-0.755	-0.59	0	33.83	0	4.745	4.897	-0.152
505.6	54.14	-0.755	0.014	0	33.85	0	4.746	4.898	-0.152
505.7	54.134	-0.72	-0.886	0	33.85	0	4.747	4.899	-0.152
505.8	54.134	-0.72	-0.844	0	33.84	0	4.748	4.9	-0.152
505.9	54.134	-0.725	-0.865	0	33.83	0	4.749	4.901	-0.152
506	54.128	-0.75	-0.004	0	33.88	0	4.75	4.902	-0.152
506.1	54.121	-0.755	-0.102	0	33.82	0	4.751	4.902	-0.152
506.2	54.121	-0.755	-0.261	0	33.85	0	4.752	4.903	-0.152
506.3	54.121	-0.723	-1.063	0	33.82	0	4.753	4.904	-0.152
506.4	54.115	-0.753	-1.561	0	33.83	0	4.754	4.905	-0.152
506.5	54.115	-0.753	-0.187	0	33.84	0	4.755	4.906	-0.152
506.6	54.109	-0.745	-0.173	0	33.84	0	4.756	4.907	-0.152
506.7	54.109	-0.735	-0.985	0	33.81	0	4.757	4.908	-0.152
506.8	54.103	-0.735	-1.225	0	33.88	0	4.758	4.909	-0.152
506.9	54.103	-0.725	-0.516	0	33.84	0	4.758	4.91	-0.152
507	54.097	-0.73	-1.091	0	33.81	0	4.759	4.911	-0.152
507.1	54.097	-0.73	-0.646	0	33.85	0	4.76	4.912	-0.152
507.2	54.09	-0.753	-0.36	0	33.8	0	4.761	4.913	-0.152

507.3	54.09	-0.745	-0.275	0	33.82	0	4.762	4.914	-0.152
507.4	54.084	-0.725	-0.346	0	33.84	0	4.763	4.915	-0.152
507.5	54.078	-0.723	-1.374	0	33.81	0	4.764	4.916	-0.152
507.6	54.078	-0.733	-1.077	0	33.82	0	4.765	4.917	-0.152
507.7	54.078	-0.733	-0.293	0	33.81	0	4.766	4.918	-0.152
507.8	54.072	-0.715	-0.321	0	33.82	0	4.767	4.918	-0.152
507.9	54.072	-0.725	-0.929	0	33.83	0	4.768	4.919	-0.152
508	54.066	-0.725	-0.975	0	33.8	0	4.769	4.92	-0.152
508.1	54.066	-0.748	-0.102	0	33.84	0	4.77	4.921	-0.152
508.2	54.066	-0.735	-0.604	0	33.81	0	4.771	4.922	-0.152
508.3	54.059	-0.735	-0.763	0	33.84	0	4.772	4.923	-0.152
508.4	54.059	-0.723	-0.946	0	33.79	0	4.773	4.924	-0.152
508.5	54.059	-0.738	-0.59	0	33.82	0	4.773	4.925	-0.152
508.6	54.053	-0.738	-0.692	0	33.81	0	4.774	4.926	-0.152
508.7	54.053	-0.738	-0.117	0	33.83	0	4.775	4.927	-0.152
508.8	54.047	-0.738	-0.989	0	33.81	0	4.776	4.928	-0.152
508.9	54.047	-0.76	-1.056	0	33.78	0	4.777	4.929	-0.152
509	54.041	-0.773	0.339	0	33.86	0	4.778	4.93	-0.152
509.1	54.041	-0.735	-0.141	0	33.8	0	4.779	4.931	-0.152
509.2	54.041	-0.735	-2.221	0	33.84	0	4.78	4.932	-0.152
509.3	54.034	-0.735	-0.749	0	33.79	0	4.781	4.933	-0.152
509.4	54.034	-0.728	-0.441	0	33.82	0	4.782	4.933	-0.152
509.5	54.034	-0.728	-0.809	0	33.81	0	4.783	4.934	-0.152
509.6	54.028	-0.743	-1.077	0	33.77	0	4.784	4.935	-0.152
509.7	54.022	-0.798	-0.558	0	33.82	0	4.785	4.936	-0.152
509.8	54.022	-0.798	0.784	0	33.76	0	4.786	4.937	-0.152
509.9	54.022	-0.798	0.109	0	33.81	0	4.787	4.938	-0.152
510	54.022	-0.75	-0.314	0	33.82	0	4.788	4.939	-0.152
510.1	54.016	-0.75	-1.85	0	33.77	0	4.789	4.94	-0.152
510.2	54.01	-0.715	-1.388	0	33.8	0	4.789	4.941	-0.152
510.3	54.01	-0.72	-0.819	0	33.78	0	4.79	4.942	-0.152
510.4	54.01	-0.72	-0.569	0	33.76	0	4.791	4.943	-0.152
510.5	54.003	-0.713	-0.576	0	33.75	0	4.792	4.944	-0.152
510.6	54.003	-0.738	-1.25	0	33.78	0	4.793	4.945	-0.152
510.7	54.003	-0.738	-0.127	0	33.77	0	4.794	4.946	-0.152
510.8	53.997	-0.743	-0.413	0	33.79	0	4.795	4.947	-0.152
510.9	53.997	-0.738	-1.052	0	33.77	0	4.796	4.948	-0.152
511	53.991	-0.738	-0.763	0	33.79	0	4.797	4.948	-0.152
511.1	53.991	-0.72	-0.89	0	33.76	0	4.798	4.949	-0.152
511.2	53.991	-0.71	-0.735	0	33.72	0	4.799	4.95	-0.152
511.3	53.985	-0.71	-1.031	0	33.78	0	4.8	4.951	-0.152
511.4	53.979	-0.735	-0.604	0	33.73	0	4.801	4.952	-0.152
511.5	53.979	-0.735	-0.145	0	33.77	0	4.802	4.953	-0.152
511.6	53.979	-0.735	-0.763	0	33.71	0	4.803	4.954	-0.152
511.7	53.979	-0.748	-0.957	0	33.78	0	4.804	4.955	-0.152
511.8	53.979	-0.748	-0.473	0	33.78	0	4.804	4.956	-0.152
511.9	53.972	-0.743	-0.622	0	33.74	0	4.805	4.957	-0.152

512	53.972	-0.748	-0.735	0	33.81	0	4.806	4.958	-0.152
512.1	53.966	-0.738	-0.441	0	33.74	0	4.807	4.959	-0.152
512.2	53.966	-0.738	-0.78	0	33.79	0	4.808	4.96	-0.152
512.3	53.96	-0.738	-0.872	0	34.44	0	4.809	4.961	-0.152
512.4	53.96	-0.743	-0.72	0	34.47	0	4.81	4.962	-0.152
512.5	53.96	-0.743	-0.191	0	35.24	0	4.811	4.963	-0.152
512.6	53.96	-0.753	-1.151	0	35.61	0	4.812	4.964	-0.152
512.7	53.954	-0.738	-0.526	0	36.19	0	4.813	4.965	-0.152
512.8	53.96	-0.738	-0.763	0	36.18	0	4.814	4.966	-0.152
512.9	53.96	-0.74	-0.749	0	36.19	0	4.815	4.967	-0.152
513	53.96	-0.753	-0.346	0	36.2	0	4.816	4.968	-0.152
513.1	53.96	-0.753	-0.36	0	36.2	0	4.817	4.969	-0.152
513.2	53.96	-0.738	-0.59	0	36.98	0	4.818	4.97	-0.152
513.3	53.96	-0.745	-1.049	0	37.06	0	4.819	4.971	-0.152
513.4	53.966	-0.755	-0.576	0	37.03	0	4.82	4.972	-0.152
513.5	53.972	-0.758	-0.201	0	37.04	0	4.821	4.973	-0.152
513.6	53.972	-0.755	-0.516	0	37.01	0	4.822	4.974	-0.152
513.7	53.972	-0.755	-0.848	0	37.05	0	4.823	4.975	-0.152
513.8	53.979	-0.73	-0.562	0	37.04	0	4.824	4.976	-0.152
513.9	53.985	-0.73	-0.915	0	37.05	0	4.825	4.977	-0.152
514	53.979	-0.73	-0.749	0	37.05	0	4.826	4.978	-0.152
514.1	53.985	-0.743	-0.622	0	37.04	0	4.827	4.979	-0.152
514.2	53.991	-0.753	-0.59	0	37.06	0	4.828	4.98	-0.152
514.3	53.991	-0.753	-0.604	0	37.04	0	4.829	4.981	-0.152
514.4	53.991	-0.73	-0.233	0	37.07	0	4.83	4.982	-0.152
514.5	53.991	-0.743	-1.402	0	37.03	0	4.832	4.983	-0.152
514.6	53.997	-0.743	-0.275	0	37.38	0	4.833	4.984	-0.152
514.7	54.003	-0.753	-0.516	0	37.8	0	4.834	4.985	-0.152
514.8	53.997	-0.753	-0.809	0	38.62	0	4.835	4.986	-0.152
514.9	54.003	-0.748	-0.833	0	38.63	0	4.836	4.987	-0.152
515	54.016	-0.733	-0.749	0	38.56	0	4.837	4.988	-0.152
515.1	54.016	-0.738	-0.72	0	38.62	0	4.838	4.989	-0.152
515.2	54.022	-0.738	-0.872	0	38.6	0	4.839	4.991	-0.152
515.3	54.022	-0.735	-0.763	0	38.62	0	4.84	4.992	-0.152
515.4	54.028	-0.723	-0.6	0	38.61	0	4.841	4.993	-0.152
515.5	54.034	-0.723	-1.077	0	38.59	0	4.842	4.994	-0.152
515.6	54.034	-0.73	-0.749	0	38.62	0	4.843	4.995	-0.152
515.7	54.041	-0.74	-0.604	0	38.61	0	4.844	4.996	-0.152
515.8	54.047	-0.74	-0.505	0	38.63	0	4.845	4.997	-0.152
515.9	54.053	-0.738	-0.632	0	38.61	0	4.846	4.998	-0.152
516	54.059	-0.753	-0.749	0	38.65	0	4.848	4.999	-0.152
516.1	54.059	-0.753	-0.427	0	38.7	0	4.849	5	-0.152
516.2	54.066	-0.76	-0.102	0	38.79	0	4.85	5.001	-0.152
516.3	54.072	-0.73	-0.47	0	38.76	0	4.851	5.002	-0.152
516.4	54.078	-0.733	-1.501	0	38.84	0	4.852	5.003	-0.152
516.5	54.084	-0.75	-1.448	0	38.79	0	4.853	5.004	-0.152
516.6	54.084	-0.75	-0.004	0	38.81	0	4.854	5.006	-0.152

516.7	54.09	-0.75	-0.562	0	38.8	0	4.855	5.007	-0.152
516.8	54.103	-0.745	-1.063	0	38.85	0	4.856	5.008	-0.152
516.9	54.109	-0.748	-0.388	0	38.56	0	4.857	5.009	-0.152
517	54.109	-0.743	-0.431	0	39.21	0	4.858	5.01	-0.152
517.1	54.121	-0.745	-0.809	0	39.32	0	4.859	5.011	-0.152
517.2	54.121	-0.758	-0.731	0	39.36	0	4.861	5.012	-0.152
517.3	54.128	-0.758	-0.057	0	39.35	0	4.862	5.013	-0.152
517.4	54.134	-0.738	-0.795	0	39.9	0	4.863	5.014	-0.152
517.5	54.134	-0.745	-1.243	0	40.51	0	4.864	5.015	-0.152
517.6	54.146	-0.745	-0.59	0	42.41	0	4.865	5.017	-0.152
517.7	54.159	-0.745	-0.576	0	43.05	0	4.866	5.018	-0.152
517.8	54.165	-0.745	-0.89	0	43.9	0	4.867	5.019	-0.152
517.9	54.177	-0.755	-0.413	0	44.04	0	4.869	5.02	-0.152
518	54.19	-0.75	-0.639	0	44.27	0	4.87	5.021	-0.152
518.1	54.202	-0.76	-0.915	0	45.5	0	4.871	5.023	-0.152
518.2	54.221	-0.76	-0.547	0	47.37	0	4.872	5.024	-0.152
518.3	54.233	-0.733	-0.219	0	49.09	0	4.874	5.025	-0.152
518.4	54.252	-0.74	-1.402	0	49.71	0	4.875	5.027	-0.152
518.5	54.271	-0.74	-0.427	0	49.66	0	4.877	5.028	-0.152
518.6	54.295	-0.758	-0.427	0	49.86	0	4.878	5.03	-0.152
518.7	54.314	-0.763	-0.565	0	50.48	0	4.879	5.031	-0.152
518.8	54.339	-0.763	-0.304	0	51.37	0	4.881	5.032	-0.152
518.9	54.358	-0.743	-1.642	0	53.51	0	4.882	5.034	-0.152
519	54.382	-0.743	-0.346	0	54.37	0	4.884	5.035	-0.152
519.1	54.413	-0.743	-0.261	0	54.92	0	4.885	5.037	-0.152
519.2	54.438	-0.718	-0.749	0	57.11	0	4.887	5.038	-0.152
519.3	54.469	-0.733	-1.282	0	58.5	0	4.889	5.04	-0.152
519.4	54.5	-0.735	-0.473	0	59.02	0	4.89	5.042	-0.152
519.5	54.538	-0.72	-0.544	0	59.16	0	4.892	5.043	-0.152
519.6	54.569	-0.71	-0.763	0	60.05	0	4.893	5.045	-0.152
519.7	54.6	-0.71	-0.735	0	59.89	0	4.895	5.047	-0.152
519.8	54.643	-0.733	-0.59	0	59.98	0	4.897	5.048	-0.152
519.9	54.674	-0.733	-0.618	0	59.97	0	4.898	5.05	-0.152
520	54.706	-0.733	-0.632	0	60.06	0	4.9	5.052	-0.152
520.1	54.743	-0.76	-0.805	0	59.44	0	4.902	5.053	-0.152
520.2	54.774	-0.745	-0.102	0	57.96	0	4.903	5.055	-0.152
520.3	54.805	-0.745	-0.961	0	55.46	0	4.905	5.057	-0.152
520.4	54.83	-0.745	-0.999	0	51.09	0	4.906	5.058	-0.152
520.5	54.855	-0.75	-0.413	0	47.17	0	4.908	5.059	-0.152
520.6	54.867	-0.75	-0.833	0	45.06	0	4.909	5.06	-0.152
520.7	54.88	-0.735	-0.427	0	43.87	0	4.91	5.062	-0.152
520.8	54.892	-0.735	-0.915	0	43.48	0	4.911	5.063	-0.152
520.9	54.898	-0.748	-0.59	0	42.63	0	4.913	5.064	-0.152
521	54.911	-0.74	-0.512	0	41.14	0	4.914	5.065	-0.152
521.1	54.917	-0.733	-0.72	0	39.34	0	4.915	5.066	-0.152
521.2	54.923	-0.733	-1.077	0	38.41	0	4.916	5.067	-0.152
521.3	54.923	-0.738	-0.413	0	38.45	0	4.917	5.068	-0.152

521.4	54.923	-0.75	-0.59	0	38.43	0	4.918	5.07	-0.152
521.5	54.923	-0.75	-0.59	0	38.44	0	4.919	5.071	-0.152
521.6	54.929	-0.75	-0.749	0	39.33	0	4.92	5.072	-0.152
521.7	54.935	-0.738	-0.678	0	39.65	0	4.921	5.073	-0.152
521.8	54.935	-0.738	-1.105	0	40.91	0	4.922	5.074	-0.152
521.9	54.942	-0.743	-0.547	0	41.85	0	4.924	5.075	-0.152
522	54.948	-0.733	-0.399	0	43.85	0	4.925	5.076	-0.152
522.1	54.954	-0.733	-0.901	0	45.58	0	4.926	5.078	-0.152
522.2	54.973	-0.735	-1.148	0	47.23	0	4.927	5.079	-0.152
522.3	54.985	-0.75	-0.413	0	48.2	0	4.929	5.08	-0.152
522.4	55.004	-0.745	-0.65	0	48.42	0	4.93	5.082	-0.152
522.5	55.016	-0.74	-0.427	0	48.32	0	4.931	5.083	-0.152
522.6	55.035	-0.733	-1.229	0	47.35	0	4.933	5.084	-0.152
522.7	55.047	-0.733	-0.547	0	45.97	0	4.934	5.086	-0.152
522.8	55.066	-0.745	-0.901	0	45.13	0	4.935	5.087	-0.152
522.9	55.072	-0.743	-0.427	0	44.75	0	4.936	5.088	-0.152
523	55.085	-0.743	-0.59	0	44.79	0	4.938	5.089	-0.152
523.1	55.097	-0.76	-1.105	0	44.78	0	4.939	5.09	-0.152
523.2	55.109	-0.783	-0.678	0	44.79	0	4.94	5.092	-0.152
523.3	55.116	-0.783	0.41	0	44.78	0	4.941	5.093	-0.152
523.4	55.128	-0.723	-0.901	0	44.82	0	4.943	5.094	-0.152
523.5	55.14	-0.738	-2.024	0	44.84	0	4.944	5.095	-0.152
523.6	55.153	-0.738	-0.413	0	44.86	0	4.945	5.097	-0.152
523.7	55.165	-0.745	0.014	0	44.83	0	4.946	5.098	-0.152
523.8	55.172	-0.745	-0.901	0	44.86	0	4.948	5.099	-0.152
523.9	55.172	-0.733	-0.946	0	44.58	0	4.949	5.1	-0.152
524	55.196	-0.735	-1.388	0	44.55	0	4.95	5.102	-0.152
524.1	55.209	-0.733	-0.283	0	44.64	0	4.951	5.103	-0.152
524.2	55.221	-0.733	-0.749	0	44.54	0	4.953	5.104	-0.152
524.3	55.227	-0.748	-0.735	0	44.58	0	4.954	5.105	-0.152
524.4	55.24	-0.738	-0.413	0	44.56	0	4.955	5.107	-0.152
524.5	55.252	-0.738	-0.78	0	44.63	0	4.956	5.108	-0.152
524.6	55.259	-0.728	-0.915	0	44.62	0	4.958	5.109	-0.152
524.7	55.271	-0.74	-0.735	0	44.74	0	4.959	5.11	-0.152
524.8	55.283	-0.74	-0.233	0	44.62	0	4.96	5.112	-0.152
524.9	55.29	-0.735	-0.498	0	44.72	0	4.961	5.113	-0.152
525	55.302	-0.748	-1.144	0	44.67	0	4.963	5.114	-0.152
525.1	55.314	-0.748	-0.498	0	44.66	0	4.964	5.115	-0.152
525.2	55.327	-0.753	-0.247	0	44.64	0	4.965	5.117	-0.152
525.3	55.333	-0.77	-1.077	0	43.43	0	4.966	5.118	-0.152
525.4	55.346	-0.763	-0.498	0	39.77	0	4.967	5.119	-0.152
525.5	55.346	-0.758	-0.66	0	39.24	0	4.968	5.12	-0.152
525.6	55.346	-0.748	-0.819	0	39.23	0	4.97	5.121	-0.152
525.7	55.352	-0.748	-1.031	0	39.3	0	4.971	5.122	-0.152
525.8	55.352	-0.733	-0.901	0	39.3	0	4.972	5.123	-0.152
525.9	55.358	-0.733	-0.862	0	39.23	0	4.973	5.124	-0.152
526	55.358	-0.735	-0.901	0	39.59	0	4.974	5.125	-0.152

526.1	55.364	-0.748	-0.66	0	40.35	0	4.975	5.127	-0.152
526.2	55.364	-0.743	-0.459	0	40.51	0	4.976	5.128	-0.152
526.3	55.364	-0.743	-0.399	0	41.19	0	4.977	5.129	-0.152
526.4	55.377	-0.753	-0.985	0	41.11	0	4.978	5.13	-0.152
526.5	55.383	-0.748	-0.735	0	41.63	0	4.98	5.131	-0.152
526.6	55.383	-0.748	-0.399	0	42.08	0	4.981	5.132	-0.152
526.7	55.389	-0.735	-0.901	0	42.09	0	4.982	5.133	-0.152
526.8	55.401	-0.735	-0.735	0	42.04	0	4.983	5.135	-0.152
526.9	55.401	-0.733	-0.809	0	42.09	0	4.984	5.136	-0.152
527	55.408	-0.735	-0.618	0	42.08	0	4.985	5.137	-0.152
527.1	55.414	-0.725	-0.491	0	42.1	0	4.987	5.138	-0.152
527.2	55.426	-0.725	-0.72	0	42.11	0	4.988	5.139	-0.152
527.3	55.433	-0.738	-1.091	0	42.14	0	4.989	5.14	-0.152
527.4	55.439	-0.73	-0.279	0	42.1	0	4.99	5.142	-0.152
527.5	55.445	-0.73	-1.049	0	42.14	0	4.991	5.143	-0.152
527.6	55.451	-0.74	-0.78	0	42.11	0	4.992	5.144	-0.152
527.7	55.457	-0.733	-0.484	0	42.17	0	4.994	5.145	-0.152
527.8	55.464	-0.733	-0.823	0	41.89	0	4.995	5.146	-0.152
527.9	55.476	-0.728	-1.314	0	41.99	0	4.996	5.147	-0.152
528	55.476	-0.743	-0.886	0	41.92	0	4.997	5.149	-0.152
528.1	55.482	-0.743	-0.074	0	41.94	0	4.998	5.15	-0.152
528.2	55.488	-0.74	-0.971	0	41.94	0	4.999	5.151	-0.152
528.3	55.495	-0.758	-0.805	0	41.91	0	5.001	5.152	-0.152
528.4	55.495	-0.763	-0.233	0	41.93	0	5.002	5.153	-0.152
528.5	55.501	-0.75	-0.191	0	41.96	0	5.003	5.154	-0.152
528.6	55.513	-0.745	-0.72	0	41.95	0	5.004	5.156	-0.152
528.7	55.513	-0.745	-1.144	0	41.95	0	5.005	5.157	-0.152
528.8	55.52	-0.74	-0.374	0	41.96	0	5.006	5.158	-0.152
528.9	55.526	-0.743	-0.946	0	41.95	0	5.008	5.159	-0.152
529	55.538	-0.738	-0.445	0	41.97	0	5.009	5.16	-0.152
529.1	55.544	-0.733	-0.604	0	41.98	0	5.01	5.161	-0.152
529.2	55.544	-0.728	-0.72	0	41.98	0	5.011	5.163	-0.152
529.3	55.551	-0.725	-0.562	0	41.99	0	5.012	5.164	-0.152
529.4	55.557	-0.733	-0.802	0	41.98	0	5.013	5.165	-0.152
529.5	55.569	-0.738	-0.678	0	42.01	0	5.015	5.166	-0.152
529.6	55.575	-0.738	-0.932	0	42.05	0	5.016	5.167	-0.152
529.7	55.575	-0.75	-0.752	0	42.04	0	5.017	5.168	-0.152
529.8	55.588	-0.75	-0.562	0	42	0	5.018	5.17	-0.152
529.9	55.594	-0.74	-0.547	0	42.07	0	5.019	5.171	-0.152
530	55.594	-0.73	-1.497	0	42.01	0	5.02	5.172	-0.152
530.1	55.6	-0.743	-0.932	0	42.01	0	5.022	5.173	-0.152
530.2	55.607	-0.743	-0.233	0	42.01	0	5.023	5.174	-0.152
530.3	55.613	-0.738	-0.632	0	42.01	0	5.024	5.175	-0.152
530.4	55.619	-0.74	-0.957	0	42.04	0	5.025	5.177	-0.152
530.5	55.625	-0.74	-0.364	0	42.04	0	5.026	5.178	-0.152
530.6	55.631	-0.738	-0.47	0	42.03	0	5.027	5.179	-0.152
530.7	55.638	-0.743	-1.031	0	42.04	0	5.029	5.18	-0.152

530.8	55.644	-0.743	-0.06	0	42.08	0	5.03	5.181	-0.152
530.9	55.65	-0.738	-1.049	0	42.04	0	5.031	5.182	-0.152
531	55.656	-0.748	-0.791	0	42.08	0	5.032	5.184	-0.152
531.1	55.662	-0.738	-0.028	0	42.06	0	5.033	5.185	-0.152
531.2	55.669	-0.738	-0.72	0	42.08	0	5.034	5.186	-0.152
531.3	55.675	-0.753	-1.374	0	42.1	0	5.036	5.187	-0.152
531.4	55.681	-0.733	-0.219	0	42.07	0	5.037	5.188	-0.152
531.5	55.687	-0.718	-0.851	0	42.08	0	5.038	5.189	-0.152
531.6	55.7	-0.735	-1.54	0	42.12	0	5.039	5.191	-0.152
531.7	55.7	-0.735	-0.233	0	42.28	0	5.04	5.192	-0.152
531.8	55.706	-0.738	-0.706	0	42.27	0	5.041	5.193	-0.152
531.9	55.718	-0.758	-0.851	0	42.3	0	5.043	5.194	-0.152
532	55.718	-0.758	-0.385	0	42.27	0	5.044	5.195	-0.152
532.1	55.725	-0.733	-0.445	0	42.28	0	5.045	5.197	-0.152
532.2	55.731	-0.738	-1.67	0	42.29	0	5.046	5.198	-0.152
532.3	55.737	-0.738	-0.795	0	42.34	0	5.047	5.199	-0.152
532.4	55.743	-0.755	-0.35	0	42.39	0	5.049	5.2	-0.152
532.5	55.749	-0.748	-0.431	0	42.36	0	5.05	5.201	-0.152
532.6	55.756	-0.743	-1.225	0	42.33	0	5.051	5.202	-0.152
532.7	55.756	-0.748	-0.678	0	42.34	0	5.052	5.204	-0.152
532.8	55.768	-0.748	-0.562	0	42.36	0	5.053	5.205	-0.152
532.9	55.774	-0.755	-0.706	0	42.38	0	5.054	5.206	-0.152
533	55.774	-0.748	-0.233	0	42.31	0	5.056	5.207	-0.152
533.1	55.78	-0.74	-0.872	0	42.19	0	5.057	5.208	-0.152
533.2	55.787	-0.74	-0.516	0	42.18	0	5.058	5.209	-0.152
533.3	55.793	-0.755	-0.788	0	42.16	0	5.059	5.211	-0.152
533.4	55.799	-0.773	-0.533	0	42.18	0	5.06	5.212	-0.152
533.5	55.805	-0.773	-0.29	0	42.19	0	5.061	5.213	-0.152
533.6	55.812	-0.765	0.268	0	42.16	0	5.063	5.214	-0.152
533.7	55.818	-0.743	-0.706	0	42.16	0	5.064	5.215	-0.152
533.8	55.824	-0.743	-1.374	0	42.21	0	5.065	5.216	-0.152
533.9	55.83	-0.748	-0.858	0	42.22	0	5.066	5.218	-0.152
534	55.83	-0.735	0.109	0	42.2	0	5.067	5.219	-0.152
534.1	55.836	-0.735	-1.36	0	42.19	0	5.068	5.22	-0.152
534.2	55.849	-0.733	-0.791	0	42.22	0	5.07	5.221	-0.152
534.3	55.849	-0.73	-0.385	0	41.89	0	5.071	5.222	-0.152
534.4	55.855	-0.743	-1.031	0	41.9	0	5.072	5.224	-0.152
534.5	55.861	-0.755	-0.47	0	41.88	0	5.073	5.225	-0.152
534.6	55.867	-0.76	-0.427	0	41.92	0	5.074	5.226	-0.152
534.7	55.874	-0.765	-0.318	0	41.91	0	5.075	5.227	-0.152
534.8	55.88	-0.743	-0.562	0	41.9	0	5.077	5.228	-0.152
534.9	55.88	-0.718	-0.385	0	41.96	0	5.078	5.229	-0.152
535	55.886	-0.718	-1.713	0	41.98	0	5.079	5.23	-0.152
535.1	55.892	-0.73	-0.72	0	41.92	0	5.08	5.232	-0.152
535.2	55.899	-0.74	-0.431	0	41.94	0	5.081	5.233	-0.152
535.3	55.899	-0.74	-0.706	0	41.97	0	5.082	5.234	-0.152
535.4	55.905	-0.755	-0.516	0	41.9	0	5.084	5.235	-0.152

535.5	55.911	-0.745	-0.547	0	41.95	0	5.085	5.236	-0.152
535.6	55.917	-0.745	-0.071	0	41.83	0	5.086	5.237	-0.152
535.7	55.923	-0.748	-1.197	0	40.91	0	5.087	5.239	-0.152
535.8	55.923	-0.748	-0.29	0	40.45	0	5.088	5.24	-0.152
535.9	55.93	-0.758	-0.335	0	40.16	0	5.089	5.241	-0.152
536	55.93	-0.758	-0.371	0	40.19	0	5.09	5.242	-0.152
536.1	55.936	-0.75	-0.735	0	40.13	0	5.092	5.243	-0.152
536.2	55.936	-0.735	-0.646	0	40.18	0	5.093	5.244	-0.152
536.3	55.942	-0.738	-1.36	0	40.16	0	5.094	5.245	-0.152
536.4	55.942	-0.738	-0.59	0	40.15	0	5.095	5.246	-0.152
536.5	55.948	-0.733	-0.456	0	40.16	0	5.096	5.248	-0.152
536.6	55.948	-0.733	-1.116	0	40.15	0	5.097	5.249	-0.152
536.7	55.948	-0.73	-0.731	0	40.18	0	5.098	5.25	-0.152
536.8	55.954	-0.73	-0.533	0	40.18	0	5.099	5.251	-0.152
536.9	55.954	-0.743	-0.706	0	40.18	0	5.1	5.252	-0.152
537	55.961	-0.735	-0.487	0	40.21	0	5.102	5.253	-0.152
537.1	55.961	-0.735	-0.929	0	40.21	0	5.103	5.254	-0.152
537.2	55.961	-0.74	-1.003	0	40.18	0	5.104	5.255	-0.152
537.3	55.967	-0.735	-0.498	0	40.24	0	5.105	5.256	-0.152
537.4	55.967	-0.738	-0.946	0	40.15	0	5.106	5.258	-0.152
537.5	55.973	-0.743	-0.565	0	40.17	0	5.107	5.259	-0.152
537.6	55.973	-0.745	-0.901	0	39.11	0	5.108	5.26	-0.152
537.7	55.973	-0.748	-0.59	0	39.13	0	5.109	5.261	-0.152
537.8	55.973	-0.745	-0.576	0	39.14	0	5.11	5.262	-0.152
537.9	55.973	-0.735	-0.692	0	39.18	0	5.112	5.263	-0.152
538	55.979	-0.735	-0.752	0	39.14	0	5.113	5.264	-0.152
538.1	55.979	-0.733	-0.844	0	39.15	0	5.114	5.265	-0.152
538.2	55.979	-0.733	-0.646	0	39.12	0	5.115	5.266	-0.152
538.3	55.979	-0.735	-0.872	0	39.12	0	5.116	5.267	-0.152
538.4	55.979	-0.73	-0.3	0	39.1	0	5.117	5.268	-0.152
538.5	55.986	-0.725	-0.735	0	39.11	0	5.118	5.27	-0.152
538.6	55.986	-0.725	-0.901	0	39.13	0	5.119	5.271	-0.152
538.7	55.986	-0.738	-0.463	0	39.14	0	5.12	5.272	-0.152
538.8	55.986	-0.738	-0.328	0	39.14	0	5.121	5.273	-0.152
538.9	55.986	-0.738	-1.017	0	39.14	0	5.122	5.274	-0.152
539	55.986	-0.735	-0.653	0	38.97	0	5.123	5.275	-0.152
539.1	55.986	-0.738	-0.562	0	38.41	0	5.125	5.276	-0.152
539.2	55.986	-0.738	-0.646	0	37.64	0	5.126	5.277	-0.152
539.3	55.986	-0.728	-0.607	0	36.95	0	5.127	5.278	-0.152
539.4	55.979	-0.733	-0.777	0	36.64	0	5.128	5.279	-0.152
539.5	55.979	-0.738	-1.017	0	35.96	0	5.129	5.28	-0.152
539.6	55.973	-0.738	-0.533	0	36	0	5.13	5.281	-0.152
539.7	55.967	-0.73	-0.858	0	35.82	0	5.131	5.282	-0.152
539.8	55.967	-0.73	-0.706	0	35.26	0	5.132	5.283	-0.152
539.9	55.961	-0.723	-0.777	0	35.25	0	5.133	5.284	-0.152
540	55.961	-0.725	-0.872	0	35.27	0	5.134	5.285	-0.152
540.1	55.954	-0.725	-0.763	0	35.27	0	5.135	5.286	-0.152

540.2	55.948	-0.728	-0.371	0	35.25	0	5.136	5.287	-0.152
540.3	55.942	-0.735	-0.738	0	34.66	0	5.136	5.288	-0.152
540.4	55.942	-0.75	-1.127	0	34.69	0	5.137	5.289	-0.152
540.5	55.936	-0.753	-0.205	0	34.67	0	5.138	5.29	-0.152
540.6	55.93	-0.738	-0.547	0	34.13	0	5.139	5.291	-0.152
540.7	55.917	-0.738	-1.017	0	33.84	0	5.14	5.292	-0.152
540.8	55.911	-0.753	-1.519	0	33.1	0	5.141	5.293	-0.152
540.9	55.905	-0.755	-0.417	0	33.14	0	5.142	5.294	-0.152
541	55.892	-0.733	0.124	0	33.14	0	5.143	5.295	-0.152
541.1	55.892	-0.728	-1.003	0	33.9	0	5.144	5.296	-0.152
541.2	55.88	-0.738	-1.388	0	34.18	0	5.145	5.296	-0.152
541.3	55.874	-0.745	-0.417	0	35.06	0	5.146	5.297	-0.152
541.4	55.874	-0.763	-0.533	0	36.23	0	5.147	5.298	-0.152
541.5	55.867	-0.763	-0.445	0	36.14	0	5.148	5.299	-0.152
541.6	55.861	-0.76	-0.576	0	36.17	0	5.149	5.3	-0.152
541.7	55.861	-0.76	-1.017	0	36.14	0	5.15	5.301	-0.152
541.8	55.855	-0.76	-0.501	0	36.15	0	5.151	5.302	-0.152
541.9	55.855	-0.75	-0.943	0	36.14	0	5.152	5.303	-0.152
542	55.849	-0.743	-0.692	0	36.15	0	5.153	5.304	-0.152
542.1	55.849	-0.73	-0.371	0	36.17	0	5.154	5.305	-0.152
542.2	55.843	-0.73	-0.777	0	36.72	0	5.155	5.307	-0.152
542.3	55.843	-0.733	-0.929	0	37.54	0	5.156	5.308	-0.152
542.4	55.843	-0.725	-0.629	0	38.39	0	5.157	5.309	-0.152
542.5	55.843	-0.725	-0.929	0	38.74	0	5.158	5.31	-0.152
542.6	55.843	-0.74	-0.858	0	39.27	0	5.159	5.311	-0.152
542.7	55.843	-0.73	-0.544	0	39.59	0	5.16	5.312	-0.152
542.8	55.843	-0.73	-0.918	0	40.42	0	5.161	5.313	-0.152
542.9	55.843	-0.745	-0.858	0	40.36	0	5.163	5.314	-0.152
543	55.849	-0.738	-0.042	0	40.36	0	5.164	5.315	-0.152
543.1	55.855	-0.733	-0.844	0	40.35	0	5.165	5.316	-0.152
543.2	55.855	-0.728	-1.105	0	40.34	0	5.166	5.317	-0.152
543.3	55.855	-0.723	-0.643	0	40.35	0	5.167	5.319	-0.152
543.4	55.867	-0.735	-0.72	0	40.13	0	5.168	5.32	-0.152
543.5	55.867	-0.735	-0.858	0	38.81	0	5.169	5.321	-0.152
543.6	55.867	-0.725	-0.371	0	37.81	0	5.17	5.322	-0.152
543.7	55.867	-0.725	-0.678	0	37.74	0	5.171	5.323	-0.152
543.8	55.867	-0.743	-0.72	0	36.99	0	5.172	5.324	-0.152
543.9	55.867	-0.755	-0.65	0	37.01	0	5.173	5.325	-0.152
544	55.867	-0.755	-0.219	0	36.98	0	5.174	5.326	-0.152
544.1	55.861	-0.743	-1.063	0	36.99	0	5.175	5.327	-0.152
544.2	55.861	-0.735	-0.516	0	36.99	0	5.177	5.328	-0.152
544.3	55.855	-0.735	-0.441	0	36.98	0	5.178	5.329	-0.152
544.4	55.855	-0.703	-1.144	0	36.96	0	5.179	5.33	-0.152
544.5	55.855	-0.733	-1.296	0	37	0	5.18	5.331	-0.152
544.6	55.855	-0.74	-0.335	0	36.99	0	5.181	5.332	-0.152
544.7	55.855	-0.735	-0.29	0	36.98	0	5.182	5.333	-0.152
544.8	55.849	-0.735	-1.017	0	36.97	0	5.183	5.334	-0.152

544.9	55.849	-0.73	-1.042	0	36.95	0	5.184	5.335	-0.152
545	55.843	-0.733	-0.65	0	36.95	0	5.185	5.336	-0.152
545.1	55.843	-0.718	-0.385	0	37	0	5.186	5.337	-0.152
545.2	55.836	-0.725	-0.812	0	36.96	0	5.187	5.338	-0.152
545.3	55.836	-0.74	-1.169	0	36.96	0	5.188	5.339	-0.152
545.4	55.836	-0.75	-0.233	0	36.95	0	5.189	5.34	-0.152
545.5	55.83	-0.75	-0.191	0	36.97	0	5.19	5.341	-0.152
545.6	55.83	-0.735	-1.077	0	36.94	0	5.191	5.342	-0.152
545.7	55.83	-0.728	-1.208	0	36.97	0	5.192	5.343	-0.152
545.8	55.83	-0.728	-0.632	0	36.96	0	5.193	5.344	-0.152
545.9	55.83	-0.723	-0.54	0	36.98	0	5.194	5.346	-0.152
546	55.824	-0.738	-0.886	0	36.94	0	5.195	5.347	-0.152
546.1	55.824	-0.748	-0.427	0	36.95	0	5.196	5.348	-0.152
546.2	55.824	-0.738	-0.106	0	36.94	0	5.197	5.349	-0.152
546.3	55.818	-0.738	-0.692	0	37	0	5.198	5.35	-0.152
546.4	55.812	-0.743	-0.844	0	36.96	0	5.199	5.351	-0.152
546.5	55.812	-0.748	-0.357	0	36.52	0	5.2	5.352	-0.152
546.6	55.812	-0.735	-0.357	0	36.17	0	5.201	5.353	-0.152
546.7	55.805	-0.733	-0.773	0	35.44	0	5.202	5.354	-0.152
546.8	55.799	-0.738	-1.215	0	35.32	0	5.203	5.355	-0.152
546.9	55.793	-0.738	-0.618	0	34.57	0	5.204	5.356	-0.152
547	55.793	-0.743	-0.59	0	34.65	0	5.205	5.357	-0.152
547.1	55.787	-0.738	-0.533	0	34.61	0	5.206	5.358	-0.152
547.2	55.78	-0.735	-0.385	0	34.74	0	5.207	5.358	-0.152
547.3	55.774	-0.735	-1.169	0	34.8	0	5.208	5.359	-0.152
547.4	55.768	-0.723	-0.692	0	34.75	0	5.209	5.36	-0.152
547.5	55.762	-0.73	-0.562	0	34.8	0	5.21	5.361	-0.152
547.6	55.756	-0.73	-0.858	0	34.77	0	5.211	5.362	-0.152
547.7	55.756	-0.728	-0.088	0	35.24	0	5.212	5.363	-0.152
547.8	55.749	-0.728	-1.116	0	36.34	0	5.213	5.364	-0.152
547.9	55.749	-0.738	-0.516	0	36.28	0	5.214	5.365	-0.152
548	55.743	-0.733	-0.6	0	36.34	0	5.215	5.366	-0.152
548.1	55.743	-0.733	-1.028	0	36.26	0	5.216	5.367	-0.152
548.2	55.737	-0.755	-0.717	0	37.56	0	5.217	5.368	-0.152
548.3	55.737	-0.76	-0.371	0	37.85	0	5.218	5.369	-0.152
548.4	55.737	-0.753	-0.385	0	37.89	0	5.219	5.37	-0.152
548.5	55.737	-0.753	-1.003	0	37.86	0	5.22	5.372	-0.152
548.6	55.737	-0.75	-0.629	0	37.57	0	5.221	5.373	-0.152
548.7	55.737	-0.745	-0.692	0	36.89	0	5.222	5.374	-0.152
548.8	55.737	-0.745	-0.872	0	36.26	0	5.223	5.375	-0.152
548.9	55.731	-0.738	-0.692	0	35.25	0	5.224	5.376	-0.152
549	55.731	-0.74	-0.886	0	34.54	0	5.225	5.377	-0.152
549.1	55.718	-0.74	-0.766	0	33.19	0	5.226	5.377	-0.152
549.2	55.718	-0.745	-0.706	0	31.44	0	5.227	5.378	-0.152
549.3	55.706	-0.758	-0.929	0	30.74	0	5.228	5.379	-0.152
549.4	55.694	-0.758	-0.66	0	30.74	0	5.229	5.38	-0.152
549.5	55.687	-0.76	-0.29	0	30.76	0	5.229	5.381	-0.152

549.6	55.675	-0.793	-1.014	0	30.76	0	5.23	5.382	-0.152
549.7	55.669	-0.783	-0.113	0	30.74	0	5.231	5.383	-0.152
549.8	55.656	-0.748	0.155	0	30.74	0	5.232	5.383	-0.152
549.9	55.644	-0.718	-1.593	0	30.7	0	5.233	5.384	-0.152
550	55.638	-0.718	-1.572	0	30.69	0	5.234	5.385	-0.152
550.1	55.625	-0.733	-1.077	0	30.71	0	5.234	5.386	-0.152
550.2	55.613	-0.743	-0.427	0	30.69	0	5.235	5.387	-0.152
550.3	55.607	-0.74	-0.399	0	30.7	0	5.236	5.388	-0.152
550.4	55.594	-0.73	-0.678	0	30.7	0	5.237	5.389	-0.152
550.5	55.582	-0.723	-0.706	0	30.67	0	5.238	5.389	-0.152
550.6	55.569	-0.728	-1.257	0	30.67	0	5.239	5.39	-0.152
550.7	55.563	-0.728	-0.576	0	30.67	0	5.24	5.391	-0.152
550.8	55.551	-0.728	-0.399	0	30.65	0	5.24	5.392	-0.152
550.9	55.538	-0.743	-0.706	0	30.32	0	5.241	5.393	-0.152
551	55.532	-0.74	-0.343	0	29.69	0	5.242	5.394	-0.152
551.1	55.513	-0.73	-0.558	0	29.11	0	5.243	5.394	-0.152
551.2	55.507	-0.73	-0.886	0	29.16	0	5.244	5.395	-0.152
551.3	55.488	-0.753	-1.003	0	29.13	0	5.245	5.396	-0.152
551.4	55.476	-0.75	0.194	0	29.1	0	5.245	5.397	-0.152
551.5	55.464	-0.748	-0.533	0	29.09	0	5.246	5.398	-0.152
551.6	55.451	-0.74	-0.858	0	29.18	0	5.247	5.399	-0.152
551.7	55.439	-0.728	-0.844	0	29.36	0	5.248	5.399	-0.152
551.8	55.433	-0.728	-1.031	0	29.31	0	5.249	5.4	-0.152
551.9	55.433	-0.725	-0.844	0	29.34	0	5.249	5.401	-0.152
552	55.408	-0.725	-0.558	0	29.32	0	5.25	5.402	-0.152
552.1	55.389	-0.72	-0.328	0	29.34	0	5.251	5.403	-0.152
552.2	55.377	-0.718	-0.622	0	29.33	0	5.252	5.403	-0.152
552.3	55.364	-0.72	-0.763	0	29.3	0	5.253	5.404	-0.152
552.4	55.358	-0.718	-0.692	0	29.3	0	5.253	5.405	-0.152
552.5	55.346	-0.71	-0.23	0	29.3	0	5.254	5.406	-0.152
552.6	55.333	-0.723	-1.063	0	29.29	0	5.255	5.407	-0.152
552.7	55.321	-0.723	-0.869	0	29.28	0	5.256	5.407	-0.152
552.8	55.308	-0.75	-0.562	0	29.29	0	5.257	5.408	-0.152
552.9	55.29	-0.755	-0.304	0	29.25	0	5.258	5.409	-0.152
553	55.283	-0.755	-0.191	0	29.26	0	5.258	5.41	-0.152
553.1	55.271	-0.75	-0.516	0	29.24	0	5.259	5.411	-0.152
553.2	55.259	-0.743	-0.54	0	29.48	0	5.26	5.412	-0.152
553.3	55.24	-0.743	-1.229	0	30.04	0	5.261	5.412	-0.152
553.4	55.234	-0.723	-0.431	0	30.77	0	5.262	5.413	-0.152
553.5	55.221	-0.723	-1.031	0	30.76	0	5.263	5.414	-0.152
553.6	55.209	-0.745	-1.158	0	31.16	0	5.263	5.415	-0.152
553.7	55.203	-0.755	-0.219	0	31.5	0	5.264	5.416	-0.152
553.8	55.196	-0.755	-0.47	0	32.22	0	5.265	5.417	-0.152
553.9	55.19	-0.733	-0.533	0	33.08	0	5.266	5.418	-0.152
554	55.184	-0.723	-1.197	0	32.99	0	5.267	5.419	-0.152
554.1	55.178	-0.723	-0.961	0	33.02	0	5.268	5.419	-0.152
554.2	55.172	-0.723	-1.141	0	32.98	0	5.269	5.42	-0.152

554.3	55.159	-0.743	-0.66	0	33.02	0	5.27	5.421	-0.152
554.4	55.153	-0.733	0.438	0	32.99	0	5.271	5.422	-0.152
554.5	55.153	-0.733	-1.01	0	32.98	0	5.272	5.423	-0.152
554.6	55.14	-0.728	-1.183	0	32.98	0	5.273	5.424	-0.152
554.7	55.134	-0.728	-0.54	0	32.95	0	5.273	5.425	-0.152
554.8	55.128	-0.728	-0.72	0	33.02	0	5.274	5.426	-0.152
554.9	55.122	-0.74	-0.576	0	32.43	0	5.275	5.427	-0.152
555	55.116	-0.745	-0.371	0	31.36	0	5.276	5.428	-0.152
555.1	55.109	-0.745	-0.72	0	29.89	0	5.277	5.429	-0.152
555.2	55.097	-0.74	-0.646	0	28.12	0	5.278	5.429	-0.152
555.3	55.097	-0.743	-0.929	0	26.72	0	5.278	5.43	-0.152
555.4	55.072	-0.73	-0.692	0	24.7	0	5.279	5.431	-0.152
555.5	55.053	-0.72	-0.901	0	22.39	0	5.28	5.431	-0.152
555.6	55.029	-0.73	-1.042	0	20.13	0	5.28	5.432	-0.152
555.7	55.004	-0.733	-0.576	0	18.44	0	5.281	5.432	-0.152
555.8	54.973	-0.728	-0.622	0	17.23	0	5.281	5.433	-0.152
555.9	54.942	-0.725	-0.858	0	15.44	0	5.282	5.433	-0.152
556	54.911	-0.725	-0.858	0	14.45	0	5.282	5.434	-0.152
556.1	54.873	-0.735	-0.544	0	14.48	0	5.283	5.434	-0.152
556.2	54.842	-0.733	-0.484	0	14.41	0	5.283	5.435	-0.152
556.3	54.805	-0.733	-0.72	0	14.4	0	5.283	5.435	-0.152
556.4	54.774	-0.728	-0.692	0	14.94	0	5.284	5.435	-0.152
556.5	54.743	-0.738	-0.943	0	15.15	0	5.284	5.436	-0.152
556.6	54.706	-0.738	-0.858	0	15.12	0	5.285	5.436	-0.152
556.7	54.674	-0.72	-0.251	0	15.56	0	5.285	5.437	-0.152
556.8	54.643	-0.72	-1.296	0	16.27	0	5.286	5.437	-0.152
556.9	54.612	-0.733	-0.689	0	17.18	0	5.286	5.438	-0.152
557	54.581	-0.743	-0.547	0	17.8	0	5.286	5.438	-0.152
557.1	54.556	-0.75	-0.858	0	17.97	0	5.287	5.439	-0.152
557.2	54.525	-0.735	-0.53	0	18.5	0	5.287	5.439	-0.152
557.3	54.494	-0.733	-0.957	0	18.99	0	5.288	5.44	-0.152
557.4	54.494	-0.74	-0.823	0	20.7	0	5.289	5.44	-0.152
557.5	54.469	-0.745	-0.692	0	21.33	0	5.289	5.441	-0.152
557.6	54.451	-0.73	-0.042	0	21.25	0	5.29	5.441	-0.152
557.7	54.401	-0.73	-0.802	0	21.27	0	5.29	5.442	-0.152
557.8	54.376	-0.73	-1.017	0	21.22	0	5.291	5.443	-0.152
557.9	54.358	-0.74	-0.12	0	21.28	0	5.292	5.443	-0.152
558	54.339	-0.733	-0.399	0	21.25	0	5.292	5.444	-0.152
558.1	54.314	-0.733	-1.088	0	21.24	0	5.293	5.444	-0.152
558.2	54.314	-0.733	-0.604	0	21.24	0	5.293	5.445	-0.152
558.3	54.289	-0.733	-0.533	0	21.21	0	5.294	5.445	-0.152
558.4	54.264	-0.715	-0.417	0	21.43	0	5.295	5.446	-0.152
558.5	54.246	-0.715	-0.562	0	22.14	0	5.295	5.447	-0.152
558.6	54.221	-0.723	-1.063	0	23.86	0	5.296	5.447	-0.152
558.7	54.177	-0.72	-0.233	0	24.69	0	5.296	5.448	-0.152
558.8	54.177	-0.72	-0.516	0	24.95	0	5.297	5.449	-0.152
558.9	54.165	-0.718	-0.883	0	24.89	0	5.298	5.449	-0.152

559	54.134	-0.718	-0.279	0	24.93	0	5.299	5.45	-0.152
559.1	54.134	-0.72	-0.604	0	24.16	0	5.299	5.451	-0.152
559.2	54.103	-0.713	-0.562	0	24.2	0	5.3	5.451	-0.152
559.3	54.084	-0.713	-0.576	0	24.17	0	5.301	5.452	-0.152
559.4	54.066	-0.718	-0.766	0	24.15	0	5.301	5.453	-0.152
559.5	54.053	-0.7	-0.357	0	24.19	0	5.302	5.453	-0.152
559.6	54.034	-0.7	-0.929	0	24.15	0	5.303	5.454	-0.152
559.7	54.016	-0.693	-0.932	0	24.17	0	5.303	5.455	-0.152
559.8	53.991	-0.693	-0.399	0	23.53	0	5.304	5.455	-0.152
559.9	53.979	-0.715	-0.12	0	22.52	0	5.305	5.456	-0.152
560	53.954	-0.723	-0.692	0	21.11	0	5.305	5.457	-0.152
560.1	53.935	-0.72	-0.448	0	19.55	0	5.306	5.457	-0.152
560.2	53.935	-0.72	-0.678	0	19.78	0	5.306	5.458	-0.152
560.3	53.885	-0.728	-0.858	0	19.78	0	5.307	5.458	-0.152
560.4	53.885	-0.733	-0.6	0	19.79	0	5.307	5.459	-0.152
560.5	53.86	-0.725	-0.371	0	19.76	0	5.308	5.459	-0.152
560.6	53.811	-0.73	-0.773	0	19.23	0	5.308	5.46	-0.152
560.7	53.792	-0.745	-0.872	0	19.03	0	5.309	5.46	-0.152
560.8	53.792	-0.745	-0.251	0	19.02	0	5.309	5.461	-0.152
560.9	53.761	-0.733	-0.547	0	18.99	0	5.31	5.462	-0.152
561	53.736	-0.723	-1.01	0	19.02	0	5.311	5.462	-0.152
561.1	53.711	-0.725	-0.516	0	18.97	0	5.311	5.463	-0.152
561.2	53.662	-0.735	-0.858	0	18.98	0	5.312	5.463	-0.152
561.3	53.662	-0.728	-0.562	0	18.98	0	5.312	5.464	-0.152
561.4	53.631	-0.733	-0.844	0	18.96	0	5.313	5.464	-0.152
561.5	53.612	-0.74	-0.872	0	18.96	0	5.313	5.465	-0.152
561.6	53.587	-0.733	-0.205	0	18.97	0	5.314	5.465	-0.152
561.7	53.537	-0.733	-1.091	0	18.93	0	5.314	5.466	-0.152
561.8	53.512	-0.74	-0.607	0	19.24	0	5.315	5.466	-0.152
561.9	53.494	-0.745	-0.706	0	20.6	0	5.315	5.467	-0.152
562	53.469	-0.745	-0.505	0	23.48	0	5.316	5.467	-0.152
562.1	53.45	-0.743	-0.985	0	24.82	0	5.317	5.468	-0.152
562.2	53.438	-0.73	-0.777	0	26.1	0	5.317	5.469	-0.152
562.3	53.425	-0.73	-0.692	0	27.2	0	5.318	5.47	-0.152
562.4	53.413	-0.745	-1.042	0	28.18	0	5.319	5.47	-0.152
562.5	53.401	-0.74	-0.533	0	30.27	0	5.32	5.471	-0.152
562.6	53.394	-0.733	-0.247	0	30.77	0	5.321	5.472	-0.152
562.7	53.388	-0.73	-0.812	0	30.91	0	5.321	5.473	-0.152
562.8	53.382	-0.73	-0.646	0	30.3	0	5.322	5.474	-0.152
562.9	53.37	-0.725	-0.547	0	30.19	0	5.323	5.475	-0.152
563	53.363	-0.735	-0.692	0	30.16	0	5.324	5.476	-0.152
563.1	53.357	-0.713	-0.371	0	30.19	0	5.325	5.476	-0.152
563.2	53.351	-0.713	-1.049	0	30.17	0	5.326	5.477	-0.152
563.3	53.345	-0.728	-0.872	0	30.17	0	5.326	5.478	-0.152
563.4	53.339	-0.725	-0.117	0	27.91	0	5.327	5.479	-0.152
563.5	53.326	-0.72	-1.045	0	22.47	0	5.328	5.479	-0.152
563.6	53.307	-0.725	-1.088	0	18.72	0	5.328	5.48	-0.152

563.7	53.283	-0.725	-0.607	0	16.56	0	5.329	5.48	-0.152
563.8	53.283	-0.725	-1.105	0	15.72	0	5.329	5.481	-0.152
563.9	53.258	-0.713	-0.692	0	15.75	0	5.33	5.481	-0.152
564	53.227	-0.718	-0.872	0	15.69	0	5.33	5.482	-0.152
564.1	53.196	-0.723	-0.883	0	15.6	0	5.331	5.482	-0.152
564.2	53.133	-0.738	-0.59	0	15.74	0	5.331	5.483	-0.152
564.3	53.109	-0.733	-0.219	0	16.03	0	5.331	5.483	-0.152
564.4	53.078	-0.728	-0.286	0	16.03	0	5.332	5.483	-0.152
564.5	53.046	-0.73	-1.243	0	16.03	0	5.332	5.484	-0.152
564.6	53.015	-0.745	-0.946	0	15.76	0	5.333	5.484	-0.152
564.7	52.991	-0.745	-0.399	0	15.44	0	5.333	5.485	-0.152
564.8	52.966	-0.75	-0.646	0	15.04	0	5.334	5.485	-0.152
564.9	52.928	-0.75	-0.738	0	14.95	0	5.334	5.486	-0.152
565	52.904	-0.73	-0.286	0	14.95	0	5.334	5.486	-0.152
565.1	52.872	-0.725	-0.858	0	14.93	0	5.335	5.486	-0.152
565.2	52.841	-0.728	-1.388	0	15.42	0	5.335	5.487	-0.152
565.3	52.81	-0.725	-0.604	0	16.04	0	5.336	5.487	-0.152
565.4	52.779	-0.713	-0.731	0	16.16	0	5.336	5.488	-0.152
565.5	52.754	-0.728	-1.028	0	16.33	0	5.337	5.488	-0.152
565.6	52.73	-0.74	-0.706	0	17.51	0	5.337	5.489	-0.152
565.7	52.698	-0.733	-0.29	0	18.74	0	5.338	5.489	-0.152
565.8	52.674	-0.733	-0.562	0	20.52	0	5.338	5.49	-0.152
565.9	52.655	-0.725	-0.982	0	23.51	0	5.339	5.49	-0.152
566	52.643	-0.73	-1.031	0	24.42	0	5.34	5.491	-0.152
566.1	52.624	-0.73	-0.47	0	26.01	0	5.34	5.492	-0.152
566.2	52.618	-0.735	-0.533	0	26.78	0	5.341	5.493	-0.152
566.3	52.605	-0.753	-0.752	0	27.21	0	5.342	5.493	-0.152
566.4	52.599	-0.735	-0.399	0	27.92	0	5.343	5.494	-0.152
566.5	52.587	-0.735	-0.706	0	27.86	0	5.343	5.495	-0.152
566.6	52.58	-0.75	-1.116	0	27.85	0	5.344	5.496	-0.152
566.7	52.574	-0.748	-0.127	0	27.9	0	5.345	5.496	-0.152
566.8	52.562	-0.748	-0.692	0	27.86	0	5.346	5.497	-0.152
566.9	52.556	-0.743	-0.706	0	27.9	0	5.346	5.498	-0.152
567	52.543	-0.738	-0.752	0	27.85	0	5.347	5.499	-0.152
567.1	52.537	-0.745	-0.706	0	27.87	0	5.348	5.5	-0.152
567.2	52.525	-0.735	-0.692	0	27.85	0	5.349	5.5	-0.152
567.3	52.518	-0.718	-0.399	0	27.89	0	5.35	5.501	-0.152
567.4	52.506	-0.715	-1.197	0	27.86	0	5.35	5.502	-0.152
567.5	52.5	-0.718	-0.72	0	27.86	0	5.351	5.503	-0.152
567.6	52.487	-0.725	-0.706	0	27.84	0	5.352	5.503	-0.152
567.7	52.481	-0.718	-0.385	0	27.86	0	5.353	5.504	-0.152
567.8	52.469	-0.708	-0.519	0	26.59	0	5.353	5.505	-0.152
567.9	52.456	-0.72	-1.211	0	23.11	0	5.354	5.506	-0.152
568	52.444	-0.73	-0.957	0	19.27	0	5.355	5.506	-0.152
568.1	52.419	-0.718	0.025	0	17.48	0	5.355	5.507	-0.152
568.2	52.394	-0.718	-0.833	0	16.55	0	5.356	5.507	-0.152
568.3	52.369	-0.723	-0.918	0	16.57	0	5.356	5.508	-0.152

568.4	52.338	-0.72	-0.463	0	16.55	0	5.356	5.508	-0.152
568.5	52.313	-0.72	-0.53	0	16.52	0	5.357	5.508	-0.152
568.6	52.282	-0.725	-0.738	0	16.53	0	5.357	5.509	-0.152
568.7	52.264	-0.723	-0.431	0	16.97	0	5.358	5.509	-0.152
568.8	52.232	-0.723	-1.056	0	19	0	5.358	5.51	-0.152
568.9	52.214	-0.775	-0.632	0	19.86	0	5.359	5.51	-0.152
569	52.214	-0.79	-0.004	0	20.85	0	5.359	5.511	-0.152
569.1	52.189	-0.765	-0.304	0	22.31	0	5.36	5.512	-0.152
569.2	52.17	-0.725	-0.586	0	23.76	0	5.361	5.512	-0.152
569.3	52.152	-0.733	-2.091	0	25.36	0	5.361	5.513	-0.152
569.4	52.127	-0.748	-1.162	0	25.9	0	5.362	5.514	-0.152
569.5	52.114	-0.735	-0.145	0	26.47	0	5.363	5.514	-0.152
569.6	52.114	-0.72	-0.957	0	26.49	0	5.364	5.515	-0.152
569.7	52.09	-0.725	-1.081	0	26.55	0	5.364	5.516	-0.152
569.8	52.083	-0.725	-0.66	0	26.64	0	5.365	5.517	-0.152
569.9	52.071	-0.753	-0.47	0	27.21	0	5.366	5.517	-0.152
570	52.065	-0.76	-0.47	0	27.88	0	5.367	5.518	-0.152
570.1	52.058	-0.74	-0.131	0	27.87	0	5.367	5.519	-0.152
570.2	52.046	-0.715	-1.112	0	27.95	0	5.368	5.52	-0.152
570.3	52.04	-0.71	-1.243	0	28.35	0	5.369	5.521	-0.152
570.4	52.034	-0.72	-1.049	0	28.93	0	5.37	5.521	-0.152
570.5	52.027	-0.728	-0.576	0	29.33	0	5.371	5.522	-0.152
570.6	52.021	-0.738	-0.547	0	29.32	0	5.371	5.523	-0.152
570.7	52.015	-0.735	-0.399	0	29.34	0	5.372	5.524	-0.152
570.8	52.009	-0.738	-0.385	0	29.32	0	5.373	5.525	-0.152
570.9	52.009	-0.73	-0.562	0	29.31	0	5.374	5.525	-0.152
571	52.003	-0.72	0.025	0	29.31	0	5.375	5.526	-0.152
571.1	52.003	-0.73	-1.187	0	29.28	0	5.376	5.527	-0.152
571.2	51.99	-0.72	-0.622	0	29.36	0	5.376	5.528	-0.152
571.3	51.984	-0.71	-0.293	0	29.33	0	5.377	5.529	-0.152
571.4	51.984	-0.715	-1.197	0	29.32	0	5.378	5.53	-0.152
571.5	51.971	-0.723	-0.59	0	29.3	0	5.379	5.53	-0.152
571.6	51.971	-0.733	-0.413	0	29.3	0	5.38	5.531	-0.152
571.7	51.965	-0.745	-0.487	0	29.3	0	5.38	5.532	-0.152
571.8	51.965	-0.745	-0.399	0	29.32	0	5.381	5.533	-0.152
571.9	51.959	-0.733	-0.431	0	29.29	0	5.382	5.534	-0.152
572	51.953	-0.715	-0.547	0	29.28	0	5.383	5.534	-0.152
572.1	51.947	-0.71	-1.374	0	29.27	0	5.384	5.535	-0.152
572.2	51.94	-0.723	-0.901	0	29.27	0	5.384	5.536	-0.152
572.3	51.934	-0.728	-0.689	0	29.25	0	5.385	5.537	-0.152
572.4	51.928	-0.713	-0.085	0	29.29	0	5.386	5.538	-0.152
572.5	51.928	-0.718	-1.01	0	29.27	0	5.387	5.538	-0.152
572.6	51.922	-0.725	-0.802	0	29.28	0	5.388	5.539	-0.152
572.7	51.922	-0.735	-0.484	0	29.28	0	5.389	5.54	-0.152
572.8	51.909	-0.735	-0.47	0	29.26	0	5.389	5.541	-0.152
572.9	51.903	-0.728	0.17	0	29.26	0	5.39	5.542	-0.152
573	51.903	-0.705	-0.692	0	29.27	0	5.391	5.543	-0.152

573.1	51.897	-0.705	-1.049	0	29.27	0	5.392	5.543	-0.152
573.2	51.891	-0.728	-1.091	0	29.24	0	5.393	5.544	-0.152
573.3	51.884	-0.735	-0.318	0	29.28	0	5.393	5.545	-0.152
573.4	51.878	-0.725	-0.473	0	29.24	0	5.394	5.546	-0.152
573.5	51.866	-0.708	-0.802	0	29.28	0	5.395	5.547	-0.152
573.6	51.866	-0.72	-0.745	0	29.24	0	5.396	5.547	-0.152
573.7	51.853	-0.725	-0.632	0	29.22	0	5.397	5.548	-0.152
573.8	51.853	-0.728	-0.413	0	29.27	0	5.397	5.549	-0.152
573.9	51.847	-0.715	-0.562	0	29.21	0	5.398	5.55	-0.152
574	51.841	-0.715	-0.957	0	29.23	0	5.399	5.551	-0.152
574.1	51.835	-0.715	-1.01	0	29.21	0	5.4	5.551	-0.152
574.2	51.829	-0.725	-0.632	0	29.27	0	5.401	5.552	-0.152
574.3	51.829	-0.723	-0.516	0	29.23	0	5.402	5.553	-0.152
574.4	51.822	-0.728	-0.664	0	29.23	0	5.402	5.554	-0.152
574.5	51.816	-0.725	-0.604	0	29.26	0	5.403	5.555	-0.152
574.6	51.81	-0.74	-1.049	0	29.18	0	5.404	5.556	-0.152
574.7	51.804	-0.753	-0.646	0	29.25	0	5.405	5.556	-0.152
574.8	51.804	-0.753	-0.074	0	29.2	0	5.406	5.557	-0.152
574.9	51.798	-0.718	-1.134	0	28.97	0	5.406	5.558	-0.152
575	51.791	-0.723	-1.091	0	28.42	0	5.407	5.559	-0.152
575.1	51.785	-0.725	-0.562	0	27.83	0	5.408	5.56	-0.152
575.2	51.785	-0.723	-0.233	0	27.34	0	5.409	5.56	-0.152
575.3	51.773	-0.735	-1.091	0	27.33	0	5.409	5.561	-0.152
575.4	51.76	-0.735	-0.646	0	27.31	0	5.41	5.562	-0.152
575.5	51.754	-0.718	-0.59	0	27.3	0	5.411	5.563	-0.152
575.6	51.748	-0.715	-0.664	0	27.38	0	5.412	5.563	-0.152
575.7	51.735	-0.725	-1.36	0	27.99	0	5.413	5.564	-0.152
575.8	51.735	-0.725	-0.399	0	28.53	0	5.413	5.565	-0.152
575.9	51.723	-0.72	-0.562	0	28.7	0	5.414	5.566	-0.152
576	51.717	-0.718	-0.72	0	29.04	0	5.415	5.566	-0.152
576.1	51.711	-0.725	-0.72	0	29.18	0	5.416	5.567	-0.152
576.2	51.711	-0.718	-0.477	0	29.14	0	5.417	5.568	-0.152
576.3	51.711	-0.72	-0.399	0	29.19	0	5.417	5.569	-0.152
576.4	51.704	-0.73	-1.091	0	29.16	0	5.418	5.57	-0.152
576.5	51.698	-0.725	-0.233	0	29.15	0	5.419	5.571	-0.152
576.6	51.692	-0.715	-0.399	0	29.19	0	5.42	5.571	-0.152
576.7	51.686	-0.703	-1.077	0	29.14	0	5.421	5.572	-0.152
576.8	51.686	-0.71	-0.901	0	29.19	0	5.421	5.573	-0.152
576.9	51.679	-0.74	-0.837	0	29.31	0	5.422	5.574	-0.152
577	51.667	-0.735	0.254	0	29.36	0	5.423	5.575	-0.152
577.1	51.661	-0.725	-0.177	0	29.37	0	5.424	5.575	-0.152
577.2	51.661	-0.73	-1.211	0	29.18	0	5.425	5.576	-0.152
577.3	51.648	-0.748	-0.791	0	28.64	0	5.425	5.577	-0.152
577.4	51.648	-0.735	-0.004	0	28.43	0	5.426	5.578	-0.152
577.5	51.642	-0.708	-0.357	0	27.86	0	5.427	5.579	-0.152
577.6	51.63	-0.713	-1.61	0	27.25	0	5.428	5.579	-0.152
577.7	51.63	-0.73	-1.049	0	27.26	0	5.429	5.58	-0.152

577.8	51.63	-0.73	0.053	0	27.24	0	5.429	5.581	-0.152
577.9	51.617	-0.74	-0.346	0	27.25	0	5.43	5.582	-0.152
578	51.611	-0.73	-0.975	0	27.23	0	5.431	5.582	-0.152
578.1	51.605	-0.713	-0.53	0	26.6	0	5.432	5.583	-0.152
578.2	51.592	-0.713	-1.388	0	25.68	0	5.432	5.584	-0.152
578.3	51.586	-0.708	-0.706	0	24.22	0	5.433	5.584	-0.152
578.4	51.555	-0.708	-0.576	0	23.04	0	5.434	5.585	-0.152
578.5	51.555	-0.723	-0.795	0	22.56	0	5.434	5.586	-0.152
578.6	51.53	-0.725	-0.562	0	22.16	0	5.435	5.586	-0.152
578.7	51.512	-0.723	-0.399	0	21.43	0	5.435	5.587	-0.152
578.8	51.512	-0.723	-0.72	0	20.33	0	5.436	5.588	-0.152
578.9	51.493	-0.72	-0.802	0	19.95	0	5.437	5.588	-0.152
579	51.456	-0.718	-0.724	0	19.93	0	5.437	5.589	-0.152
579.1	51.437	-0.72	-0.872	0	19.92	0	5.438	5.589	-0.152
579.2	51.437	-0.713	-0.576	0	19.55	0	5.438	5.59	-0.152
579.3	51.418	-0.718	-0.678	0	18.79	0	5.439	5.59	-0.152
579.4	51.394	-0.73	-0.932	0	18.7	0	5.439	5.591	-0.152
579.5	51.375	-0.728	-0.145	0	18.68	0	5.44	5.591	-0.152
579.6	51.35	-0.73	-0.819	0	18.56	0	5.44	5.592	-0.152
579.7	51.307	-0.728	-0.72	0	18.49	0	5.441	5.592	-0.152
579.8	51.307	-0.723	-0.646	0	18.47	0	5.441	5.593	-0.152
579.9	51.282	-0.72	-0.908	0	18.45	0	5.442	5.593	-0.152
580	51.257	-0.728	-0.735	0	18.44	0	5.442	5.594	-0.152
580.1	51.238	-0.725	-0.735	0	18.41	0	5.443	5.594	-0.152
580.2	51.195	-0.725	-0.562	0	18.42	0	5.443	5.595	-0.152
580.3	51.176	-0.73	-0.886	0	18.4	0	5.444	5.595	-0.152
580.4	51.151	-0.708	-0.268	0	18.39	0	5.444	5.596	-0.152
580.5	51.151	-0.695	-0.675	0	18.13	0	5.445	5.596	-0.152
580.6	51.133	-0.715	-1.257	0	15.44	0	5.445	5.597	-0.152
580.7	51.108	-0.733	-0.445	0	11.76	0	5.446	5.597	-0.152
580.8	51.083	-0.733	-0.332	0	9.98	0	5.446	5.597	-0.152
580.9	51.052	-0.73	-0.932	0	9.26	0	5.446	5.598	-0.152
581	51.015	-0.743	-0.618	0	9.09	0	5.446	5.598	-0.152
581.1	50.94	-0.73	-0.159	0	8.88	0	5.447	5.598	-0.152
581.2	50.94	-0.718	-0.65	0	8.27	0	5.447	5.598	-0.152
581.3	50.865	-0.723	-1.063	0	7.15	0	5.447	5.599	-0.152
581.4	50.865	-0.725	-0.749	0	5.66	0	5.447	5.599	-0.152
581.5	50.785	-0.73	-0.678	0	3.85	0	5.447	5.599	-0.152
581.6	50.735	-0.728	-0.706	0	1.96	0	5.447	5.599	-0.152
581.7	50.691	-0.725	-0.562	0	0.61	0	5.447	5.599	-0.152
581.8	50.636	-0.725	-0.929	0	0	0	5.447	5.599	-0.152
581.9	50.586	-0.725	-0.886	0	0	0	5.447	5.599	-0.152
582	50.536	-0.743	-0.78	0	0	0	5.447	5.599	-0.152
582.1	50.48	-0.748	-0.074	0	0	0	5.447	5.599	-0.152
582.2	50.424	-0.738	-0.473	0	0	0	5.447	5.599	-0.152
582.3	50.375	-0.728	-0.692	0	0	0	5.447	5.599	-0.152
582.4	50.325	-0.745	-1.473	0	0	0	5.447	5.599	-0.152

582.5	50.269	-0.75	-0.562	0	0	0	5.447	5.599	-0.152
582.6	50.219	-0.73	0.095	0	0	0	5.447	5.599	-0.152
582.7	50.17	-0.71	-0.706	0	0	0	5.447	5.599	-0.152
582.8	50.12	-0.71	-1.211	0	0	0	5.447	5.599	-0.152
582.9	50.058	-0.72	-0.915	0	0	0	5.447	5.599	-0.152
583	50.014	-0.735	-0.233	0	0	0	5.447	5.599	-0.152
583.1	49.958	-0.743	-0.562	0	0	0	5.447	5.599	-0.152
583.2	49.909	-0.728	-0.59	0	0	0	5.447	5.599	-0.152
583.3	49.859	-0.715	-0.858	0	0	0	5.447	5.599	-0.152
583.4	49.809	-0.738	-1.049	0	0	0	5.447	5.599	-0.152
583.5	49.809	-0.75	-0.66	0	0	0	5.447	5.599	-0.152
583.6	49.753	-0.753	0.053	0	0	0	5.447	5.599	-0.152
583.7	49.703	-0.758	-0.749	0	0	0	5.447	5.599	-0.152
583.8	49.604	-0.758	-0.72	0	0	0	5.447	5.599	-0.152
583.9	49.604	-0.74	-0.325	0	0	0	5.447	5.599	-0.152
584	49.548	-0.743	-1.063	0	0	0	5.447	5.599	-0.152
584.1	49.449	-0.735	-1.063	0	0	0	5.447	5.599	-0.152
584.2	49.399	-0.71	-0.233	0	0	0	5.447	5.599	-0.152
584.3	49.399	-0.703	-1.031	0	0	0	5.447	5.599	-0.152
584.4	49.349	-0.713	-1.148	0	0	0	5.447	5.599	-0.152
584.5	49.3	-0.72	-0.247	0	0	0	5.447	5.599	-0.152
584.6	49.244	-0.723	-0.858	0	0	0	5.447	5.599	-0.152
584.7	49.144	-0.725	-0.576	0	0	0	5.447	5.599	-0.152
584.8	49.144	-0.725	-0.915	0	0	0	5.447	5.599	-0.152
584.9	49.095	-0.73	-0.562	0	0	0	5.447	5.599	-0.152
585	49.039	-0.733	-0.805	0	0	0	5.447	5.599	-0.152
585.1	48.995	-0.725	-0.219	0	0	0	5.447	5.599	-0.152
585.2	48.896	-0.728	-0.886	0	0	0	5.447	5.599	-0.152
585.3	48.84	-0.725	-0.491	0	0	0	5.447	5.599	-0.152
585.4	48.796	-0.733	-0.477	0	0	0	5.447	5.599	-0.152
585.5	48.747	-0.738	-0.72	0	0	0	5.447	5.599	-0.152
585.6	48.747	-0.733	-0.441	0	0	0	5.447	5.599	-0.152
585.7	48.641	-0.733	-0.614	0	0	0	5.447	5.599	-0.152
585.8	48.597	-0.73	-0.66	0	0	0	5.447	5.599	-0.152
585.9	48.542	-0.725	-0.562	0	0	0	5.447	5.599	-0.152
586	48.492	-0.725	-1.328	0	0	0	5.447	5.599	-0.152
586.1	48.442	-0.723	-0.901	0	0	0	5.447	5.599	-0.152
586.2	48.442	-0.715	-0.413	0	0.94	0	5.447	5.599	-0.152
586.3	48.349	-0.725	-0.946	0	2.4	0	5.448	5.599	-0.152
586.4	48.349	-0.73	-0.66	0	4.48	0	5.448	5.599	-0.152
586.5	48.262	-0.735	-0.735	0	8.78	0	5.448	5.599	-0.152
586.6	48.231	-0.733	-0.413	0	11.29	0	5.448	5.6	-0.152
586.7	48.2	-0.738	-0.427	0	12.33	0	5.449	5.6	-0.152
586.8	48.175	-0.738	-0.516	0	12.78	0	5.449	5.6	-0.152
586.9	48.175	-0.728	-0.247	0	12.77	0	5.449	5.601	-0.152
587	48.15	-0.725	-0.819	0	12.78	0	5.45	5.601	-0.152
587.1	48.125	-0.723	-0.886	0	12.8	0	5.45	5.602	-0.152

587.2	48.094	-0.713	-0.576	0	12.77	0	5.45	5.602	-0.152
587.3	48.069	-0.71	-0.901	0	12.79	0	5.451	5.602	-0.152
587.4	48.038	-0.718	-0.735	0	12.78	0	5.451	5.603	-0.152
587.5	48.013	-0.715	-0.413	0	12.74	0	5.451	5.603	-0.152
587.6	47.988	-0.735	-0.614	0	12.78	0	5.452	5.603	-0.152
587.7	47.933	-0.735	-0.544	0	13.31	0	5.452	5.604	-0.152
587.8	47.914	-0.735	-0.074	0	13.91	0	5.453	5.604	-0.152
587.9	47.914	-0.73	-1.356	0	14.84	0	5.453	5.604	-0.152
588	47.883	-0.713	-0.735	0	15.04	0	5.453	5.605	-0.152
588.1	47.864	-0.708	-0.618	0	14.97	0	5.454	5.605	-0.152
588.2	47.839	-0.725	-1.063	0	15.55	0	5.454	5.606	-0.152
588.3	47.796	-0.73	-0.413	0	17.98	0	5.455	5.606	-0.152
588.4	47.783	-0.73	-0.261	0	19.82	0	5.455	5.607	-0.152
588.5	47.765	-0.72	-0.491	0	20.67	0	5.456	5.607	-0.152
588.6	47.759	-0.718	-1.063	0	21.11	0	5.456	5.608	-0.152
588.7	47.746	-0.73	-0.816	0	21.82	0	5.457	5.609	-0.152
588.8	47.734	-0.738	-0.498	0	23.88	0	5.458	5.609	-0.152
588.9	47.728	-0.738	-0.378	0	25.4	0	5.458	5.61	-0.152
589	47.728	-0.733	-0.777	0	27.24	0	5.459	5.611	-0.152
589.1	47.721	-0.725	-0.576	0	28.19	0	5.46	5.611	-0.152
589.2	47.721	-0.733	-1.148	0	29.01	0	5.461	5.612	-0.152
589.3	47.728	-0.735	-0.886	0	30.37	0	5.462	5.613	-0.152
589.4	47.728	-0.738	-0.173	0	30.76	0	5.462	5.614	-0.152
589.5	47.734	-0.74	-0.901	0	31.31	0	5.463	5.615	-0.152
589.6	47.74	-0.743	-0.646	0	31.92	0	5.464	5.616	-0.152
589.7	47.752	-0.73	-0.735	0	33.35	0	5.465	5.617	-0.152
589.8	47.752	-0.73	-0.735	0	34.88	0	5.466	5.618	-0.152
589.9	47.777	-0.733	-0.985	0	37.55	0	5.467	5.619	-0.152
590	47.777	-0.735	-0.819	0	38.75	0	5.468	5.62	-0.152
590.1	47.79	-0.73	-0.646	0	39.1	0	5.469	5.621	-0.152
590.2	47.815	-0.738	-0.777	0	40.81	0	5.47	5.622	-0.152
590.3	47.833	-0.74	-0.441	0	43.85	0	5.472	5.623	-0.152
590.4	47.852	-0.753	-0.664	0	44.33	0	5.473	5.624	-0.152
590.5	47.908	-0.743	-0.576	0	45.29	0	5.474	5.626	-0.152
590.6	47.939	-0.733	-0.576	0	45.33	0	5.475	5.627	-0.152
590.7	47.939	-0.725	-0.727	0	45.37	0	5.477	5.628	-0.152
590.8	47.97	-0.725	-0.735	0	45.37	0	5.478	5.629	-0.152
590.9	48.026	-0.743	-0.53	0	45.98	0	5.479	5.631	-0.152
591	48.057	-0.75	0.124	0	47.73	0	5.48	5.632	-0.152
591.1	48.088	-0.753	-0.53	0	48.91	0	5.482	5.633	-0.152
591.2	48.125	-0.733	-0.247	0	50.23	0	5.483	5.635	-0.152
591.3	48.125	-0.72	-0.735	0	51.51	0	5.485	5.636	-0.152
591.4	48.2	-0.705	-0.901	0	51.89	0	5.486	5.638	-0.152
591.5	48.237	-0.705	-0.692	0	52.9	0	5.488	5.639	-0.152
591.6	48.281	-0.73	-1.063	0	52.88	0	5.489	5.641	-0.152
591.7	48.281	-0.73	-0.374	0	52.99	0	5.491	5.642	-0.152
591.8	48.318	-0.715	-0.177	0	52.9	0	5.492	5.644	-0.152

591.9	48.399	-0.73	-1.105	0	52.71	0	5.493	5.645	-0.152
592	48.442	-0.74	-0.819	0	52.8	0	5.495	5.646	-0.152
592.1	48.479	-0.72	0.095	0	52.84	0	5.496	5.648	-0.152
592.2	48.523	-0.718	-0.901	0	52.9	0	5.498	5.649	-0.152
592.3	48.523	-0.728	-1.077	0	52.79	0	5.499	5.651	-0.152
592.4	48.56	-0.72	-0.247	0	52.76	0	5.501	5.652	-0.152
592.5	48.641	-0.718	-0.533	0	52.83	0	5.502	5.654	-0.152
592.6	48.678	-0.705	-0.735	0	52.64	0	5.504	5.655	-0.152
592.7	48.678	-0.718	-1.049	0	50.14	0	5.505	5.657	-0.152
592.8	48.722	-0.718	-0.735	0	46.25	0	5.506	5.658	-0.152
592.9	48.753	-0.728	-0.445	0	42.49	0	5.508	5.659	-0.152
593	48.784	-0.735	-0.703	0	40.02	0	5.509	5.66	-0.152
593.1	48.802	-0.74	-0.576	0	39.27	0	5.51	5.661	-0.152
593.2	48.821	-0.73	-0.72	0	38.65	0	5.511	5.662	-0.152
593.3	48.84	-0.72	-0.735	0	38.7	0	5.512	5.663	-0.152
593.4	48.852	-0.723	-0.901	0	38.66	0	5.513	5.665	-0.152
593.5	48.871	-0.723	-0.819	0	38.67	0	5.514	5.666	-0.152
593.6	48.889	-0.728	-0.72	0	38.68	0	5.515	5.667	-0.152
593.7	48.921	-0.715	-0.735	0	38.73	0	5.516	5.668	-0.152
593.8	48.921	-0.715	-0.562	0	39.84	0	5.517	5.669	-0.152
593.9	48.939	-0.733	-1.685	0	39.88	0	5.518	5.67	-0.152
594	48.952	-0.74	-0.378	0	39.91	0	5.52	5.671	-0.152
594.1	48.97	-0.725	-0.088	0	39.89	0	5.521	5.672	-0.152
594.2	48.989	-0.723	-0.946	0	39.96	0	5.522	5.673	-0.152
594.3	49.008	-0.733	-0.735	0	38.27	0	5.523	5.674	-0.152
594.4	49.026	-0.72	-0.162	0	33.89	0	5.524	5.675	-0.152
594.5	49.039	-0.71	-0.675	0	30.44	0	5.525	5.676	-0.152
594.6	49.051	-0.718	-1.473	0	30.12	0	5.525	5.677	-0.152
594.7	49.051	-0.718	-0.498	0	30.13	0	5.526	5.678	-0.152
594.8	49.057	-0.72	-0.766	0	30.1	0	5.527	5.679	-0.152
594.9	49.057	-0.728	-0.78	0	30.11	0	5.528	5.68	-0.152
595	49.057	-0.725	-0.576	0	30.09	0	5.529	5.68	-0.152
595.1	49.057	-0.733	-0.886	0	30.1	0	5.53	5.681	-0.152
595.2	49.063	-0.738	-0.332	0	30.02	0	5.53	5.682	-0.152
595.3	49.063	-0.723	-0.66	0	29.91	0	5.531	5.683	-0.152
595.4	49.063	-0.733	-0.901	0	29.91	0	5.532	5.684	-0.152
595.5	49.063	-0.755	-1.049	0	29.23	0	5.533	5.684	-0.152
595.6	49.063	-0.74	-0.088	0	25.66	0	5.534	5.685	-0.152
595.7	49.063	-0.723	-0.72	0	24.11	0	5.534	5.686	-0.152
595.8	49.063	-0.723	-1.314	0	24.19	0	5.535	5.687	-0.152
595.9	49.051	-0.733	-0.805	0	24.17	0	5.536	5.687	-0.152
596	49.045	-0.738	-0.413	0	24.17	0	5.536	5.688	-0.152
596.1	49.032	-0.735	-0.498	0	24.18	0	5.537	5.689	-0.152
596.2	49.026	-0.735	-0.819	0	24.14	0	5.538	5.689	-0.152
596.3	49.02	-0.73	-0.233	0	24.14	0	5.538	5.69	-0.152
596.4	49.001	-0.743	-1.017	0	24.11	0	5.539	5.691	-0.152
596.5	49.001	-0.75	-0.851	0	23.33	0	5.54	5.691	-0.152

596.6	48.995	-0.733	-0.247	0	21.19	0	5.54	5.692	-0.152
596.7	48.97	-0.73	-0.611	0	19.52	0	5.541	5.692	-0.152
596.8	48.952	-0.73	-1.388	0	19.63	0	5.541	5.693	-0.152
596.9	48.952	-0.72	-0.399	0	19.53	0	5.542	5.693	-0.152
597	48.939	-0.723	-1.105	0	19.55	0	5.542	5.694	-0.152
597.1	48.921	-0.725	-0.516	0	19.54	0	5.543	5.695	-0.152
597.2	48.902	-0.733	-0.943	0	19.51	0	5.544	5.695	-0.152
597.3	48.889	-0.735	-0.413	0	19.54	0	5.544	5.696	-0.152
597.4	48.871	-0.723	-0.72	0	19.5	0	5.545	5.696	-0.152
597.5	48.858	-0.725	-1.148	0	19.47	0	5.545	5.697	-0.152
597.6	48.827	-0.73	-0.819	0	19.49	0	5.546	5.697	-0.152
597.7	48.809	-0.73	-0.205	0	19.46	0	5.546	5.698	-0.152
597.8	48.809	-0.733	-0.498	0	19.53	0	5.547	5.698	-0.152
597.9	48.796	-0.743	-0.72	0	19.69	0	5.547	5.699	-0.152
598	48.778	-0.745	-0.576	0	18.61	0	5.548	5.699	-0.152
598.1	48.765	-0.74	-0.66	0	16.62	0	5.548	5.7	-0.152
598.2	48.747	-0.74	-0.819	0	16.43	0	5.549	5.7	-0.152
598.3	48.728	-0.74	-1.063	0	16.45	0	5.549	5.701	-0.152
598.4	48.703	-0.74	-0.445	0	16.6	0	5.55	5.701	-0.152
598.5	48.684	-0.728	-1.031	0	16.64	0	5.55	5.702	-0.152
598.6	48.666	-0.715	-0.692	0	16.3	0	5.551	5.702	-0.152
598.7	48.641	-0.715	-0.971	0	13.86	0	5.551	5.703	-0.152
598.8	48.622	-0.715	-0.901	0	12.24	0	5.551	5.703	-0.152
598.9	48.597	-0.708	-0.692	0	12.27	0	5.552	5.703	-0.152
599	48.566	-0.715	-1.049	0	12.24	0	5.552	5.704	-0.152
599.1	48.535	-0.73	-0.819	0	12.41	0	5.552	5.704	-0.152
599.2	48.51	-0.733	-0.445	0	12.45	0	5.553	5.704	-0.152
599.3	48.479	-0.723	-0.173	0	12.45	0	5.553	5.705	-0.152
599.4	48.423	-0.74	-1.063	0	12.42	0	5.553	5.705	-0.152
599.5	48.399	-0.758	-0.646	0	12.44	0	5.554	5.705	-0.152
599.6	48.374	-0.743	0.124	0	13.02	0	5.554	5.706	-0.152
599.7	48.343	-0.733	-0.78	0	13.14	0	5.554	5.706	-0.152
599.8	48.324	-0.733	-1.211	0	13.12	0	5.555	5.706	-0.152
599.9	48.293	-0.713	-0.735	0	13.15	0	5.555	5.707	-0.152
600	48.268	-0.715	-0.901	0	13.1	0	5.556	5.707	-0.152
600.1	48.243	-0.735	-0.985	0	13.12	0	5.556	5.707	-0.152
600.2	48.212	-0.738	-0.131	0	13.13	0	5.556	5.708	-0.152
600.3	48.187	-0.725	-0.441	0	13.48	0	5.557	5.708	-0.152
600.4	48.162	-0.733	-0.886	0	13.55	0	5.557	5.709	-0.152
600.5	48.138	-0.743	-0.735	0	13.52	0	5.557	5.709	-0.152
600.6	48.113	-0.738	-0.247	0	13.48	0	5.558	5.709	-0.152
600.7	48.088	-0.728	-0.53	0	13.51	0	5.558	5.71	-0.152
600.8	48.063	-0.733	-0.805	0	13.48	0	5.559	5.71	-0.152
600.9	48.032	-0.753	-0.72	0	13.48	0	5.559	5.71	-0.152
601	48.007	-0.763	-0.456	0	13.49	0	5.559	5.711	-0.152
601.1	47.982	-0.738	-0.484	0	13.67	0	5.56	5.711	-0.152
601.2	47.957	-0.728	-0.805	0	13.92	0	5.56	5.712	-0.152

601.3	47.933	-0.74	-1.416	0	13.93	0	5.56	5.712	-0.152
601.4	47.933	-0.738	-0.074	0	14.7	0	5.561	5.712	-0.152
601.5	47.914	-0.733	-0.65	0	16.08	0	5.561	5.713	-0.152
601.6	47.889	-0.738	-0.971	0	16.19	0	5.562	5.713	-0.152
601.7	47.852	-0.74	-0.562	0	16.57	0	5.562	5.714	-0.152
601.8	47.827	-0.74	-0.247	0	16.59	0	5.563	5.714	-0.152
601.9	47.815	-0.728	-1.049	0	16.63	0	5.563	5.715	-0.152
602	47.796	-0.738	-0.901	0	17.33	0	5.564	5.715	-0.152
602.1	47.771	-0.748	-0.735	0	17.3	0	5.564	5.716	-0.152
602.2	47.759	-0.743	-0.385	0	17.27	0	5.565	5.716	-0.152
602.3	47.74	-0.733	-0.78	0	17.89	0	5.565	5.717	-0.152
602.4	47.721	-0.735	-1.017	0	18.1	0	5.566	5.717	-0.152
602.5	47.703	-0.735	-0.89	0	20.79	0	5.566	5.718	-0.152
602.6	47.696	-0.74	-0.47	0	20.85	0	5.567	5.718	-0.152
602.7	47.684	-0.743	-0.562	0	21.15	0	5.567	5.719	-0.152
602.8	47.672	-0.743	-0.484	0	21.51	0	5.568	5.719	-0.152
602.9	47.659	-0.738	-0.484	0	21.53	0	5.568	5.72	-0.152
603	47.653	-0.745	-0.805	0	21.51	0	5.569	5.721	-0.152
603.1	47.641	-0.743	-0.332	0	21.48	0	5.57	5.721	-0.152
603.2	47.628	-0.738	-0.614	0	22.03	0	5.57	5.722	-0.152
603.3	47.622	-0.725	-0.692	0	22.63	0	5.571	5.722	-0.152
603.4	47.616	-0.72	-0.872	0	23.85	0	5.572	5.723	-0.152
603.5	47.603	-0.723	-1.049	0	24.38	0	5.572	5.724	-0.152
603.6	47.603	-0.723	-0.233	0	24.33	0	5.573	5.724	-0.152
603.7	47.597	-0.728	-0.72	0	25.03	0	5.574	5.725	-0.152
603.8	47.591	-0.735	-0.562	0	25.27	0	5.574	5.726	-0.152
603.9	47.591	-0.725	-0.074	0	27.82	0	5.575	5.727	-0.152
604	47.591	-0.735	-0.791	0	28.46	0	5.576	5.727	-0.152
604.1	47.591	-0.748	-1.017	0	29.44	0	5.577	5.728	-0.152
604.2	47.591	-0.745	-0.233	0	30.27	0	5.578	5.729	-0.152
604.3	47.597	-0.725	-0.646	0	31.65	0	5.578	5.73	-0.152
604.4	47.603	-0.728	-1.36	0	33.53	0	5.579	5.731	-0.152
604.5	47.616	-0.748	-1.031	0	34.16	0	5.58	5.732	-0.152
604.6	47.628	-0.755	-0.187	0	35.89	0	5.581	5.733	-0.152
604.7	47.628	-0.75	-0.403	0	38	0	5.582	5.734	-0.152
604.8	47.659	-0.75	-0.805	0	40.55	0	5.584	5.735	-0.152
604.9	47.678	-0.723	-1.095	0	42.16	0	5.585	5.736	-0.152
605	47.703	-0.723	-1.116	0	44.46	0	5.586	5.737	-0.152
605.1	47.703	-0.73	-0.646	0	48.25	0	5.587	5.739	-0.152
605.2	47.734	-0.748	-0.498	0	50.34	0	5.589	5.74	-0.152
605.3	47.802	-0.738	0.095	0	50.31	0	5.59	5.742	-0.152
605.4	47.802	-0.718	-0.562	0	50.84	0	5.591	5.743	-0.152
605.5	47.846	-0.71	-1.134	0	51.34	0	5.593	5.744	-0.152
605.6	47.883	-0.73	-1.176	0	53.29	0	5.594	5.746	-0.152
605.7	47.92	-0.74	-0.074	0	56.44	0	5.596	5.747	-0.152
605.8	48.013	-0.74	-0.074	0	57.32	0	5.598	5.749	-0.152
605.9	48.057	-0.768	-0.562	0	58.7	0	5.599	5.751	-0.152

606	48.113	-0.763	-0.159	0	58.74	0	5.601	5.752	-0.152
606.1	48.156	-0.735	-0.547	0	58.64	0	5.602	5.754	-0.152
606.2	48.156	-0.73	-1.116	0	60.15	0	5.604	5.756	-0.152
606.3	48.212	-0.73	-1.211	0	60.91	0	5.606	5.757	-0.152
606.4	48.262	-0.725	-0.562	0	61.3	0	5.607	5.759	-0.152
606.5	48.368	-0.73	-0.985	0	61.84	0	5.609	5.761	-0.152
606.6	48.423	-0.73	-0.399	0	61.49	0	5.611	5.762	-0.152
606.7	48.423	-0.73	-0.431	0	60.86	0	5.613	5.764	-0.152
606.8	48.529	-0.728	-1.116	0	60.68	0	5.614	5.766	-0.152
606.9	48.591	-0.713	-0.646	0	60.74	0	5.616	5.768	-0.152
607	48.641	-0.718	-1.109	0	60.84	0	5.618	5.769	-0.152
607.1	48.641	-0.743	-0.886	0	60.47	0	5.619	5.771	-0.152
607.2	48.74	-0.76	-0.346	0	56.89	0	5.621	5.772	-0.152
607.3	48.79	-0.745	0.155	0	50.7	0	5.622	5.774	-0.152
607.4	48.827	-0.725	-0.752	0	43.88	0	5.624	5.775	-0.152
607.5	48.852	-0.71	-1.211	0	39.79	0	5.625	5.776	-0.152
607.6	48.871	-0.708	-0.971	0	38.03	0	5.626	5.777	-0.152
607.7	48.883	-0.733	-0.692	0	37.89	0	5.627	5.778	-0.152
607.8	48.902	-0.733	-0.279	0	37.85	0	5.628	5.779	-0.152
607.9	48.914	-0.72	-0.233	0	37.87	0	5.629	5.78	-0.152
608	48.927	-0.73	-1.444	0	37.84	0	5.63	5.781	-0.152
608.1	48.927	-0.728	-0.547	0	37.83	0	5.631	5.783	-0.152
608.2	48.958	-0.723	-0.399	0	37.84	0	5.632	5.784	-0.152
608.3	48.958	-0.73	-1.031	0	37.81	0	5.633	5.785	-0.152
608.4	48.97	-0.738	-0.463	0	37.84	0	5.634	5.786	-0.152
608.5	48.983	-0.74	-0.646	0	37.83	0	5.635	5.787	-0.152
608.6	48.995	-0.745	-0.855	0	37.81	0	5.636	5.788	-0.152
608.7	49.008	-0.738	-0.413	0	35.64	0	5.637	5.789	-0.152
608.8	49.026	-0.738	-0.72	0	32.56	0	5.638	5.79	-0.152
608.9	49.039	-0.73	-0.72	0	29.77	0	5.639	5.79	-0.152
609	49.045	-0.723	-0.371	0	27.31	0	5.64	5.791	-0.152
609.1	49.039	-0.74	-1.197	0	23.43	0	5.64	5.792	-0.152
609.2	49.026	-0.743	-0.547	0	16.92	0	5.641	5.792	-0.152
609.3	49.008	-0.725	-0.371	0	10.79	0	5.641	5.793	-0.152
609.4	48.976	-0.725	-0.946	0	6.94	0	5.641	5.793	-0.152
609.5	48.976	-0.725	-0.872	0	4.24	0	5.641	5.793	-0.152
609.6	48.939	-0.73	-0.886	0	2.26	0	5.641	5.793	-0.152
609.7	48.896	-0.733	-0.413	0	0.89	0	5.642	5.793	-0.152
609.8	48.846	-0.74	-0.632	0	0	0	5.642	5.793	-0.152
609.9	48.802	-0.738	-0.385	0	0	0	5.642	5.793	-0.152
610	48.753	-0.743	-0.604	0	0	0	5.642	5.793	-0.152
610.1	48.697	-0.74	-1.105	0	0	0	5.642	5.793	-0.152
610.2	48.653	-0.735	-0.417	0	0	0	5.642	5.793	-0.152
610.3	48.597	-0.735	-0.706	0	0	0	5.642	5.793	-0.152
610.4	48.554	-0.73	-0.83	0	0	0	5.642	5.793	-0.152
610.5	48.504	-0.733	-0.558	0	0	0	5.642	5.793	-0.152
610.6	48.448	-0.75	-0.706	0	0	0	5.642	5.793	-0.152

610.7	48.399	-0.75	-0.385	0	0	0	5.642	5.793	-0.152
610.8	48.281	-0.75	-0.385	0	0	0	5.642	5.793	-0.152
610.9	48.218	-0.73	-1.13	0	-5.44	0	5.641	5.793	-0.152
611	48.138	-0.733	-0.918	0	-9.37	0	5.641	5.793	-0.152
611.1	48.138	-0.733	-0.547	0	-10.02	0	5.641	5.793	-0.152
611.2	48.063	-0.743	-0.385	0	-9.76	0	5.641	5.793	-0.153
611.3	47.976	-0.745	-0.706	0	-9.73	0	5.64	5.793	-0.153
611.4	47.902	-0.755	-0.562	0	-9.89	0	5.64	5.793	-0.153
611.5	47.827	-0.753	-0.872	0	-10.71	0	5.64	5.793	-0.153
611.6	47.759	-0.745	-0.516	0	-11.35	0	5.64	5.793	-0.154
611.7	47.672	-0.735	-0.872	0	-11.33	0	5.639	5.793	-0.154
611.8	47.516	-0.735	-0.872	0	-11.29	0	5.639	5.793	-0.154
611.9	47.442	-0.7	-0.706	0	-12.05	0	5.639	5.793	-0.155
612	47.361	-0.73	-1.345	0	-15.46	0	5.638	5.793	-0.155
612.1	47.268	-0.753	-0.392	0	-18.79	0	5.638	5.793	-0.156
612.2	47.162	-0.755	0.095	0	-20.43	0	5.637	5.793	-0.156
612.3	47.162	-0.743	-0.413	0	-20.69	0	5.636	5.793	-0.157
612.4	47.056	-0.743	-1.059	0	-20.03	0	5.636	5.793	-0.157
612.5	46.951	-0.743	-0.706	0	-12.92	0	5.636	5.793	-0.158
612.6	46.858	-0.738	-0.611	0	-1.89	0	5.635	5.793	-0.158
612.7	46.783	-0.743	-0.586	0	0	0	5.635	5.793	-0.158
612.8	46.733	-0.738	-0.692	0	0	0	5.635	5.793	-0.158
612.9	46.684	-0.73	-0.646	0	0	0	5.635	5.793	-0.158
613	46.64	-0.73	-1.144	0	0	0	5.635	5.793	-0.158
613.1	46.59	-0.72	-1.017	0	0	0	5.635	5.793	-0.158
613.2	46.541	-0.718	-0.78	0	0	0	5.635	5.793	-0.158
613.3	46.491	-0.73	-1.285	0	0	0	5.635	5.793	-0.158
613.4	46.441	-0.733	-0.219	0	0	0	5.635	5.793	-0.158
613.5	46.392	-0.733	-0.689	0	0	0	5.635	5.793	-0.158
613.6	46.342	-0.755	-0.752	0	0	0	5.635	5.793	-0.158
613.7	46.298	-0.765	-0.547	0	0	0	5.635	5.793	-0.158
613.8	46.255	-0.765	-0.06	0	0	0	5.636	5.793	-0.158
613.9	46.205	-0.723	-0.957	0	1.61	0	5.636	5.793	-0.158
614	46.118	-0.733	-1.374	0	3.16	0	5.636	5.793	-0.158
614.1	46.118	-0.735	-0.618	0	6.33	0	5.636	5.793	-0.158
614.2	46.081	-0.725	-0.459	0	10.84	0	5.636	5.794	-0.158
614.3	46.044	-0.733	-1.049	0	12.92	0	5.636	5.794	-0.158
614.4	46.019	-0.733	-0.533	0	14.51	0	5.637	5.795	-0.158
614.5	45.994	-0.728	-0.385	0	18.15	0	5.637	5.795	-0.158
614.6	45.969	-0.718	-0.901	0	20.62	0	5.638	5.796	-0.158
614.7	45.95	-0.715	-0.932	0	22.8	0	5.639	5.796	-0.158
614.8	45.944	-0.715	-0.692	0	24.01	0	5.639	5.797	-0.158
614.9	45.944	-0.738	-0.357	0	25.39	0	5.64	5.798	-0.158
615	45.944	-0.74	-0.777	0	27	0	5.641	5.798	-0.158
615.1	45.944	-0.733	-0.576	0	30.21	0	5.642	5.799	-0.158
615.2	45.957	-0.733	-1.063	0	34.66	0	5.643	5.8	-0.158
615.3	45.957	-0.73	-0.886	0	35.24	0	5.643	5.801	-0.158

615.4	45.969	-0.725	-0.533	0	35.27	0	5.644	5.802	-0.158
615.5	45.988	-0.743	-0.858	0	36.25	0	5.645	5.803	-0.158
615.6	46	-0.743	-0.159	0	39.48	0	5.647	5.804	-0.158
615.7	46.019	-0.73	-0.205	0	40.91	0	5.648	5.805	-0.158
615.8	46.044	-0.723	-1.116	0	42.78	0	5.649	5.807	-0.158
615.9	46.068	-0.72	-1.031	0	44.01	0	5.65	5.808	-0.158
616	46.106	-0.733	-1.116	0	46.52	0	5.651	5.809	-0.158
616.1	46.131	-0.735	-0.547	0	47.06	0	5.653	5.81	-0.158
616.2	46.168	-0.74	-0.516	0	48.62	0	5.654	5.812	-0.158
616.3	46.205	-0.75	-0.791	0	51.59	0	5.655	5.813	-0.158
616.4	46.249	-0.75	-0.777	0	53.84	0	5.657	5.815	-0.158
616.5	46.292	-0.735	-0.692	0	60.27	0	5.659	5.816	-0.158
616.6	46.336	-0.735	-0.544	0	61.21	0	5.66	5.818	-0.158
616.7	46.404	-0.738	-0.982	0	61.58	0	5.662	5.82	-0.158
616.8	46.466	-0.738	-0.258	0	63.57	0	5.664	5.822	-0.158
616.9	46.59	-0.74	-0.533	0	63.86	0	5.666	5.823	-0.158
617	46.653	-0.745	-0.678	0	64.43	0	5.667	5.825	-0.158
617.1	46.715	-0.74	-0.562	0	65.94	0	5.669	5.827	-0.158
617.2	46.783	-0.73	-0.886	0	67.27	0	5.671	5.829	-0.158
617.3	46.851	-0.73	-1.197	0	69.17	0	5.673	5.831	-0.158
617.4	46.926	-0.723	-0.533	0	70.78	0	5.675	5.833	-0.158
617.5	46.926	-0.723	-0.59	0	71.68	0	5.677	5.835	-0.158
617.6	47.001	-0.723	-0.544	0	74.73	0	5.679	5.837	-0.158
617.7	47.075	-0.725	-0.537	0	75.84	0	5.681	5.839	-0.158
617.8	47.156	-0.725	-0.653	0	75.6	0	5.683	5.841	-0.158
617.9	47.237	-0.71	-0.533	0	75.62	0	5.685	5.843	-0.158
618	47.317	-0.708	-1.197	0	76.85	0	5.688	5.845	-0.158
618.1	47.479	-0.718	-0.385	0	76.88	0	5.69	5.847	-0.158
618.2	47.566	-0.73	-0.819	0	76.84	0	5.692	5.849	-0.158
618.3	47.634	-0.72	-0.148	0	76.8	0	5.694	5.852	-0.158
618.4	47.728	-0.73	-0.516	0	79.5	0	5.696	5.854	-0.158
618.5	47.802	-0.728	-0.844	0	81.87	0	5.698	5.856	-0.158
618.6	47.802	-0.718	-0.399	0	83.2	0	5.701	5.858	-0.158
618.7	47.889	-0.715	-0.968	0	84.7	0	5.703	5.861	-0.158
618.8	48.075	-0.725	-0.706	0	84.54	0	5.705	5.863	-0.158
618.9	48.075	-0.73	-0.791	0	84.39	0	5.708	5.865	-0.158
619	48.175	-0.735	-0.371	0	85.02	0	5.71	5.868	-0.158
619.1	48.268	-0.738	-0.72	0	85.72	0	5.712	5.87	-0.158
619.2	48.361	-0.75	-0.562	0	86.5	0	5.715	5.873	-0.158
619.3	48.535	-0.745	-0.456	0	91.01	0	5.717	5.875	-0.158
619.4	48.647	-0.733	-0.562	0	94.25	0	5.72	5.878	-0.158
619.5	48.753	-0.73	-1.257	0	95.47	0	5.723	5.88	-0.158
619.6	48.852	-0.73	-0.971	0	95.23	0	5.725	5.883	-0.158
619.7	48.964	-0.748	-0.357	0	95.39	0	5.728	5.886	-0.158
619.8	49.076	-0.748	-0.629	0	95.64	0	5.731	5.888	-0.158
619.9	49.169	-0.735	-0.501	0	96.87	0	5.733	5.891	-0.158
620	49.275	-0.73	-1.081	0	96.79	0	5.736	5.894	-0.158

620.1	49.368	-0.72	-0.66	0	96.81	0	5.739	5.896	-0.158
620.2	49.486	-0.723	-0.971	0	96.8	0	5.741	5.899	-0.158
620.3	49.592	-0.745	-1.028	0	96.85	0	5.744	5.902	-0.158
620.4	49.691	-0.743	-0.304	0	96.87	0	5.747	5.904	-0.158
620.5	49.691	-0.735	-0.6	0	96.93	0	5.749	5.907	-0.158
620.6	49.902	-0.735	-1.088	0	96.9	0	5.752	5.91	-0.158
620.7	50.008	-0.728	-0.929	0	96.79	0	5.755	5.913	-0.158
620.8	50.008	-0.728	-0.533	0	96.85	0	5.758	5.915	-0.158
620.9	50.213	-0.723	-1.116	0	96.95	0	5.76	5.918	-0.158
621	50.312	-0.73	-0.805	0	96.94	0	5.763	5.921	-0.158
621.1	50.412	-0.728	-0.657	0	96.8	0	5.766	5.923	-0.158
621.2	50.511	-0.725	-0.66	0	96.67	0	5.768	5.926	-0.158
621.3	50.611	-0.72	-0.773	0	96.75	0	5.771	5.929	-0.158
621.4	50.716	-0.718	-0.385	0	96.74	0	5.774	5.931	-0.158
621.5	50.81	-0.73	-0.749	0	96.72	0	5.776	5.934	-0.158
621.6	50.81	-0.745	-0.929	0	95.81	0	5.779	5.937	-0.158
621.7	50.903	-0.745	-0.586	0	94.47	0	5.782	5.939	-0.158
621.8	50.996	-0.725	-0.307	0	93.84	0	5.784	5.942	-0.158
621.9	51.095	-0.718	-1.13	0	93.9	0	5.787	5.945	-0.158
622	51.207	-0.72	-1.197	0	93.87	0	5.789	5.947	-0.158
622.1	51.282	-0.733	-0.897	0	93.92	0	5.792	5.95	-0.158
622.2	51.375	-0.733	-0.516	0	94.06	0	5.795	5.952	-0.158
622.3	51.474	-0.74	-0.745	0	93.88	0	5.797	5.955	-0.158
622.4	51.568	-0.74	-0.749	0	94	0	5.8	5.958	-0.158
622.5	51.661	-0.728	-0.441	0	93.96	0	5.803	5.96	-0.158
622.6	51.754	-0.73	-0.72	0	93.88	0	5.805	5.963	-0.158
622.7	51.835	-0.735	-0.678	0	93.47	0	5.808	5.965	-0.158
622.8	51.928	-0.735	-0.706	0	92.11	0	5.81	5.968	-0.158
622.9	52.027	-0.733	-0.763	0	89.04	0	5.813	5.97	-0.158
623	52.114	-0.735	-0.586	0	85.79	0	5.815	5.973	-0.158
623.1	52.27	-0.738	-0.805	0	82.97	0	5.817	5.975	-0.158
623.2	52.338	-0.733	-0.614	0	81.26	0	5.82	5.977	-0.158
623.3	52.413	-0.728	-0.858	0	80.16	0	5.822	5.98	-0.158
623.4	52.481	-0.728	-0.706	0	80.35	0	5.824	5.982	-0.158
623.5	52.549	-0.733	-0.791	0	80.11	0	5.826	5.984	-0.158
623.6	52.618	-0.738	-0.516	0	77.04	0	5.829	5.986	-0.158
623.7	52.618	-0.72	-0.325	0	64.31	0	5.83	5.988	-0.158
623.8	52.736	-0.72	-1.031	0	56.73	0	5.832	5.99	-0.158
623.9	52.736	-0.758	-1.003	0	56.03	0	5.833	5.991	-0.158
624	52.773	-0.775	0.353	0	55.65	0	5.835	5.993	-0.158
624.1	52.798	-0.763	-0.219	0	55.67	0	5.837	5.994	-0.158
624.2	52.829	-0.733	-0.459	0	55.66	0	5.838	5.996	-0.158
624.3	52.866	-0.725	-1.522	0	56.65	0	5.84	5.997	-0.158
624.4	52.897	-0.73	-1.268	0	58.7	0	5.841	5.999	-0.158
624.5	52.935	-0.73	-0.339	0	59.89	0	5.843	6.001	-0.158
624.6	52.966	-0.718	-0.678	0	60.02	0	5.845	6.002	-0.158
624.7	53.009	-0.73	-0.872	0	60.02	0	5.846	6.004	-0.158

624.8	53.046	-0.738	-0.706	0	60.41	0	5.848	6.006	-0.158
624.9	53.084	-0.715	-0.134	0	61.76	0	5.85	6.007	-0.158
625	53.121	-0.713	-1.444	0	62.32	0	5.851	6.009	-0.158
625.1	53.165	-0.725	-1.3	0	62.28	0	5.853	6.011	-0.158
625.2	53.208	-0.738	-0.385	0	62.34	0	5.855	6.013	-0.158
625.3	53.245	-0.738	-0.385	0	62.19	0	5.857	6.014	-0.158
625.4	53.289	-0.733	-0.53	0	62.13	0	5.858	6.016	-0.158
625.5	53.339	-0.738	-1.045	0	62.16	0	5.86	6.018	-0.158
625.6	53.37	-0.728	-0.544	0	62.27	0	5.862	6.019	-0.158
625.7	53.45	-0.723	-0.498	0	62.31	0	5.864	6.021	-0.158
625.8	53.45	-0.723	-0.872	0	62.35	0	5.865	6.023	-0.158
625.9	53.494	-0.725	-0.678	0	62.13	0	5.867	6.025	-0.158
626	53.531	-0.75	-0.943	0	62.24	0	5.869	6.026	-0.158
626.1	53.575	-0.76	-0.318	0	62.22	0	5.87	6.028	-0.158
626.2	53.612	-0.748	-0.304	0	62.27	0	5.872	6.03	-0.158
626.3	53.662	-0.743	-0.872	0	61.69	0	5.874	6.032	-0.158
626.4	53.693	-0.74	-0.844	0	60.49	0	5.876	6.033	-0.158
626.5	53.736	-0.755	-0.773	0	59.53	0	5.877	6.035	-0.158
626.6	53.773	-0.765	-0.872	0	58.91	0	5.879	6.037	-0.158
626.7	53.805	-0.75	-0.042	0	58.96	0	5.88	6.038	-0.158
626.8	53.842	-0.75	-1.003	0	57.82	0	5.882	6.04	-0.158
626.9	53.879	-0.743	-1.444	0	57.76	0	5.884	6.041	-0.158
627	53.947	-0.753	-0.629	0	57.77	0	5.885	6.043	-0.158
627.1	53.979	-0.75	-0.042	0	57.83	0	5.887	6.045	-0.158
627.2	54.003	-0.738	-0.371	0	57.85	0	5.889	6.046	-0.158
627.3	54.041	-0.75	-1.116	0	57.94	0	5.89	6.048	-0.158
627.4	54.041	-0.755	-0.791	0	57.66	0	5.892	6.049	-0.158
627.5	54.072	-0.75	-0.155	0	56.68	0	5.893	6.051	-0.158
627.6	54.103	-0.74	-0.826	0	56.59	0	5.895	6.053	-0.158
627.7	54.14	-0.73	-0.812	0	56.62	0	5.896	6.054	-0.158
627.8	54.171	-0.73	-1.017	0	56.67	0	5.898	6.056	-0.158
627.9	54.202	-0.725	-1.197	0	55.74	0	5.9	6.057	-0.158
628	54.233	-0.725	-0.413	0	54.48	0	5.901	6.059	-0.158
628.1	54.258	-0.723	-0.706	0	54.46	0	5.903	6.06	-0.158
628.2	54.289	-0.718	-0.501	0	53.46	0	5.904	6.062	-0.158
628.3	54.314	-0.715	-1.045	0	52.44	0	5.906	6.063	-0.158
628.4	54.339	-0.725	-0.872	0	51.44	0	5.907	6.065	-0.158
628.5	54.364	-0.738	-0.544	0	51.52	0	5.908	6.066	-0.158
628.6	54.389	-0.74	-0.385	0	51.47	0	5.91	6.068	-0.158
628.7	54.407	-0.72	-0.791	0	51.61	0	5.911	6.069	-0.158
628.8	54.432	-0.72	-1.102	0	51.41	0	5.913	6.07	-0.158
628.9	54.451	-0.728	-1.155	0	51.21	0	5.914	6.072	-0.158
629	54.476	-0.72	-0.339	0	52.2	0	5.916	6.073	-0.158
629.1	54.494	-0.725	-1.017	0	52.31	0	5.917	6.075	-0.158
629.2	54.519	-0.745	-0.858	0	52.33	0	5.918	6.076	-0.158
629.3	54.563	-0.743	-0.113	0	52.32	0	5.92	6.078	-0.158
629.4	54.563	-0.728	-0.205	0	52.33	0	5.921	6.079	-0.158

629.5	54.612	-0.725	-1.183	0	52.34	0	5.923	6.081	-0.158
629.6	54.637	-0.708	-0.593	0	52.42	0	5.924	6.082	-0.158
629.7	54.662	-0.715	-1.225	0	52.38	0	5.926	6.083	-0.158
629.8	54.662	-0.715	-1.162	0	53.96	0	5.927	6.085	-0.158
629.9	54.687	-0.73	-0.014	0	55.87	0	5.929	6.086	-0.158
630	54.706	-0.73	-0.791	0	57.64	0	5.93	6.088	-0.158
630.1	54.737	-0.73	-0.982	0	57.62	0	5.932	6.09	-0.158
630.2	54.768	-0.72	-0.501	0	57.54	0	5.934	6.091	-0.158
630.3	54.793	-0.72	-1.183	0	57.51	0	5.935	6.093	-0.158
630.4	54.824	-0.725	-0.692	0	58.36	0	5.937	6.094	-0.158
630.5	54.855	-0.715	0	0	58.68	0	5.938	6.096	-0.158
630.6	54.886	-0.71	-1.017	0	58.94	0	5.94	6.098	-0.158
630.7	54.917	-0.71	-1.017	0	59.84	0	5.942	6.099	-0.158
630.8	54.954	-0.723	-0.692	0	59.86	0	5.943	6.101	-0.158
630.9	54.985	-0.728	-0.777	0	59.86	0	5.945	6.103	-0.158
631	55.016	-0.725	-0.544	0	59.65	0	5.947	6.104	-0.158
631.1	55.047	-0.72	-0.809	0	59.75	0	5.948	6.106	-0.158
631.2	55.078	-0.728	-0.858	0	59.77	0	5.95	6.108	-0.158
631.3	55.116	-0.733	-0.858	0	59.78	0	5.952	6.109	-0.158
631.4	55.147	-0.735	-0.371	0	59.71	0	5.953	6.111	-0.158
631.5	55.178	-0.735	-0.53	0	58.8	0	5.955	6.113	-0.158
631.6	55.215	-0.723	-0.53	0	57.72	0	5.957	6.114	-0.158
631.7	55.246	-0.718	-0.791	0	56.96	0	5.958	6.116	-0.158
631.8	55.277	-0.718	-1.24	0	56.44	0	5.96	6.117	-0.158
631.9	55.302	-0.713	-0.367	0	55.95	0	5.961	6.119	-0.158
632	55.333	-0.705	-0.943	0	55.44	0	5.963	6.121	-0.158
632.1	55.358	-0.728	-1.345	0	54.21	0	5.964	6.122	-0.158
632.2	55.389	-0.755	-0.812	0	52.38	0	5.966	6.123	-0.158
632.3	55.408	-0.743	0.17	0	46.78	0	5.967	6.125	-0.158
632.4	55.433	-0.725	-0.29	0	42.42	0	5.968	6.126	-0.158
632.5	55.445	-0.73	-1.444	0	42.48	0	5.969	6.127	-0.158
632.6	55.451	-0.72	-0.614	0	42.46	0	5.971	6.128	-0.158
632.7	55.457	-0.715	-0.572	0	41.63	0	5.972	6.129	-0.158
632.8	55.464	-0.715	-1.582	0	38.07	0	5.973	6.131	-0.158
632.9	55.47	-0.725	-0.692	0	34.45	0	5.974	6.131	-0.158
633	55.47	-0.713	-0.544	0	29.27	0	5.975	6.132	-0.158
633.1	55.464	-0.723	-1.282	0	25.72	0	5.975	6.133	-0.158
633.2	55.451	-0.738	-0.456	0	22.16	0	5.976	6.134	-0.158
633.3	55.439	-0.738	-0.042	0	18.65	0	5.976	6.134	-0.158
633.4	55.414	-0.723	-0.438	0	16.64	0	5.977	6.135	-0.158
633.5	55.383	-0.72	-1.067	0	15.51	0	5.977	6.135	-0.158
633.6	55.352	-0.735	-0.943	0	12.13	0	5.978	6.135	-0.158
633.7	55.321	-0.735	-0.53	0	11.25	0	5.978	6.136	-0.158
633.8	55.283	-0.725	-0.028	0	10.61	0	5.978	6.136	-0.158
633.9	55.246	-0.735	-1.225	0	8.59	0	5.979	6.136	-0.158
634	55.203	-0.73	-0.53	0	5.5	0	5.979	6.136	-0.158
634.1	55.165	-0.718	-0.371	0	2.68	0	5.979	6.136	-0.158

634.2	55.116	-0.725	-1.345	0	0.93	0	5.979	6.136	-0.158
634.3	55.06	-0.738	-0.777	0	0	0	5.979	6.136	-0.158
634.4	55.01	-0.74	-0.456	0	0	0	5.979	6.136	-0.158
634.5	54.948	-0.75	-0.53	0	0	0	5.979	6.136	-0.158
634.6	54.892	-0.755	-0.6	0	0	0	5.979	6.136	-0.158
634.7	54.836	-0.748	-0.487	0	0	0	5.979	6.136	-0.158
634.8	54.78	-0.748	-0.858	0	0	0	5.979	6.136	-0.158
634.9	54.718	-0.718	-1.003	0	0	0	5.979	6.136	-0.158
635	54.656	-0.713	-0.943	0	0	0	5.979	6.136	-0.158
635.1	54.606	-0.728	-1.017	0	0	0	5.979	6.136	-0.158
635.2	54.494	-0.733	-0.53	0	0	0	5.979	6.136	-0.158
635.3	54.432	-0.735	-0.544	0	0	0	5.979	6.136	-0.158
635.4	54.382	-0.733	-0.858	0	0	0	5.979	6.136	-0.158
635.5	54.32	-0.735	-0.66	0	0	0	5.979	6.136	-0.158
635.6	54.258	-0.738	-0.84	0	0	0	5.979	6.136	-0.158
635.7	54.258	-0.735	-0.703	0	-5.3	0	5.979	6.136	-0.158
635.8	54.196	-0.735	-0.858	0	-14.31	0	5.978	6.136	-0.158
635.9	54.109	-0.72	-0.872	0	-20.8	0	5.978	6.136	-0.159
636	53.898	-0.723	-0.858	0	-21.67	0	5.977	6.136	-0.159
636.1	53.898	-0.738	-0.943	0	-23.17	0	5.976	6.136	-0.16
636.2	53.792	-0.738	-0.53	0	-26.59	0	5.976	6.136	-0.161
636.3	53.68	-0.733	-0.191	0	-30.45	0	5.975	6.136	-0.162
636.4	53.556	-0.733	-1.028	0	-36.95	0	5.974	6.136	-0.163
636.5	53.425	-0.735	-0.614	0	-40.95	0	5.973	6.136	-0.164
636.6	53.289	-0.728	-0.706	0	-42.73	0	5.971	6.136	-0.165
636.7	53.14	-0.713	-0.371	0	-44.74	0	5.97	6.136	-0.166
636.8	52.841	-0.725	-0.858	0	-49.62	0	5.969	6.136	-0.168
636.9	52.68	-0.743	-0.943	0	-56.44	0	5.967	6.136	-0.169
637	52.493	-0.723	-0.205	0	-68.11	0	5.965	6.136	-0.171
637.1	52.282	-0.718	-1.017	0	-77.1	0	5.963	6.136	-0.173
637.2	52.034	-0.723	-1.017	0	-80.09	0	5.961	6.136	-0.175
637.3	51.829	-0.725	-0.371	0	-80.35	0	5.959	6.136	-0.178
637.4	51.592	-0.733	-0.735	0	-81.85	0	5.957	6.136	-0.18
637.5	51.356	-0.735	-0.692	0	-81.94	0	5.954	6.136	-0.182
637.6	51.114	-0.73	-0.53	0	-77.34	0	5.952	6.136	-0.184
637.7	50.89	-0.743	-0.929	0	-73.35	0	5.95	6.136	-0.186
637.8	50.89	-0.743	-0.763	0	-72.52	0	5.948	6.136	-0.188
637.9	50.667	-0.745	-0.244	0	-72.21	0	5.946	6.136	-0.19
638	50.455	-0.738	-0.879	0	-71.86	0	5.944	6.136	-0.192
638.1	50.238	-0.718	-0.53	0	-71.44	0	5.942	6.136	-0.194
638.2	50.02	-0.728	-0.968	0	-71.11	0	5.94	6.136	-0.196
638.3	49.592	-0.733	-0.53	0	-70.77	0	5.938	6.136	-0.198
638.4	49.374	-0.718	-0.286	0	-70.41	0	5.936	6.136	-0.2
638.5	49.163	-0.73	-1.063	0	-70.16	0	5.934	6.136	-0.202
638.6	49.163	-0.745	-0.84	0	-70.19	0	5.932	6.136	-0.204
638.7	48.921	-0.743	-0.039	0	-69.8	0	5.93	6.136	-0.206
638.8	48.709	-0.743	-0.526	0	-69.45	0	5.928	6.136	-0.208

638.9	48.299	-0.723	-0.897	0	-69.11	0	5.926	6.136	-0.21
639	48.299	-0.728	-0.826	0	-66.1	0	5.925	6.136	-0.212
639.1	48.082	-0.733	-0.692	0	-53.71	0	5.923	6.136	-0.213
639.2	47.877	-0.735	-0.858	0	-41.67	0	5.922	6.136	-0.214
639.3	47.703	-0.728	-0.487	0	-40.3	0	5.921	6.136	-0.216
639.4	47.554	-0.733	-0.901	0	-40.41	0	5.92	6.136	-0.217
639.5	47.411	-0.723	-0.692	0	-40.24	0	5.919	6.136	-0.218
639.6	47.268	-0.71	-0.629	0	-40.06	0	5.918	6.136	-0.219
639.7	47.119	-0.718	-1.063	0	-39.49	0	5.916	6.136	-0.22
639.8	46.976	-0.728	-0.858	0	-31.65	0	5.916	6.136	-0.221
639.9	46.833	-0.723	-0.678	0	-19.51	0	5.915	6.136	-0.221
640	46.708	-0.72	-0.692	0	-11.61	0	5.915	6.136	-0.222
640.1	46.609	-0.723	-0.689	0	-3.33	0	5.915	6.136	-0.222
640.2	46.541	-0.708	-0.572	0	0	0	5.915	6.136	-0.222
640.3	46.485	-0.71	-0.689	0	0	0	5.915	6.136	-0.222
640.4	46.435	-0.708	-1.003	0	0	0	5.915	6.137	-0.222
640.5	46.385	-0.698	-0.477	0	0	0	5.915	6.137	-0.222
640.6	46.292	-0.718	-1.169	0	0	0	5.915	6.137	-0.222
640.7	46.242	-0.728	-0.205	0	0	0	5.915	6.137	-0.222
640.8	46.242	-0.728	-0.247	0	0	0	5.915	6.137	-0.222
640.9	46.143	-0.743	-0.692	0	0	0	5.915	6.137	-0.222
641	46.106	-0.733	-0.614	0	1.36	0	5.915	6.137	-0.222
641.1	46.062	-0.725	-0.526	0	3.2	0	5.915	6.137	-0.222
641.2	46.019	-0.733	-0.798	0	4.72	0	5.915	6.137	-0.222
641.3	46.019	-0.74	-0.812	0	5.82	0	5.915	6.137	-0.222
641.4	45.981	-0.738	-0.371	0	5.94	0	5.915	6.137	-0.222
641.5	45.913	-0.728	-0.692	0	7.28	0	5.915	6.137	-0.222
641.6	45.876	-0.73	-0.858	0	12.28	0	5.916	6.138	-0.222
641.7	45.851	-0.743	-0.925	0	15.43	0	5.916	6.138	-0.222
641.8	45.832	-0.743	-0.371	0	15.76	0	5.917	6.139	-0.222
641.9	45.814	-0.733	-0.371	0	15.75	0	5.917	6.139	-0.222
642	45.814	-0.723	-0.943	0	15.77	0	5.918	6.139	-0.222
642.1	45.783	-0.715	-0.777	0	15.92	0	5.918	6.14	-0.222
642.2	45.764	-0.728	-1.017	0	17.36	0	5.918	6.14	-0.222
642.3	45.764	-0.743	-0.865	0	18.99	0	5.919	6.141	-0.222
642.4	45.752	-0.74	-0.371	0	20.33	0	5.92	6.141	-0.222
642.5	45.739	-0.723	-0.191	0	23.42	0	5.92	6.142	-0.222
642.6	45.733	-0.72	-1.183	0	24.51	0	5.921	6.143	-0.222
642.7	45.727	-0.723	-0.858	0	25.43	0	5.922	6.143	-0.222
642.8	45.727	-0.718	-0.53	0	25.55	0	5.922	6.144	-0.222
642.9	45.727	-0.723	-0.844	0	28.17	0	5.923	6.145	-0.222
643	45.727	-0.72	-0.357	0	29.92	0	5.924	6.146	-0.222
643.1	45.733	-0.72	-0.371	0	30.48	0	5.925	6.147	-0.222
643.2	45.745	-0.728	-1.059	0	33.98	0	5.926	6.148	-0.222
643.3	45.752	-0.758	-0.855	0	36.66	0	5.927	6.149	-0.222
643.4	45.764	-0.745	0.124	0	38.37	0	5.928	6.15	-0.222
643.5	45.783	-0.725	-0.53	0	39.62	0	5.929	6.151	-0.222

643.6	45.807	-0.735	-1.511	0	42.36	0	5.93	6.152	-0.222
643.7	45.832	-0.745	-0.731	0	44.91	0	5.931	6.153	-0.222
643.8	45.863	-0.745	-0.456	0	45.37	0	5.933	6.154	-0.222
643.9	45.894	-0.74	-0.614	0	46.07	0	5.934	6.156	-0.222
644	45.932	-0.723	-0.953	0	46.17	0	5.935	6.157	-0.222
644.1	45.963	-0.708	-0.855	0	46.31	0	5.936	6.158	-0.222
644.2	46	-0.713	-1.225	0	48.7	0	5.938	6.16	-0.222
644.3	46.037	-0.72	-0.664	0	49.94	0	5.939	6.161	-0.222
644.4	46.081	-0.725	-0.614	0	49.95	0	5.941	6.162	-0.222
644.5	46.124	-0.73	-0.53	0	51.08	0	5.942	6.164	-0.222
644.6	46.211	-0.715	-0.763	0	54.92	0	5.943	6.165	-0.222
644.7	46.255	-0.713	-0.855	0	55.33	0	5.945	6.167	-0.222
644.8	46.255	-0.713	-1.102	0	55.72	0	5.947	6.168	-0.222
644.9	46.311	-0.728	-0.731	0	57.21	0	5.948	6.17	-0.222
645	46.367	-0.723	-0.487	0	61.11	0	5.95	6.172	-0.222
645.1	46.416	-0.71	-0.385	0	62.83	0	5.952	6.173	-0.222
645.2	46.472	-0.72	-0.978	0	62.72	0	5.953	6.175	-0.222
645.3	46.541	-0.723	-0.678	0	62.72	0	5.955	6.177	-0.222
645.4	46.597	-0.71	-0.456	0	64.18	0	5.957	6.179	-0.222
645.5	46.665	-0.715	-1.074	0	66.27	0	5.959	6.181	-0.222
645.6	46.727	-0.72	-0.735	0	67.67	0	5.961	6.182	-0.222
645.7	46.795	-0.713	-0.692	0	68.7	0	5.962	6.184	-0.222
645.8	46.864	-0.715	-1.148	0	69.65	0	5.964	6.186	-0.222
645.9	46.932	-0.713	-0.872	0	71	0	5.966	6.188	-0.222
646	47.007	-0.7	-0.456	0	73.4	0	5.968	6.19	-0.222
646.1	47.081	-0.708	-1.063	0	74.28	0	5.97	6.192	-0.222
646.2	47.156	-0.71	-0.844	0	74.45	0	5.973	6.194	-0.222
646.3	47.237	-0.705	-0.205	0	74.43	0	5.975	6.197	-0.222
646.4	47.311	-0.71	-0.855	0	75.88	0	5.977	6.199	-0.222
646.5	47.386	-0.71	-0.706	0	75.98	0	5.979	6.201	-0.222
646.6	47.473	-0.708	-0.53	0	76.03	0	5.981	6.203	-0.222
646.7	47.547	-0.72	-0.858	0	76.06	0	5.983	6.205	-0.222
646.8	47.622	-0.72	-0.53	0	75.89	0	5.985	6.207	-0.222
646.9	47.703	-0.725	0.067	0	75.82	0	5.987	6.209	-0.222
647	47.79	-0.723	-0.692	0	75.7	0	5.989	6.211	-0.222
647.1	47.87	-0.718	-0.385	0	75.83	0	5.991	6.213	-0.222
647.2	47.945	-0.708	-0.678	0	75.79	0	5.994	6.215	-0.222
647.3	48.026	-0.71	-0.413	0	76.24	0	5.996	6.218	-0.222
647.4	48.1	-0.723	-0.812	0	76.24	0	5.998	6.22	-0.222
647.5	48.175	-0.735	-0.385	0	76.02	0	6	6.222	-0.222
647.6	48.249	-0.73	-0.516	0	75.67	0	6.002	6.224	-0.222
647.7	48.324	-0.718	-0.692	0	75.96	0	6.004	6.226	-0.222
647.8	48.405	-0.718	-1.017	0	76.88	0	6.006	6.228	-0.222
647.9	48.479	-0.73	-0.692	0	76.86	0	6.008	6.23	-0.222
648	48.56	-0.725	-0.459	0	77.04	0	6.011	6.232	-0.222
648.1	48.635	-0.713	-0.042	0	76.89	0	6.013	6.235	-0.222
648.2	48.716	-0.718	-0.982	0	77.15	0	6.015	6.237	-0.222

648.3	48.79	-0.72	-1.031	0	77.03	0	6.017	6.239	-0.222
648.4	48.865	-0.713	-0.371	0	77.19	0	6.019	6.241	-0.222
648.5	48.939	-0.72	-0.788	0	77.11	0	6.021	6.243	-0.222
648.6	49.02	-0.725	-0.53	0	77.08	0	6.023	6.245	-0.222
648.7	49.169	-0.73	-0.41	0	77.08	0	6.026	6.247	-0.222
648.8	49.169	-0.72	-0.413	0	76.97	0	6.028	6.25	-0.222
648.9	49.244	-0.713	-0.858	0	77.03	0	6.03	6.252	-0.222
649	49.318	-0.718	-1.031	0	76.89	0	6.032	6.254	-0.222
649.1	49.393	-0.718	-0.544	0	77.09	0	6.034	6.256	-0.222
649.2	49.467	-0.698	-0.247	0	76.94	0	6.036	6.258	-0.222
649.3	49.548	-0.705	-1.017	0	76.84	0	6.038	6.26	-0.222
649.4	49.616	-0.73	-1.229	0	76.84	0	6.041	6.262	-0.222
649.5	49.691	-0.738	0.258	0	76.69	0	6.043	6.265	-0.222
649.6	49.766	-0.728	-0.456	0	76.83	0	6.045	6.267	-0.222
649.7	49.846	-0.725	-0.777	0	76.69	0	6.047	6.269	-0.222
649.8	49.915	-0.725	-0.858	0	76.75	0	6.049	6.271	-0.222
649.9	49.989	-0.718	-1.13	0	76.81	0	6.051	6.273	-0.222
650	50.058	-0.715	-0.544	0	77.28	0	6.053	6.275	-0.222
650.1	50.132	-0.705	-0.735	0	78.1	0	6.055	6.277	-0.222
650.2	50.207	-0.71	-0.65	0	78.02	0	6.058	6.28	-0.222
650.3	50.275	-0.72	-0.501	0	78.15	0	6.06	6.282	-0.222
650.4	50.35	-0.715	-0.459	0	77.98	0	6.062	6.284	-0.222
650.5	50.43	-0.705	-0.53	0	78.16	0	6.064	6.286	-0.222
650.6	50.499	-0.713	-1.13	0	77.93	0	6.066	6.288	-0.222
650.7	50.573	-0.728	-0.544	0	78.05	0	6.069	6.29	-0.222
650.8	50.648	-0.728	-0.385	0	78.06	0	6.071	6.293	-0.222
650.9	50.716	-0.735	-0.509	0	77.57	0	6.073	6.295	-0.222
651	50.785	-0.748	-0.706	0	72.96	0	6.075	6.297	-0.222
651.1	50.859	-0.73	-0.12	0	65.92	0	6.077	6.299	-0.222
651.2	50.921	-0.723	-0.759	0	62.62	0	6.078	6.3	-0.222
651.3	50.977	-0.743	-1.487	0	62.69	0	6.08	6.302	-0.222
651.4	51.027	-0.755	-0.371	0	62.76	0	6.082	6.304	-0.222
651.5	51.07	-0.745	0.109	0	61.04	0	6.084	6.306	-0.222
651.6	51.12	-0.73	-0.629	0	58.53	0	6.085	6.307	-0.222
651.7	51.164	-0.748	-1.225	0	56.62	0	6.087	6.309	-0.222
651.8	51.207	-0.763	-0.544	0	55.06	0	6.088	6.31	-0.222
651.9	51.282	-0.75	-0.014	0	55.15	0	6.09	6.312	-0.222
652	51.319	-0.733	-0.706	0	55.09	0	6.091	6.313	-0.222
652.1	51.319	-0.73	-1.183	0	55.18	0	6.093	6.315	-0.222
652.2	51.35	-0.718	-0.879	0	56.62	0	6.095	6.316	-0.222
652.3	51.387	-0.715	-0.692	0	58.8	0	6.096	6.318	-0.222
652.4	51.425	-0.71	-1.141	0	60.89	0	6.098	6.32	-0.222
652.5	51.462	-0.71	-0.788	0	62.61	0	6.1	6.321	-0.222
652.6	51.512	-0.723	-1.017	0	63.94	0	6.101	6.323	-0.222
652.7	51.561	-0.733	-0.304	0	64.96	0	6.103	6.325	-0.222
652.8	51.655	-0.733	-0.456	0	66.47	0	6.105	6.327	-0.222
652.9	51.704	-0.713	-0.544	0	67.64	0	6.107	6.329	-0.222

653	51.76	-0.718	-0.957	0	68.32	0	6.109	6.331	-0.222
653.1	51.76	-0.72	-0.872	0	68.38	0	6.111	6.333	-0.222
653.2	51.81	-0.713	-0.205	0	68.41	0	6.113	6.334	-0.222
653.3	51.866	-0.71	-1.031	0	68.42	0	6.114	6.336	-0.222
653.4	51.922	-0.713	-0.886	0	68.41	0	6.116	6.338	-0.222
653.5	51.971	-0.718	-0.47	0	67.61	0	6.118	6.34	-0.222
653.6	52.027	-0.713	-0.6	0	66.09	0	6.12	6.342	-0.222
653.7	52.083	-0.718	-0.646	0	64.45	0	6.122	6.344	-0.222
653.8	52.133	-0.718	-0.858	0	61.57	0	6.124	6.345	-0.222
653.9	52.226	-0.713	-0.053	0	57.37	0	6.125	6.347	-0.222
654	52.226	-0.718	-0.858	0	57.04	0	6.127	6.349	-0.222
654.1	52.264	-0.713	-1.031	0	57.08	0	6.128	6.35	-0.222
654.2	52.295	-0.713	-0.385	0	57.19	0	6.13	6.352	-0.222
654.3	52.332	-0.723	-0.946	0	57.16	0	6.132	6.353	-0.222
654.4	52.363	-0.728	-0.456	0	56.21	0	6.133	6.355	-0.222
654.5	52.4	-0.728	-0.706	0	50.92	0	6.135	6.356	-0.222
654.6	52.438	-0.723	-0.703	0	40.31	0	6.136	6.358	-0.222
654.7	52.462	-0.728	-1.102	0	29.83	0	6.136	6.358	-0.222
654.8	52.475	-0.715	-0.773	0	20.89	0	6.137	6.359	-0.222
654.9	52.462	-0.705	-0.219	0	19.33	0	6.138	6.359	-0.222
655	52.444	-0.708	-1.077	0	18.27	0	6.138	6.36	-0.222
655.1	52.425	-0.705	-0.59	0	14.77	0	6.138	6.36	-0.222
655.2	52.4	-0.7	-0.692	0	11.27	0	6.139	6.361	-0.222
655.3	52.375	-0.7	-0.872	0	9.26	0	6.139	6.361	-0.222
655.4	52.332	-0.7	-0.872	0	8.65	0	6.139	6.361	-0.222
655.5	52.301	-0.713	-0.381	0	8.18	0	6.14	6.361	-0.222
655.6	52.257	-0.725	-0.59	0	8.08	0	6.14	6.362	-0.222
655.7	52.22	-0.723	-0.258	0	7.76	0	6.14	6.362	-0.222
655.8	52.133	-0.723	-0.791	0	6.38	0	6.14	6.362	-0.222
655.9	52.133	-0.715	-0.516	0	4.9	0	6.14	6.362	-0.222
656	52.09	-0.71	-0.886	0	3.74	0	6.14	6.362	-0.222
656.1	52.046	-0.733	-0.773	0	2.9	0	6.14	6.362	-0.222
656.2	51.953	-0.763	-0.685	0	2.56	0	6.141	6.362	-0.222
656.3	51.897	-0.745	0.353	0	1.66	0	6.141	6.362	-0.222
656.4	51.847	-0.71	-0.544	0	0.75	0	6.141	6.362	-0.222
656.5	51.798	-0.723	-2.009	0	0	0	6.141	6.362	-0.222
656.6	51.742	-0.738	-0.957	0	0	0	6.141	6.362	-0.222
656.7	51.686	-0.733	0.071	0	0	0	6.141	6.362	-0.222
656.8	51.686	-0.733	-0.791	0	0	0	6.141	6.362	-0.222
656.9	51.636	-0.7	-1.031	0	0	0	6.141	6.362	-0.222
657	51.58	-0.705	-1.031	0	0	0	6.141	6.362	-0.222
657.1	51.53	-0.718	-0.777	0	0	0	6.141	6.362	-0.222
657.2	51.474	-0.718	-0.385	0	0	0	6.141	6.362	-0.222
657.3	51.418	-0.708	-0.66	0	0	0	6.141	6.362	-0.222
657.4	51.369	-0.7	-1.031	0	0.93	0	6.141	6.363	-0.222
657.5	51.319	-0.713	-0.918	0	1.55	0	6.141	6.363	-0.222
657.6	51.263	-0.723	-0.625	0	2.35	0	6.141	6.363	-0.222

657.7	51.213	-0.738	-0.364	0	2.71	0	6.141	6.363	-0.222
657.8	51.164	-0.763	-0.763	0	3.82	0	6.141	6.363	-0.222
657.9	51.12	-0.778	0.095	0	6.56	0	6.141	6.363	-0.222
658	51.07	-0.805	-0.498	0	13.14	0	6.141	6.363	-0.222
658.1	51.033	-0.763	0.085	0	17.4	0	6.142	6.364	-0.222
658.2	51.002	-0.703	-0.6	0	18.95	0	6.142	6.364	-0.222
658.3	50.977	-0.715	-2.74	0	22.44	0	6.143	6.365	-0.222
658.4	50.959	-0.745	-1.116	0	24.7	0	6.144	6.366	-0.222
658.5	50.946	-0.74	0.586	0	25	0	6.144	6.366	-0.222
658.6	50.934	-0.723	-0.562	0	25.81	0	6.145	6.367	-0.222
658.7	50.921	-0.718	-1.031	0	26.91	0	6.146	6.368	-0.222
658.8	50.915	-0.718	-0.816	0	27.59	0	6.147	6.369	-0.222
658.9	50.903	-0.708	-1.056	0	28.27	0	6.147	6.369	-0.222
659	50.897	-0.72	-1.197	0	28.25	0	6.148	6.37	-0.222
659.1	50.897	-0.72	-0.364	0	28.28	0	6.149	6.371	-0.222
659.2	50.884	-0.718	-0.558	0	28.25	0	6.15	6.372	-0.222
659.3	50.884	-0.725	-0.706	0	28.29	0	6.151	6.373	-0.222
659.4	50.878	-0.723	-0.72	0	28.46	0	6.151	6.373	-0.222
659.5	50.865	-0.713	-0.692	0	30.11	0	6.152	6.374	-0.222
659.6	50.865	-0.713	-1.211	0	30.62	0	6.153	6.375	-0.222
659.7	50.865	-0.713	-0.971	0	31.97	0	6.154	6.376	-0.222
659.8	50.865	-0.713	-0.72	0	33.04	0	6.155	6.377	-0.222
659.9	50.865	-0.698	-0.477	0	33.74	0	6.156	6.378	-0.222
660	50.865	-0.715	-1.197	0	35.48	0	6.157	6.379	-0.222
660.1	50.865	-0.72	-0.66	0	36.55	0	6.158	6.38	-0.222
660.2	50.872	-0.705	-0.113	0	38.5	0	6.159	6.381	-0.222
660.3	50.884	-0.723	-0.957	0	39.45	0	6.16	6.382	-0.222
660.4	50.897	-0.735	-0.886	0	42.08	0	6.161	6.383	-0.222
660.5	50.909	-0.713	-0.219	0	44.01	0	6.162	6.384	-0.222
660.6	50.921	-0.695	-0.848	0	44.47	0	6.164	6.386	-0.222
660.7	50.946	-0.703	-1.211	0	44.87	0	6.165	6.387	-0.222
660.8	50.965	-0.718	-0.833	0	44.9	0	6.166	6.388	-0.222
660.9	50.984	-0.738	-0.258	0	45.98	0	6.167	6.389	-0.222
661	51.008	-0.75	-0.141	0	46.02	0	6.169	6.391	-0.222
661.1	51.027	-0.743	-0.516	0	46.94	0	6.17	6.392	-0.222
661.2	51.052	-0.713	-0.562	0	46.86	0	6.171	6.393	-0.222
661.3	51.07	-0.708	-1.391	0	46.82	0	6.173	6.394	-0.222
661.4	51.095	-0.71	-1.342	0	46.78	0	6.174	6.396	-0.222
661.5	51.12	-0.718	-0.318	0	47.63	0	6.175	6.397	-0.222
661.6	51.145	-0.713	-0.48	0	48.91	0	6.177	6.398	-0.222
661.7	51.176	-0.725	-0.692	0	48.75	0	6.178	6.4	-0.222
661.8	51.195	-0.725	-0.957	0	48.75	0	6.179	6.401	-0.222
661.9	51.22	-0.723	-0.261	0	48.72	0	6.181	6.403	-0.222
662	51.251	-0.73	-0.957	0	48.75	0	6.182	6.404	-0.222
662.1	51.269	-0.73	-0.766	0	48.76	0	6.183	6.405	-0.222
662.2	51.3	-0.715	-0.357	0	48.8	0	6.185	6.407	-0.222
662.3	51.35	-0.703	-1.031	0	48.8	0	6.186	6.408	-0.222

662.4	51.35	-0.713	-1.54	0	48.82	0	6.187	6.409	-0.222
662.5	51.375	-0.715	-0.459	0	48.87	0	6.189	6.411	-0.222
662.6	51.406	-0.715	-0.501	0	48.9	0	6.19	6.412	-0.222
662.7	51.431	-0.71	-0.72	0	48.87	0	6.191	6.413	-0.222
662.8	51.456	-0.71	-0.484	0	48.63	0	6.193	6.415	-0.222
662.9	51.481	-0.72	-0.636	0	48.72	0	6.194	6.416	-0.222
663	51.512	-0.72	-0.396	0	48.7	0	6.196	6.417	-0.222
663.1	51.537	-0.728	-0.858	0	48.72	0	6.197	6.419	-0.222
663.2	51.561	-0.733	-0.706	0	48.77	0	6.198	6.42	-0.222
663.3	51.611	-0.715	-0.233	0	48.79	0	6.2	6.422	-0.222
663.4	51.611	-0.705	-0.886	0	48.89	0	6.201	6.423	-0.222
663.5	51.636	-0.72	-1.296	0	48.86	0	6.202	6.424	-0.222
663.6	51.661	-0.735	-0.72	0	48.86	0	6.204	6.426	-0.222
663.7	51.686	-0.74	-0.314	0	48.9	0	6.205	6.427	-0.222
663.8	51.711	-0.715	-0.339	0	48.8	0	6.206	6.428	-0.222
663.9	51.735	-0.725	-1.211	0	48.7	0	6.208	6.43	-0.222
664	51.76	-0.74	-1.01	0	48.66	0	6.209	6.431	-0.222
664.1	51.81	-0.745	-0.099	0	48.78	0	6.21	6.432	-0.222
664.2	51.81	-0.745	-0.646	0	48.74	0	6.212	6.434	-0.222
664.3	51.835	-0.725	-0.385	0	48.78	0	6.213	6.435	-0.222
664.4	51.86	-0.723	-0.812	0	48.79	0	6.215	6.436	-0.222
664.5	51.884	-0.725	-1.006	0	48.8	0	6.216	6.438	-0.222
664.6	51.903	-0.718	-0.562	0	48.85	0	6.217	6.439	-0.222
664.7	51.953	-0.71	-0.929	0	48.91	0	6.219	6.44	-0.222
664.8	51.953	-0.71	-0.766	0	48.87	0	6.22	6.442	-0.222
664.9	51.978	-0.718	-0.805	0	48.73	0	6.221	6.443	-0.222
665	52.009	-0.71	-0.357	0	48.7	0	6.223	6.445	-0.222
665.1	52.027	-0.713	-0.646	0	48.72	0	6.224	6.446	-0.222
665.2	52.058	-0.728	-0.766	0	48.78	0	6.225	6.447	-0.222
665.3	52.077	-0.715	-0.004	0	48.82	0	6.227	6.449	-0.222
665.4	52.102	-0.71	-0.72	0	48.82	0	6.228	6.45	-0.222
665.5	52.127	-0.73	-1.211	0	48.85	0	6.229	6.451	-0.222
665.6	52.152	-0.738	-0.646	0	48.85	0	6.231	6.453	-0.222
665.7	52.177	-0.71	-0.399	0	48.89	0	6.232	6.454	-0.222
665.8	52.201	-0.71	-1.045	0	48.92	0	6.234	6.455	-0.222
665.9	52.226	-0.715	-1.374	0	48.98	0	6.235	6.457	-0.222
666	52.257	-0.718	-0.396	0	48.84	0	6.236	6.458	-0.222
666.1	52.276	-0.708	-0.396	0	48.7	0	6.238	6.459	-0.222
666.2	52.301	-0.723	-0.696	0	48.72	0	6.239	6.461	-0.222
666.3	52.319	-0.74	-0.562	0	48.77	0	6.24	6.462	-0.222
666.4	52.344	-0.718	0.081	0	48.77	0	6.242	6.464	-0.222
666.5	52.394	-0.715	-0.675	0	48.78	0	6.243	6.465	-0.222
666.6	52.394	-0.74	-1.254	0	48.79	0	6.244	6.466	-0.222
666.7	52.419	-0.738	-0.004	0	48.83	0	6.246	6.468	-0.222
666.8	52.438	-0.708	0.042	0	48.83	0	6.247	6.469	-0.222
666.9	52.487	-0.713	-1.211	0	48.9	0	6.248	6.47	-0.222
667	52.487	-0.733	-1.271	0	48.89	0	6.25	6.472	-0.222

667.1	52.512	-0.73	-0.004	0	48.71	0	6.251	6.473	-0.222
667.2	52.537	-0.728	-0.576	0	48.72	0	6.252	6.474	-0.222
667.3	52.556	-0.733	-0.805	0	48.73	0	6.254	6.476	-0.222
667.4	52.58	-0.733	-0.498	0	48.74	0	6.255	6.477	-0.222
667.5	52.605	-0.723	-0.735	0	48.78	0	6.257	6.478	-0.222
667.6	52.624	-0.715	-0.925	0	48.29	0	6.258	6.48	-0.222
667.7	52.643	-0.718	-0.777	0	45.34	0	6.259	6.481	-0.222
667.8	52.667	-0.718	-0.59	0	42.55	0	6.26	6.482	-0.222
667.9	52.686	-0.72	-0.749	0	39.36	0	6.261	6.483	-0.222
668	52.698	-0.72	-0.735	0	36.42	0	6.262	6.484	-0.222
668.1	52.711	-0.708	-0.29	0	33.86	0	6.263	6.485	-0.222
668.2	52.711	-0.715	-1.197	0	34.02	0	6.264	6.486	-0.222
668.3	52.711	-0.723	-0.558	0	33.88	0	6.265	6.487	-0.222
668.4	52.711	-0.703	-0.244	0	33.7	0	6.266	6.488	-0.222
668.5	52.711	-0.698	-0.975	0	33.09	0	6.267	6.489	-0.222
668.6	52.711	-0.72	-1.059	0	33.15	0	6.268	6.49	-0.222
668.7	52.711	-0.72	-0.286	0	33.12	0	6.269	6.491	-0.222
668.8	52.705	-0.72	-0.088	0	33.14	0	6.27	6.492	-0.222
668.9	52.705	-0.728	-0.929	0	33.14	0	6.271	6.493	-0.222
669	52.705	-0.728	-0.3	0	33.12	0	6.272	6.494	-0.222
669.1	52.705	-0.723	-0.886	0	33.13	0	6.273	6.495	-0.222
669.2	52.698	-0.723	-0.667	0	33.12	0	6.274	6.495	-0.222
669.3	52.698	-0.73	-0.576	0	33.13	0	6.274	6.496	-0.222
669.4	52.698	-0.725	-0.343	0	32.74	0	6.275	6.497	-0.222
669.5	52.698	-0.718	-0.427	0	32.4	0	6.276	6.498	-0.222
669.6	52.698	-0.728	-0.975	0	32.41	0	6.277	6.499	-0.222
669.7	52.692	-0.725	-0.572	0	32.4	0	6.278	6.5	-0.222
669.8	52.686	-0.708	-0.459	0	32.3	0	6.279	6.501	-0.222
669.9	52.686	-0.713	-1.059	0	32.22	0	6.28	6.502	-0.222
670	52.68	-0.72	-1.059	0	32.25	0	6.281	6.503	-0.222
670.1	52.68	-0.72	-0.205	0	32.22	0	6.282	6.504	-0.222
670.2	52.68	-0.725	-0.858	0	32.22	0	6.283	6.504	-0.222
670.3	52.674	-0.72	-0.484	0	32.15	0	6.283	6.505	-0.222
670.4	52.674	-0.71	-0.547	0	31.4	0	6.284	6.506	-0.222
670.5	52.667	-0.72	-0.975	0	31.35	0	6.285	6.507	-0.222
670.6	52.661	-0.723	-0.413	0	30.68	0	6.286	6.508	-0.222
670.7	52.655	-0.71	-0.014	0	30.46	0	6.287	6.509	-0.222
670.8	52.655	-0.71	-1.059	0	29.36	0	6.288	6.51	-0.222
670.9	52.643	-0.72	-0.858	0	28.55	0	6.289	6.51	-0.222
671	52.636	-0.718	-0.689	0	28.49	0	6.289	6.511	-0.222
671.1	52.636	-0.703	-0.576	0	28.5	0	6.29	6.512	-0.222
671.2	52.624	-0.7	-0.858	0	28.5	0	6.291	6.513	-0.222
671.3	52.618	-0.718	-1.116	0	28.48	0	6.292	6.514	-0.222
671.4	52.611	-0.725	-0.427	0	28.49	0	6.292	6.514	-0.222
671.5	52.605	-0.718	-0.427	0	28.88	0	6.293	6.515	-0.222
671.6	52.599	-0.71	-0.629	0	29.46	0	6.294	6.516	-0.222
671.7	52.587	-0.72	-0.999	0	30.33	0	6.295	6.517	-0.222

671.8	52.587	-0.72	-0.498	0	31.5	0	6.296	6.518	-0.222
671.9	52.574	-0.703	-0.572	0	32.46	0	6.297	6.519	-0.222
672	52.574	-0.698	-1.105	0	33.1	0	6.298	6.52	-0.222
672.1	52.574	-0.705	-1.077	0	33.07	0	6.299	6.52	-0.222
672.2	52.568	-0.71	-0.473	0	33.06	0	6.299	6.521	-0.222
672.3	52.568	-0.708	-0.399	0	33.07	0	6.3	6.522	-0.222
672.4	52.568	-0.718	-0.706	0	33.05	0	6.301	6.523	-0.222
672.5	52.568	-0.725	-0.562	0	33.06	0	6.302	6.524	-0.222
672.6	52.568	-0.725	-0.413	0	33.07	0	6.303	6.525	-0.222
672.7	52.568	-0.713	-0.576	0	33.1	0	6.304	6.526	-0.222
672.8	52.568	-0.71	-0.706	0	33.08	0	6.305	6.527	-0.222
672.9	52.568	-0.725	-0.999	0	33.08	0	6.306	6.528	-0.222
673	52.562	-0.73	-0.261	0	33.1	0	6.307	6.529	-0.222
673.1	52.562	-0.715	-0.413	0	33.09	0	6.308	6.53	-0.222
673.2	52.562	-0.708	-0.576	0	33.09	0	6.309	6.531	-0.222
673.3	52.562	-0.713	-1.285	0	33.09	0	6.31	6.531	-0.222
673.4	52.562	-0.71	-0.427	0	33.58	0	6.311	6.532	-0.222
673.5	52.562	-0.718	-0.459	0	33.87	0	6.311	6.533	-0.222
673.6	52.562	-0.738	-0.819	0	33.81	0	6.312	6.534	-0.222
673.7	52.562	-0.733	-0.074	0	33.83	0	6.313	6.535	-0.222
673.8	52.562	-0.733	-0.261	0	33.79	0	6.314	6.536	-0.222
673.9	52.562	-0.723	-1.388	0	33.84	0	6.315	6.537	-0.222
674	52.568	-0.713	-0.314	0	33.31	0	6.316	6.538	-0.222
674.1	52.562	-0.718	-0.886	0	32.81	0	6.317	6.539	-0.222
674.2	52.562	-0.74	-0.717	0	31.84	0	6.318	6.54	-0.222
674.3	52.562	-0.75	-0.367	0	31.32	0	6.319	6.541	-0.222
674.4	52.562	-0.723	0.025	0	30.62	0	6.32	6.542	-0.222
674.5	52.556	-0.708	-0.844	0	30.3	0	6.32	6.542	-0.222
674.6	52.549	-0.73	-1.575	0	29.87	0	6.321	6.543	-0.222
674.7	52.543	-0.73	-0.074	0	29.9	0	6.322	6.544	-0.222
674.8	52.537	-0.73	-0.205	0	29.17	0	6.323	6.545	-0.222
674.9	52.537	-0.703	-1.049	0	29.17	0	6.324	6.546	-0.222
675	52.525	-0.718	-1.059	0	28.65	0	6.325	6.546	-0.222
675.1	52.518	-0.718	-0.427	0	28.41	0	6.325	6.547	-0.222
675.2	52.512	-0.72	-0.427	0	28.28	0	6.326	6.548	-0.222
675.3	52.506	-0.715	-0.275	0	27.47	0	6.327	6.549	-0.222
675.4	52.5	-0.72	-0.72	0	26.21	0	6.328	6.55	-0.222
675.5	52.487	-0.728	-0.886	0	24.97	0	6.328	6.55	-0.222
675.6	52.481	-0.733	-0.59	0	24.74	0	6.329	6.551	-0.222
675.7	52.462	-0.738	-0.346	0	24.09	0	6.33	6.552	-0.222
675.8	52.45	-0.738	-0.671	0	23.75	0	6.33	6.552	-0.222
675.9	52.438	-0.738	-0.646	0	22.85	0	6.331	6.553	-0.222
676	52.419	-0.725	-0.59	0	22.52	0	6.332	6.553	-0.222
676.1	52.406	-0.725	-0.735	0	22.55	0	6.332	6.554	-0.222
676.2	52.388	-0.715	-0.915	0	22.55	0	6.333	6.555	-0.222
676.3	52.375	-0.715	-0.805	0	22.51	0	6.333	6.555	-0.222
676.4	52.351	-0.723	-0.703	0	22.52	0	6.334	6.556	-0.222

676.5	52.338	-0.725	-0.473	0	22.45	0	6.335	6.557	-0.222
676.6	52.319	-0.72	-0.399	0	19.97	0	6.335	6.557	-0.222
676.7	52.307	-0.718	-0.562	0	13.95	0	6.336	6.558	-0.222
676.8	52.282	-0.718	-0.999	0	13.34	0	6.336	6.558	-0.222
676.9	52.251	-0.71	-0.544	0	13.37	0	6.336	6.558	-0.222
677	52.22	-0.713	-0.749	0	13.28	0	6.337	6.559	-0.222
677.1	52.189	-0.71	-0.59	0	13.3	0	6.337	6.559	-0.222
677.2	52.158	-0.708	-0.689	0	13.3	0	6.338	6.559	-0.222
677.3	52.127	-0.708	-1.049	0	13.27	0	6.338	6.56	-0.222
677.4	52.096	-0.728	-0.749	0	13.28	0	6.338	6.56	-0.222
677.5	52.065	-0.748	-0.357	0	13.15	0	6.339	6.561	-0.222
677.6	52.027	-0.738	-0.261	0	10.32	0	6.339	6.561	-0.222
677.7	51.996	-0.715	-0.413	0	7.72	0	6.339	6.561	-0.222
677.8	51.965	-0.715	-1.699	0	6.08	0	6.339	6.561	-0.222
677.9	51.922	-0.73	-1.119	0	4.56	0	6.339	6.561	-0.222
678	51.884	-0.735	-0.275	0	3.26	0	6.34	6.561	-0.222
678.1	51.841	-0.733	-0.318	0	2.94	0	6.34	6.561	-0.222
678.2	51.785	-0.715	-0.604	0	2.93	0	6.34	6.562	-0.222
678.3	51.735	-0.71	-0.547	0	2.95	0	6.34	6.562	-0.222
678.4	51.692	-0.715	-1.24	0	2.78	0	6.34	6.562	-0.222
678.5	51.599	-0.713	-0.318	0	1.58	0	6.34	6.562	-0.222
678.6	51.599	-0.72	-0.547	0	0	0	6.34	6.562	-0.222
678.7	51.543	-0.723	-0.463	0	0	0	6.34	6.562	-0.222
678.8	51.493	-0.715	-0.562	0	0	0	6.34	6.562	-0.222
678.9	51.443	-0.708	-0.735	0	0	0	6.34	6.562	-0.222
679	51.387	-0.72	-0.678	0	0	0	6.34	6.562	-0.222
679.1	51.331	-0.733	-0.576	0	0	0	6.34	6.562	-0.222
679.2	51.282	-0.73	-0.399	0	0	0	6.34	6.562	-0.222
679.3	51.226	-0.72	-0.805	0	0	0	6.34	6.562	-0.222
679.4	51.176	-0.7	-0.646	0	0	0	6.34	6.562	-0.222
679.5	51.126	-0.708	-1.211	0	0	0	6.34	6.562	-0.222
679.6	51.07	-0.713	-0.692	0	0	0	6.34	6.562	-0.222
679.7	51.015	-0.71	-0.258	0	0	0	6.34	6.562	-0.222
679.8	50.965	-0.71	-1.088	0	0	0	6.34	6.562	-0.222
679.9	50.915	-0.715	-0.706	0	0	0	6.34	6.562	-0.222
680	50.859	-0.718	-0.646	0	0	0	6.34	6.562	-0.222
680.1	50.81	-0.73	-0.805	0	0	0	6.34	6.562	-0.222
680.2	50.754	-0.735	-0.484	0	0	0	6.34	6.562	-0.222
680.3	50.704	-0.73	-0.346	0	0	0	6.34	6.562	-0.222
680.4	50.648	-0.718	-0.749	0	0	0	6.34	6.562	-0.222
680.5	50.598	-0.703	-1.031	0	0	0	6.34	6.562	-0.222
680.6	50.549	-0.703	-1.063	0	0	0	6.34	6.562	-0.222
680.7	50.493	-0.715	-0.604	0	0	0	6.34	6.562	-0.222
680.8	50.443	-0.715	-0.59	0	0	0	6.34	6.562	-0.222
680.9	50.387	-0.73	-0.004	0	0	0	6.34	6.562	-0.222
681	50.337	-0.72	-0.413	0	0	0	6.34	6.562	-0.222
681.1	50.281	-0.723	-1.24	0	0	0	6.34	6.562	-0.222

681.2	50.238	-0.728	-1.003	0	0	0	6.34	6.562	-0.222
681.3	50.182	-0.72	-0.36	0	0	0	6.34	6.562	-0.222
681.4	50.132	-0.713	-0.795	0	0	0	6.34	6.562	-0.222
681.5	50.076	-0.713	-0.901	0	0	0	6.34	6.562	-0.222
681.6	50.027	-0.715	-0.512	0	0	0	6.34	6.562	-0.222
681.7	49.977	-0.72	-0.512	0	0	0	6.34	6.562	-0.222
681.8	49.927	-0.72	-0.675	0	1.29	0	6.34	6.562	-0.222
681.9	49.871	-0.723	-0.844	0	2.88	0	6.34	6.562	-0.222
682	49.822	-0.723	-0.66	0	4.52	0	6.34	6.562	-0.222
682.1	49.772	-0.713	-0.413	0	6.29	0	6.34	6.562	-0.222
682.2	49.735	-0.718	-0.819	0	6.98	0	6.341	6.562	-0.222
682.3	49.691	-0.728	-0.72	0	9.08	0	6.341	6.563	-0.222
682.4	49.654	-0.735	-0.219	0	10.17	0	6.341	6.563	-0.222
682.5	49.623	-0.733	-0.576	0	11.02	0	6.341	6.563	-0.222
682.6	49.585	-0.733	-0.399	0	13.19	0	6.342	6.564	-0.222
682.7	49.554	-0.71	-0.706	0	13.84	0	6.342	6.564	-0.222
682.8	49.529	-0.71	-0.886	0	14.11	0	6.342	6.564	-0.222
682.9	49.505	-0.715	-1.063	0	15.28	0	6.343	6.565	-0.222
683	49.48	-0.713	0.081	0	15.93	0	6.343	6.565	-0.222
683.1	49.449	-0.728	-0.441	0	15.9	0	6.344	6.566	-0.222
683.2	49.43	-0.763	-0.763	0	15.92	0	6.344	6.566	-0.222
683.3	49.405	-0.753	0.254	0	16.31	0	6.345	6.567	-0.222
683.4	49.387	-0.725	-0.205	0	17.21	0	6.345	6.567	-0.222
683.5	49.362	-0.715	-1.582	0	18.14	0	6.346	6.568	-0.222
683.6	49.343	-0.713	-0.72	0	19.53	0	6.346	6.568	-0.222
683.7	49.324	-0.71	-0.576	0	20.63	0	6.347	6.569	-0.222
683.8	49.306	-0.71	-0.83	0	20.69	0	6.347	6.569	-0.222
683.9	49.293	-0.725	-0.576	0	20.79	0	6.348	6.57	-0.222
684	49.281	-0.733	-0.498	0	22.51	0	6.349	6.57	-0.222
684.1	49.262	-0.725	-0.562	0	23.91	0	6.349	6.571	-0.222
684.2	49.25	-0.733	-0.66	0	24.46	0	6.35	6.572	-0.222
684.3	49.244	-0.733	-0.576	0	24.47	0	6.351	6.572	-0.222
684.4	49.237	-0.715	-0.088	0	24.65	0	6.351	6.573	-0.222
684.5	49.231	-0.713	-1.063	0	25.83	0	6.352	6.574	-0.222
684.6	49.219	-0.718	-0.427	0	27.39	0	6.353	6.575	-0.222
684.7	49.213	-0.715	-0.332	0	27.36	0	6.354	6.575	-0.222
684.8	49.213	-0.708	-0.498	0	27.4	0	6.354	6.576	-0.222
684.9	49.213	-0.715	-0.689	0	27.84	0	6.355	6.577	-0.222
685	49.206	-0.723	-0.865	0	29.34	0	6.356	6.578	-0.222
685.1	49.206	-0.713	0.011	0	29.42	0	6.357	6.579	-0.222
685.2	49.206	-0.713	-0.819	0	30.08	0	6.358	6.579	-0.222
685.3	49.206	-0.723	-0.999	0	30.36	0	6.358	6.58	-0.222
685.4	49.206	-0.738	-0.66	0	30.87	0	6.359	6.581	-0.222
685.5	49.206	-0.743	-0.201	0	31.9	0	6.36	6.582	-0.222
685.6	49.213	-0.733	-0.576	0	33.65	0	6.361	6.583	-0.222
685.7	49.213	-0.723	-0.53	0	35.36	0	6.362	6.584	-0.222
685.8	49.225	-0.723	-0.819	0	35.88	0	6.363	6.585	-0.222

685.9	49.231	-0.725	-0.438	0	35.91	0	6.364	6.586	-0.222
686	49.244	-0.723	-0.484	0	35.89	0	6.365	6.587	-0.222
686.1	49.25	-0.735	-0.901	0	35.95	0	6.366	6.588	-0.222
686.2	49.262	-0.733	-0.689	0	35.94	0	6.367	6.589	-0.222
686.3	49.275	-0.73	-0.72	0	36.24	0	6.368	6.59	-0.222
686.4	49.281	-0.725	-0.59	0	36.7	0	6.369	6.591	-0.222
686.5	49.293	-0.718	-0.901	0	37.15	0	6.37	6.592	-0.222
686.6	49.306	-0.72	-0.858	0	38.78	0	6.371	6.593	-0.222
686.7	49.324	-0.715	-0.858	0	38.78	0	6.372	6.594	-0.222
686.8	49.331	-0.715	-0.47	0	38.83	0	6.373	6.595	-0.222
686.9	49.349	-0.698	-0.929	0	39.83	0	6.374	6.596	-0.222
687	49.368	-0.713	-1.063	0	40.05	0	6.376	6.597	-0.222
687.1	49.38	-0.73	-0.576	0	41.55	0	6.377	6.599	-0.222
687.2	49.399	-0.728	-0.247	0	45.85	0	6.378	6.6	-0.222
687.3	49.411	-0.723	-0.205	0	46.72	0	6.379	6.601	-0.222
687.4	49.443	-0.733	-0.848	0	46.74	0	6.381	6.602	-0.222
687.5	49.467	-0.738	-0.576	0	47.67	0	6.382	6.604	-0.222
687.6	49.492	-0.735	-0.088	0	47.78	0	6.383	6.605	-0.222
687.7	49.523	-0.735	-0.614	0	47.84	0	6.385	6.606	-0.222
687.8	49.554	-0.745	-0.819	0	47.89	0	6.386	6.608	-0.222
687.9	49.579	-0.743	-0.66	0	47.86	0	6.387	6.609	-0.222
688	49.61	-0.725	-0.759	0	47.68	0	6.389	6.61	-0.222
688.1	49.635	-0.713	-0.901	0	47.76	0	6.39	6.612	-0.222
688.2	49.666	-0.71	-1.148	0	47.82	0	6.391	6.613	-0.222
688.3	49.691	-0.705	-0.53	0	47.84	0	6.392	6.614	-0.222
688.4	49.722	-0.71	-0.53	0	48.04	0	6.394	6.616	-0.222
688.5	49.753	-0.72	-0.901	0	48.84	0	6.395	6.617	-0.222
688.6	49.778	-0.72	-0.332	0	48.8	0	6.397	6.618	-0.222
688.7	49.809	-0.735	-0.544	0	48.81	0	6.398	6.62	-0.222
688.8	49.84	-0.735	-0.643	0	48.8	0	6.399	6.621	-0.222
688.9	49.871	-0.718	-0.004	0	49.53	0	6.401	6.623	-0.222
689	49.896	-0.703	-0.901	0	49.51	0	6.402	6.624	-0.222
689.1	49.927	-0.72	-1.473	0	49.57	0	6.403	6.625	-0.222
689.2	49.958	-0.733	-0.745	0	49.53	0	6.405	6.627	-0.222
689.3	49.989	-0.728	0.124	0	49.61	0	6.406	6.628	-0.222
689.4	50.02	-0.728	-0.675	0	49.59	0	6.408	6.629	-0.222
689.5	50.051	-0.728	-0.805	0	49.69	0	6.409	6.631	-0.222
689.6	50.083	-0.735	-0.66	0	49.65	0	6.41	6.632	-0.222
689.7	50.114	-0.74	-0.544	0	49.57	0	6.412	6.634	-0.222
689.8	50.145	-0.74	-0.371	0	50.96	0	6.413	6.635	-0.222
689.9	50.176	-0.71	-0.576	0	53.44	0	6.415	6.636	-0.222
690	50.207	-0.71	-1.229	0	53.43	0	6.416	6.638	-0.222
690.1	50.25	-0.715	-0.498	0	53.46	0	6.418	6.639	-0.222
690.2	50.275	-0.718	-0.675	0	53.49	0	6.419	6.641	-0.222
690.3	50.312	-0.703	-0.247	0	53.52	0	6.42	6.642	-0.222
690.4	50.356	-0.705	-0.925	0	53.33	0	6.422	6.644	-0.222
690.5	50.387	-0.72	-0.735	0	54.33	0	6.423	6.645	-0.222

690.6	50.418	-0.745	-0.261	0	57.51	0	6.425	6.647	-0.222
690.7	50.455	-0.768	-0.173	0	58.17	0	6.427	6.649	-0.222
690.8	50.499	-0.75	-0.205	0	58.83	0	6.428	6.65	-0.222
690.9	50.542	-0.728	-0.385	0	60.67	0	6.43	6.652	-0.222
691	50.586	-0.738	-1.388	0	62.34	0	6.432	6.654	-0.222
691.1	50.629	-0.738	-0.526	0	63.26	0	6.433	6.655	-0.222
691.2	50.685	-0.728	-0.343	0	63.3	0	6.435	6.657	-0.222
691.3	50.729	-0.723	-0.749	0	63.35	0	6.437	6.659	-0.222
691.4	50.778	-0.735	-1.038	0	63.93	0	6.439	6.661	-0.222
691.5	50.828	-0.738	-0.763	0	64.2	0	6.441	6.662	-0.222
691.6	50.878	-0.723	-0.441	0	64.33	0	6.442	6.664	-0.222
691.7	50.928	-0.718	-0.706	0	64.37	0	6.444	6.666	-0.222
691.8	50.984	-0.718	-0.985	0	64.29	0	6.446	6.668	-0.222
691.9	51.033	-0.735	-0.512	0	64.2	0	6.448	6.67	-0.222
692	51.083	-0.738	-0.346	0	64.27	0	6.45	6.671	-0.222
692.1	51.133	-0.738	-0.498	0	64.33	0	6.451	6.673	-0.222
692.2	51.182	-0.733	-0.844	0	64.41	0	6.453	6.675	-0.222
692.3	51.238	-0.725	-0.646	0	64.22	0	6.455	6.677	-0.222
692.4	51.288	-0.723	-1.091	0	64.31	0	6.457	6.679	-0.222
692.5	51.338	-0.718	-0.939	0	64.35	0	6.458	6.68	-0.222
692.6	51.381	-0.733	-0.989	0	64.49	0	6.46	6.682	-0.222
692.7	51.431	-0.73	-0.576	0	64.28	0	6.462	6.684	-0.222
692.8	51.53	-0.73	-0.498	0	64.31	0	6.464	6.686	-0.222
692.9	51.53	-0.728	-0.66	0	64.38	0	6.466	6.687	-0.222
693	51.586	-0.738	-0.777	0	64.47	0	6.467	6.689	-0.222
693.1	51.636	-0.738	-0.597	0	64.28	0	6.469	6.691	-0.222
693.2	51.679	-0.73	-0.66	0	63.77	0	6.471	6.693	-0.222
693.3	51.729	-0.713	-0.858	0	61.29	0	6.473	6.695	-0.222
693.4	51.773	-0.723	-0.985	0	55.23	0	6.474	6.696	-0.222
693.5	51.816	-0.738	-1.148	0	48.21	0	6.476	6.697	-0.222
693.6	51.86	-0.735	-0.088	0	41.69	0	6.477	6.699	-0.222
693.7	51.878	-0.725	-0.53	0	36.71	0	6.478	6.7	-0.222
693.8	51.897	-0.725	-0.749	0	35.52	0	6.479	6.701	-0.222
693.9	51.897	-0.72	-0.901	0	35.53	0	6.48	6.702	-0.222
694	51.903	-0.713	-0.791	0	35.41	0	6.481	6.703	-0.222
694.1	51.909	-0.733	-0.904	0	35.71	0	6.482	6.704	-0.222
694.2	51.916	-0.738	-0.749	0	37.6	0	6.483	6.705	-0.222
694.3	51.916	-0.72	-0.088	0	39.99	0	6.484	6.706	-0.222
694.4	51.928	-0.718	-0.985	0	42.81	0	6.485	6.707	-0.222
694.5	51.934	-0.738	-1.063	0	43.72	0	6.486	6.708	-0.222
694.6	51.947	-0.735	-0.102	0	44.29	0	6.487	6.709	-0.222
694.7	51.965	-0.73	-0.66	0	45.81	0	6.489	6.711	-0.222
694.8	51.984	-0.73	-1.183	0	48.57	0	6.49	6.712	-0.222
694.9	52.003	-0.725	-0.576	0	50.27	0	6.491	6.713	-0.222
695	52.027	-0.715	-0.576	0	51.33	0	6.493	6.715	-0.222
695.1	52.058	-0.723	-0.6	0	52.48	0	6.494	6.716	-0.222
695.2	52.083	-0.74	-0.901	0	53.76	0	6.496	6.718	-0.222

695.3	52.114	-0.74	-0.088	0	55.58	0	6.497	6.719	-0.222
695.4	52.145	-0.725	-0.516	0	57.11	0	6.499	6.721	-0.222
695.5	52.177	-0.728	-0.692	0	58.05	0	6.501	6.722	-0.222
695.6	52.214	-0.738	-0.692	0	58.08	0	6.502	6.724	-0.222
695.7	52.251	-0.74	-0.23	0	58.1	0	6.504	6.726	-0.222
695.8	52.288	-0.74	-0.763	0	58.12	0	6.505	6.727	-0.222
695.9	52.326	-0.73	-0.66	0	58.22	0	6.507	6.729	-0.222
696	52.363	-0.725	-0.819	0	59.21	0	6.509	6.731	-0.222
696.1	52.4	-0.728	-0.982	0	59.33	0	6.51	6.732	-0.222
696.2	52.438	-0.725	-0.53	0	59.41	0	6.512	6.734	-0.222
696.3	52.481	-0.733	-0.999	0	59.34	0	6.514	6.736	-0.222
696.4	52.518	-0.745	-0.576	0	59.22	0	6.515	6.737	-0.222
696.5	52.556	-0.75	-0.646	0	59.28	0	6.517	6.739	-0.222
696.6	52.599	-0.743	-0.413	0	59.87	0	6.519	6.74	-0.222
696.7	52.63	-0.725	-0.72	0	60.42	0	6.52	6.742	-0.222
696.8	52.674	-0.715	-0.692	0	60.46	0	6.522	6.744	-0.222
696.9	52.711	-0.715	-1.374	0	60.4	0	6.524	6.746	-0.222
697	52.748	-0.72	-0.117	0	60.28	0	6.525	6.747	-0.222
697.1	52.792	-0.715	-0.53	0	60.34	0	6.527	6.749	-0.222
697.2	52.829	-0.72	-0.901	0	60.4	0	6.529	6.751	-0.222
697.3	52.866	-0.738	-1.049	0	60.4	0	6.53	6.752	-0.222
697.4	52.91	-0.735	-0.332	0	60.48	0	6.532	6.754	-0.222
697.5	52.941	-0.735	-0.614	0	60.39	0	6.534	6.756	-0.222
697.6	52.984	-0.74	-0.614	0	60.28	0	6.535	6.757	-0.222
697.7	53.022	-0.733	-0.53	0	60.32	0	6.537	6.759	-0.222
697.8	53.059	-0.733	-0.413	0	60.37	0	6.539	6.761	-0.222
697.9	53.102	-0.73	-1.063	0	61.48	0	6.54	6.762	-0.222
698	53.14	-0.718	-0.576	0	61.57	0	6.542	6.764	-0.222
698.1	53.183	-0.72	-0.357	0	61.59	0	6.544	6.766	-0.222
698.2	53.22	-0.725	-0.819	0	61.59	0	6.546	6.767	-0.222
698.3	53.258	-0.738	-0.558	0	61.47	0	6.547	6.769	-0.222
698.4	53.301	-0.745	-0.678	0	61.38	0	6.549	6.771	-0.222
698.5	53.339	-0.735	-0.247	0	61.42	0	6.551	6.773	-0.222
698.6	53.376	-0.72	-0.576	0	61.49	0	6.552	6.774	-0.222
698.7	53.419	-0.72	-0.901	0	61.52	0	6.554	6.776	-0.222
698.8	53.457	-0.72	-1.049	0	61.59	0	6.556	6.778	-0.222
698.9	53.5	-0.713	-0.646	0	60.62	0	6.557	6.779	-0.222
699	53.537	-0.738	-0.901	0	59.13	0	6.559	6.781	-0.222
699.1	53.575	-0.735	-0.293	0	57.84	0	6.561	6.783	-0.222
699.2	53.612	-0.718	0.24	0	56.34	0	6.562	6.784	-0.222
699.3	53.643	-0.708	-1.211	0	55.22	0	6.564	6.786	-0.222
699.4	53.68	-0.705	-1.134	0	53.87	0	6.565	6.787	-0.222
699.5	53.705	-0.723	-0.646	0	52.78	0	6.567	6.789	-0.222
699.6	53.73	-0.723	-0.088	0	52.74	0	6.568	6.79	-0.222
699.7	53.761	-0.72	-0.159	0	52.78	0	6.57	6.792	-0.222
699.8	53.786	-0.725	-0.872	0	52.79	0	6.571	6.793	-0.222
699.9	53.811	-0.733	-0.413	0	54.07	0	6.573	6.795	-0.222

700	53.836	-0.725	-0.399	0	56.05	0	6.574	6.796	-0.222
700.1	53.867	-0.718	-0.516	0	57.7	0	6.576	6.798	-0.222
700.2	53.898	-0.738	-1.038	0	59.56	0	6.577	6.799	-0.222
700.3	53.929	-0.743	-0.191	0	60.72	0	6.579	6.801	-0.222
700.4	53.966	-0.733	-0.233	0	62.66	0	6.581	6.803	-0.222
700.5	54.003	-0.735	-1.024	0	63.66	0	6.583	6.805	-0.222
700.6	54.041	-0.725	-0.819	0	63.64	0	6.584	6.806	-0.222
700.7	54.078	-0.71	-0.399	0	63.7	0	6.586	6.808	-0.222
700.8	54.121	-0.71	-1.049	0	63.77	0	6.588	6.81	-0.222
700.9	54.165	-0.705	-0.886	0	63.76	0	6.59	6.812	-0.222
701	54.208	-0.715	-0.562	0	63.53	0	6.592	6.813	-0.222
701.1	54.246	-0.725	-0.632	0	63.57	0	6.593	6.815	-0.222
701.2	54.283	-0.72	-0.275	0	63.65	0	6.595	6.817	-0.222
701.3	54.326	-0.713	-0.915	0	63.72	0	6.597	6.819	-0.222
701.4	54.364	-0.725	-0.961	0	63.69	0	6.599	6.82	-0.222
701.5	54.407	-0.75	-0.72	0	63.5	0	6.6	6.822	-0.222
701.6	54.445	-0.748	-0.018	0	63.55	0	6.602	6.824	-0.222
701.7	54.482	-0.74	-0.484	0	63.61	0	6.604	6.826	-0.222
701.8	54.525	-0.74	-1.01	0	63.64	0	6.606	6.828	-0.222
701.9	54.569	-0.713	-0.886	0	63.73	0	6.607	6.829	-0.222
702	54.6	-0.72	-1.134	0	63.51	0	6.609	6.831	-0.222
702.1	54.643	-0.728	-0.957	0	63.47	0	6.611	6.833	-0.222
702.2	54.681	-0.713	-0.378	0	63.54	0	6.613	6.835	-0.222
702.3	54.718	-0.703	-0.562	0	63.61	0	6.614	6.836	-0.222
702.4	54.761	-0.723	-1.211	0	63.78	0	6.616	6.838	-0.222
702.5	54.799	-0.745	-0.643	0	63.74	0	6.618	6.84	-0.222
702.6	54.836	-0.743	-0.102	0	63.63	0	6.62	6.842	-0.222
702.7	54.873	-0.73	-0.47	0	63.7	0	6.622	6.843	-0.222
702.8	54.911	-0.72	-1.049	0	63.79	0	6.623	6.845	-0.222
702.9	54.954	-0.72	-0.929	0	63.83	0	6.625	6.847	-0.222
703	54.985	-0.725	-0.689	0	63.91	0	6.627	6.849	-0.222
703.1	55.022	-0.738	-0.632	0	63.67	0	6.629	6.851	-0.222
703.2	55.066	-0.753	-0.59	0	63.57	0	6.63	6.852	-0.222
703.3	55.103	-0.74	-0.102	0	63.59	0	6.632	6.854	-0.222
703.4	55.134	-0.718	-0.547	0	63.65	0	6.634	6.856	-0.222
703.5	55.178	-0.725	-1.134	0	63.76	0	6.636	6.858	-0.222
703.6	55.215	-0.738	-0.901	0	63.84	0	6.638	6.859	-0.222
703.7	55.246	-0.728	0.226	0	63.6	0	6.639	6.861	-0.222
703.8	55.283	-0.728	-0.72	0	63.59	0	6.641	6.863	-0.222
703.9	55.327	-0.718	-0.678	0	63.51	0	6.643	6.865	-0.222
704	55.358	-0.72	-0.576	0	63.49	0	6.645	6.866	-0.222
704.1	55.395	-0.728	-0.427	0	63.54	0	6.646	6.868	-0.222
704.2	55.433	-0.723	-0.484	0	63.45	0	6.648	6.87	-0.222
704.3	55.47	-0.72	-0.427	0	63.36	0	6.65	6.872	-0.222
704.4	55.507	-0.72	-1.091	0	63.35	0	6.652	6.874	-0.222
704.5	55.544	-0.715	-0.572	0	63.4	0	6.653	6.875	-0.222
704.6	55.582	-0.718	-0.72	0	63.44	0	6.655	6.877	-0.222

704.7	55.613	-0.715	-0.547	0	63.46	0	6.657	6.879	-0.222
704.8	55.65	-0.715	-0.547	0	63.53	0	6.659	6.881	-0.222
704.9	55.687	-0.728	-0.872	0	63.57	0	6.66	6.882	-0.222
705	55.725	-0.723	-0.547	0	62.46	0	6.662	6.884	-0.222
705.1	55.762	-0.725	-0.47	0	61.88	0	6.664	6.886	-0.222
705.2	55.793	-0.735	-1.01	0	61.11	0	6.666	6.887	-0.222
705.3	55.83	-0.733	-0.47	0	60.53	0	6.667	6.889	-0.222
705.4	55.861	-0.74	-0.431	0	59.26	0	6.669	6.891	-0.222
705.5	55.892	-0.743	-0.816	0	57.22	0	6.671	6.892	-0.222
705.6	55.923	-0.738	-0.385	0	54.33	0	6.672	6.894	-0.222
705.7	55.948	-0.733	-0.576	0	51.88	0	6.673	6.895	-0.222
705.8	55.967	-0.723	-0.936	0	50.58	0	6.675	6.897	-0.222
705.9	55.992	-0.73	-0.614	0	49.37	0	6.676	6.898	-0.222
706	56.004	-0.74	-0.943	0	48.26	0	6.678	6.899	-0.222
706.1	56.023	-0.735	-0.194	0	46.69	0	6.679	6.901	-0.222
706.2	56.035	-0.728	-0.689	0	45.35	0	6.68	6.902	-0.222
706.3	56.048	-0.723	-1.031	0	45.1	0	6.681	6.903	-0.222
706.4	56.06	-0.73	-0.872	0	45.13	0	6.683	6.905	-0.222
706.5	56.066	-0.74	-0.833	0	45.62	0	6.684	6.906	-0.222
706.6	56.079	-0.74	-0.028	0	47.26	0	6.685	6.907	-0.222
706.7	56.085	-0.738	-0.427	0	47.91	0	6.687	6.908	-0.222
706.8	56.097	-0.738	-0.735	0	49.03	0	6.688	6.91	-0.222
706.9	56.11	-0.723	-0.901	0	49.38	0	6.689	6.911	-0.222
707	56.128	-0.72	-1.102	0	49.8	0	6.691	6.913	-0.222
707.1	56.141	-0.728	-0.706	0	49.78	0	6.692	6.914	-0.222
707.2	56.16	-0.74	-0.731	0	49.94	0	6.693	6.915	-0.222
707.3	56.172	-0.745	-0.427	0	50.68	0	6.695	6.917	-0.222
707.4	56.184	-0.73	-0.155	0	50.71	0	6.696	6.918	-0.222
707.5	56.203	-0.728	-0.982	0	50.7	0	6.698	6.92	-0.222
707.6	56.222	-0.748	-1.225	0	50.71	0	6.699	6.921	-0.222
707.7	56.24	-0.738	-0.088	0	50.79	0	6.7	6.922	-0.222
707.8	56.253	-0.738	-0.618	0	50.72	0	6.702	6.924	-0.222
707.9	56.271	-0.733	-1.134	0	50.74	0	6.703	6.925	-0.222
708	56.29	-0.72	-0.562	0	50.75	0	6.705	6.927	-0.222
708.1	56.302	-0.725	-0.597	0	50.75	0	6.706	6.928	-0.222
708.2	56.321	-0.748	-1.031	0	50.78	0	6.708	6.929	-0.222
708.3	56.334	-0.755	-0.219	0	50.78	0	6.709	6.931	-0.222
708.4	56.352	-0.748	-0.261	0	50.89	0	6.71	6.932	-0.222
708.5	56.371	-0.75	-0.968	0	50.82	0	6.712	6.934	-0.222
708.6	56.383	-0.743	-0.607	0	50.83	0	6.713	6.935	-0.222
708.7	56.402	-0.735	-0.385	0	50.88	0	6.715	6.936	-0.222
708.8	56.421	-0.738	-1.045	0	50.86	0	6.716	6.938	-0.222
708.9	56.433	-0.74	-0.901	0	50.89	0	6.717	6.939	-0.222
709	56.445	-0.75	-0.6	0	50.67	0	6.719	6.941	-0.222
709.1	56.464	-0.74	-0.441	0	50.73	0	6.72	6.942	-0.222
709.2	56.476	-0.72	-0.572	0	50.75	0	6.722	6.944	-0.222
709.3	56.495	-0.723	-1.165	0	50.7	0	6.723	6.945	-0.222

709.4	56.514	-0.733	-0.915	0	50.73	0	6.724	6.946	-0.222
709.5	56.526	-0.733	-0.318	0	50.74	0	6.726	6.948	-0.222
709.6	56.545	-0.72	-0.72	0	50.78	0	6.727	6.949	-0.222
709.7	56.557	-0.71	-0.766	0	50.78	0	6.729	6.951	-0.222
709.8	56.576	-0.71	-0.925	0	51.62	0	6.73	6.952	-0.222
709.9	56.588	-0.72	-0.396	0	51.63	0	6.732	6.953	-0.222
710	56.607	-0.725	-0.777	0	51.68	0	6.733	6.955	-0.222
710.1	56.626	-0.735	-0.985	0	51.69	0	6.734	6.956	-0.222
710.2	56.644	-0.725	-0.357	0	52.63	0	6.736	6.958	-0.222
710.3	56.657	-0.72	-0.576	0	52.75	0	6.737	6.959	-0.222
710.4	56.675	-0.72	-1.095	0	52.76	0	6.739	6.961	-0.222
710.5	56.694	-0.718	-0.304	0	52.81	0	6.74	6.962	-0.222
710.6	56.713	-0.733	-0.858	0	52.83	0	6.742	6.964	-0.222
710.7	56.731	-0.728	-0.802	0	52.83	0	6.743	6.965	-0.222
710.8	56.75	-0.728	-0.47	0	52.81	0	6.745	6.967	-0.222
710.9	56.762	-0.725	-1.296	0	53.7	0	6.746	6.968	-0.222
711	56.787	-0.73	-0.766	0	53.66	0	6.748	6.97	-0.222
711.1	56.806	-0.733	-0.706	0	53.68	0	6.749	6.971	-0.222
711.2	56.824	-0.733	-0.47	0	53.72	0	6.751	6.973	-0.222
711.3	56.843	-0.725	-0.929	0	53.8	0	6.752	6.974	-0.222
711.4	56.862	-0.725	-0.893	0	54.58	0	6.754	6.976	-0.222
711.5	56.88	-0.72	-0.742	0	55.15	0	6.755	6.977	-0.222
711.6	56.905	-0.73	-0.805	0	56.03	0	6.757	6.979	-0.222
711.7	56.924	-0.733	-0.371	0	56.62	0	6.758	6.98	-0.222
711.8	56.949	-0.723	-0.47	0	57.1	0	6.76	6.982	-0.222
711.9	56.974	-0.725	-1.13	0	57.99	0	6.762	6.983	-0.222
712	56.992	-0.743	-0.689	0	58.54	0	6.763	6.985	-0.222
712.1	57.017	-0.735	-0.219	0	59.47	0	6.765	6.987	-0.222
712.2	57.042	-0.723	-0.646	0	60.79	0	6.766	6.988	-0.222
712.3	57.067	-0.72	-1.13	0	61.48	0	6.768	6.99	-0.222
712.4	57.098	-0.723	-0.805	0	62.61	0	6.77	6.992	-0.222
712.5	57.123	-0.718	-0.498	0	63.49	0	6.772	6.994	-0.222
712.6	57.154	-0.72	-0.646	0	63.58	0	6.773	6.995	-0.222
712.7	57.185	-0.735	-0.872	0	64.72	0	6.775	6.997	-0.222
712.8	57.222	-0.735	-0.141	0	64.72	0	6.777	6.999	-0.222
712.9	57.253	-0.72	-0.706	0	64.5	0	6.779	7.001	-0.222
713	57.284	-0.738	-0.957	0	64.5	0	6.781	7.003	-0.222
713.1	57.321	-0.758	-0.957	0	64.55	0	6.782	7.004	-0.222
713.2	57.353	-0.73	0.113	0	64.47	0	6.784	7.006	-0.222
713.3	57.384	-0.718	-1.197	0	63.42	0	6.786	7.008	-0.222
713.4	57.415	-0.733	-1.677	0	63.4	0	6.788	7.01	-0.222
713.5	57.446	-0.748	-0.706	0	63.48	0	6.79	7.011	-0.222
713.6	57.477	-0.755	-0.219	0	63.56	0	6.791	7.013	-0.222
713.7	57.508	-0.733	-0.759	0	63.61	0	6.793	7.015	-0.222
713.8	57.539	-0.733	-0.494	0	64.32	0	6.795	7.017	-0.222
713.9	57.57	-0.738	-1.441	0	64.53	0	6.797	7.019	-0.222
714	57.607	-0.803	-0.915	0	65.15	0	6.798	7.02	-0.222

714.1	57.638	-0.78	0.558	0	66.96	0	6.8	7.022	-0.222
714.2	57.669	-0.73	0.194	0	67.84	0	6.802	7.024	-0.222
714.3	57.701	-0.723	-2.659	0	68.17	0	6.804	7.026	-0.222
714.4	57.738	-0.728	-1.091	0	68.11	0	6.806	7.028	-0.222
714.5	57.775	-0.723	-0.261	0	67.88	0	6.808	7.03	-0.222
714.6	57.812	-0.725	-0.54	0	67.95	0	6.81	7.032	-0.222
714.7	57.85	-0.718	-0.83	0	68.01	0	6.812	7.034	-0.222
714.8	57.887	-0.723	-0.953	0	68.44	0	6.814	7.035	-0.222
714.9	57.918	-0.73	-0.872	0	69.35	0	6.815	7.037	-0.222
715	57.955	-0.733	-0.413	0	69.34	0	6.817	7.039	-0.222
715.1	57.993	-0.725	-0.614	0	69.36	0	6.819	7.041	-0.222
715.2	58.03	-0.723	-0.731	0	69.14	0	6.821	7.043	-0.222
715.3	58.067	-0.715	-0.727	0	69.16	0	6.823	7.045	-0.222
715.4	58.111	-0.723	-0.622	0	69.21	0	6.825	7.047	-0.222
715.5	58.142	-0.728	-0.742	0	70.13	0	6.827	7.049	-0.222
715.6	58.179	-0.725	-0.385	0	72.05	0	6.829	7.051	-0.222
715.7	58.216	-0.725	-0.66	0	72.87	0	6.831	7.053	-0.222
715.8	58.254	-0.725	-0.735	0	72.89	0	6.833	7.055	-0.222
715.9	58.297	-0.743	-0.819	0	72.93	0	6.835	7.057	-0.222
716	58.341	-0.725	-0.335	0	72.98	0	6.837	7.059	-0.222
716.1	58.378	-0.713	-0.872	0	72.99	0	6.839	7.061	-0.222
716.2	58.421	-0.725	-1.229	0	72.85	0	6.841	7.063	-0.222
716.3	58.459	-0.74	-0.53	0	72.87	0	6.843	7.065	-0.222
716.4	58.502	-0.74	-0.141	0	72.9	0	6.845	7.067	-0.222
716.5	58.546	-0.735	-0.692	0	72.94	0	6.847	7.069	-0.222
716.6	58.583	-0.72	-0.544	0	72.97	0	6.849	7.071	-0.222
716.7	58.62	-0.705	-0.858	0	72.94	0	6.851	7.073	-0.222
716.8	58.664	-0.705	-1.074	0	72.77	0	6.853	7.075	-0.222
716.9	58.701	-0.713	-0.664	0	72.87	0	6.855	7.077	-0.222
717	58.744	-0.735	-0.735	0	72.97	0	6.857	7.079	-0.222
717.1	58.782	-0.75	-0.385	0	73.02	0	6.859	7.081	-0.222
717.2	58.819	-0.755	-0.357	0	73.06	0	6.861	7.083	-0.222
717.3	58.862	-0.74	-0.29	0	72.83	0	6.863	7.085	-0.222
717.4	58.9	-0.728	-1.183	0	71.72	0	6.865	7.087	-0.222
717.5	58.943	-0.723	-1.074	0	70.2	0	6.867	7.089	-0.222
717.6	58.981	-0.733	-0.731	0	68.32	0	6.869	7.091	-0.222
717.7	59.018	-0.745	-0.943	0	64.54	0	6.871	7.093	-0.222
717.8	59.049	-0.723	-0.205	0	60.9	0	6.873	7.095	-0.222
717.9	59.08	-0.713	-0.66	0	58.41	0	6.874	7.096	-0.222
718	59.099	-0.748	-1.716	0	56.62	0	6.876	7.098	-0.222
718.1	59.123	-0.758	-0.332	0	54.69	0	6.877	7.099	-0.222
718.2	59.142	-0.74	0.155	0	51.94	0	6.879	7.101	-0.222
718.3	59.155	-0.718	-0.812	0	47.94	0	6.88	7.102	-0.222
718.4	59.167	-0.71	-1.264	0	42.12	0	6.881	7.103	-0.222
718.5	59.167	-0.733	-1.063	0	39.92	0	6.883	7.104	-0.222
718.6	59.167	-0.74	-0.544	0	36.07	0	6.884	7.105	-0.222
718.7	59.161	-0.725	-0.205	0	33.04	0	6.884	7.106	-0.222

718.8	59.148	-0.725	-0.886	0	32.28	0	6.885	7.107	-0.222
718.9	59.136	-0.72	-1.197	0	31.03	0	6.886	7.108	-0.222
719	59.117	-0.725	-0.646	0	31.19	0	6.887	7.109	-0.222
719.1	59.099	-0.728	-0.456	0	31.61	0	6.888	7.11	-0.222
719.2	59.086	-0.728	-0.484	0	32.42	0	6.889	7.111	-0.222
719.3	59.068	-0.728	-0.367	0	32.84	0	6.89	7.112	-0.222
719.4	59.055	-0.723	-0.544	0	33.03	0	6.891	7.113	-0.222
719.5	59.036	-0.718	-0.735	0	33	0	6.892	7.114	-0.222
719.6	59.018	-0.72	-0.982	0	32.99	0	6.893	7.114	-0.222
719.7	59.005	-0.733	-0.731	0	32.21	0	6.893	7.115	-0.222
719.8	58.993	-0.733	-0.54	0	32.14	0	6.894	7.116	-0.222
719.9	58.974	-0.718	-0.452	0	32.13	0	6.895	7.117	-0.222
720	58.962	-0.718	-0.978	0	31.79	0	6.896	7.118	-0.222
720.1	58.943	-0.733	-1.183	0	30.9	0	6.897	7.119	-0.222
720.2	58.931	-0.748	-0.191	0	30.4	0	6.898	7.12	-0.222
720.3	58.912	-0.745	-0.205	0	28.29	0	6.899	7.12	-0.222
720.4	58.894	-0.733	-0.53	0	25.15	0	6.899	7.121	-0.222
720.5	58.875	-0.725	-0.932	0	24.33	0	6.9	7.122	-0.222
720.6	58.85	-0.713	-0.826	0	22.95	0	6.901	7.122	-0.222
720.7	58.819	-0.72	-0.812	0	22.99	0	6.901	7.123	-0.222
720.8	58.794	-0.733	-0.932	0	22.94	0	6.902	7.124	-0.222
720.9	58.763	-0.723	-0.247	0	22.94	0	6.903	7.124	-0.222
721	58.738	-0.708	-0.844	0	22.93	0	6.903	7.125	-0.222
721.1	58.707	-0.715	-1.328	0	22.92	0	6.904	7.126	-0.222
721.2	58.682	-0.728	-0.929	0	22.88	0	6.904	7.126	-0.222
721.3	58.657	-0.73	-0.155	0	22.89	0	6.905	7.127	-0.222
721.4	58.626	-0.723	-0.777	0	22.86	0	6.906	7.128	-0.222
721.5	58.595	-0.72	-1.254	0	23.89	0	6.906	7.128	-0.222
721.6	58.57	-0.715	-1.031	0	24.03	0	6.907	7.129	-0.222
721.7	58.546	-0.718	-0.516	0	24	0	6.908	7.13	-0.222
721.8	58.515	-0.718	-0.879	0	23.16	0	6.908	7.13	-0.222
721.9	58.49	-0.73	-0.304	0	22.63	0	6.909	7.131	-0.222
722	58.465	-0.728	-0.286	0	18.86	0	6.909	7.131	-0.222
722.1	58.434	-0.73	-0.855	0	14.55	0	6.91	7.132	-0.222
722.2	58.403	-0.733	-0.678	0	11.67	0	6.91	7.132	-0.222
722.3	58.359	-0.743	-0.777	0	10.78	0	6.911	7.132	-0.222
722.4	58.322	-0.748	-0.367	0	10.27	0	6.911	7.133	-0.222
722.5	58.272	-0.738	-0.614	0	10.19	0	6.911	7.133	-0.222
722.6	58.229	-0.72	-0.844	0	10.17	0	6.911	7.133	-0.222
722.7	58.185	-0.728	-1.088	0	10.18	0	6.912	7.134	-0.222
722.8	58.142	-0.728	-1.003	0	10.18	0	6.912	7.134	-0.222
722.9	58.092	-0.723	-0.321	0	10.15	0	6.912	7.134	-0.222
723	58.048	-0.698	-0.586	0	9.49	0	6.912	7.134	-0.222
723.1	58.005	-0.7	-1.225	0	7.28	0	6.913	7.135	-0.222
723.2	57.955	-0.715	-1.197	0	4.55	0	6.913	7.135	-0.222
723.3	57.906	-0.72	-0.159	0	2.14	0	6.913	7.135	-0.222
723.4	57.856	-0.72	-0.777	0	0	0	6.913	7.135	-0.222

723.5	57.8	-0.728	-0.678	0	0	0	6.913	7.135	-0.222
723.6	57.732	-0.733	-0.554	0	0	0	6.913	7.135	-0.222
723.7	57.676	-0.71	-0.614	0	0	0	6.913	7.135	-0.222
723.8	57.614	-0.703	-1.183	0	0	0	6.913	7.135	-0.222
723.9	57.551	-0.718	-1.374	0	0	0	6.913	7.135	-0.222
724	57.489	-0.733	-0.456	0	0	0	6.913	7.135	-0.222
724.1	57.433	-0.728	-0.028	0	0	0	6.913	7.135	-0.222
724.2	57.371	-0.715	-0.826	0	0	0	6.913	7.135	-0.222
724.3	57.315	-0.698	-0.763	0	0	0	6.913	7.135	-0.222
724.4	57.253	-0.71	-1.169	0	0	0	6.913	7.135	-0.222
724.5	57.191	-0.733	-0.999	0	0	0	6.913	7.135	-0.222
724.6	57.135	-0.72	0.212	0	1.4	0	6.913	7.135	-0.222
724.7	57.079	-0.72	-0.607	0	3.23	0	6.913	7.135	-0.222
724.8	57.017	-0.72	-1.003	0	5.14	0	6.913	7.135	-0.222
724.9	56.961	-0.715	-0.205	0	8.53	0	6.913	7.135	-0.222
725	56.911	-0.728	-0.597	0	10.66	0	6.914	7.136	-0.222
725.1	56.868	-0.75	-1.088	0	10.77	0	6.914	7.136	-0.222
725.2	56.824	-0.748	-0.187	0	10.77	0	6.914	7.136	-0.222
725.3	56.781	-0.738	-0.625	0	10.77	0	6.915	7.136	-0.222
725.4	56.737	-0.73	-1.006	0	11.26	0	6.915	7.137	-0.222
725.5	56.7	-0.72	-0.777	0	14.69	0	6.915	7.137	-0.222
725.6	56.663	-0.728	-1.268	0	15.81	0	6.916	7.138	-0.222
725.7	56.619	-0.718	-0.554	0	16.1	0	6.916	7.138	-0.222
725.8	56.588	-0.718	-0.47	0	16.12	0	6.917	7.139	-0.222
725.9	56.557	-0.703	-1.169	0	16.11	0	6.917	7.139	-0.222
726	56.52	-0.72	-0.759	0	16.12	0	6.918	7.139	-0.222
726.1	56.489	-0.728	-0.357	0	16.09	0	6.918	7.14	-0.222
726.2	56.458	-0.715	-0.177	0	16.08	0	6.918	7.14	-0.222
726.3	56.421	-0.718	-1.148	0	16.09	0	6.919	7.141	-0.222
726.4	56.383	-0.735	-1.169	0	15.88	0	6.919	7.141	-0.222
726.5	56.352	-0.735	-0.23	0	15.28	0	6.92	7.142	-0.222
726.6	56.321	-0.73	-0.357	0	15.02	0	6.92	7.142	-0.222
726.7	56.284	-0.715	-0.593	0	15.03	0	6.921	7.142	-0.222
726.8	56.247	-0.728	-0.999	0	15.03	0	6.921	7.143	-0.222
726.9	56.215	-0.733	-0.664	0	15.01	0	6.921	7.143	-0.222
727	56.178	-0.723	-0.205	0	15.02	0	6.922	7.144	-0.222
727.1	56.147	-0.713	-0.717	0	15.01	0	6.922	7.144	-0.222
727.2	56.11	-0.73	-0.858	0	14.97	0	6.923	7.145	-0.222
727.3	56.073	-0.735	-0.54	0	14.97	0	6.923	7.145	-0.222
727.4	56.041	-0.718	-0.187	0	14.97	0	6.923	7.145	-0.222
727.5	56.004	-0.713	-1.077	0	14.99	0	6.924	7.146	-0.222
727.6	55.967	-0.725	-1.254	0	14.97	0	6.924	7.146	-0.222
727.7	55.936	-0.728	-0.113	0	14.94	0	6.925	7.147	-0.222
727.8	55.899	-0.728	-0.586	0	14.95	0	6.925	7.147	-0.222
727.9	55.861	-0.73	-0.763	0	14.93	0	6.926	7.147	-0.222
728	55.824	-0.728	-0.516	0	14.94	0	6.926	7.148	-0.222
728.1	55.793	-0.733	-0.929	0	14.64	0	6.926	7.148	-0.222

728.2	55.762	-0.728	-0.869	0	13.9	0	6.927	7.149	-0.222
728.3	55.725	-0.72	-0.554	0	12.87	0	6.927	7.149	-0.222
728.4	55.687	-0.718	-1.278	0	11.45	0	6.927	7.149	-0.222
728.5	55.65	-0.72	-0.918	0	9.12	0	6.928	7.15	-0.222
728.6	55.607	-0.73	-0.844	0	6.91	0	6.928	7.15	-0.222
728.7	55.563	-0.738	-0.763	0	3.98	0	6.928	7.15	-0.222
728.8	55.52	-0.738	-0.141	0	1.81	0	6.928	7.15	-0.222
728.9	55.476	-0.718	-1.25	0	0	0	6.928	7.15	-0.222
729	55.42	-0.73	-1.031	0	0	0	6.928	7.15	-0.222
729.1	55.364	-0.73	-0.053	0	0	0	6.928	7.15	-0.222
729.2	55.302	-0.74	-0.643	0	0	0	6.928	7.15	-0.222
729.3	55.246	-0.738	-0.6	0	0	0	6.928	7.15	-0.222
729.4	55.184	-0.738	-0.586	0	0	0	6.928	7.15	-0.222
729.5	55.128	-0.75	-0.696	0	0	0	6.928	7.15	-0.222
729.6	55.072	-0.748	-0.6	0	0	0	6.928	7.15	-0.222
729.7	55.016	-0.75	-0.558	0	0	0	6.928	7.15	-0.222
729.8	54.96	-0.745	-0.788	0	0	0	6.928	7.15	-0.222
729.9	54.898	-0.72	-0.622	0	0	0	6.928	7.15	-0.222
730	54.842	-0.703	-1.003	0	0	0	6.928	7.15	-0.222
730.1	54.786	-0.715	-1.483	0	0	0	6.928	7.15	-0.222
730.2	54.73	-0.713	-0.562	0	0	0	6.928	7.15	-0.222
730.3	54.674	-0.705	-0.028	0	0	0	6.928	7.15	-0.222
730.4	54.619	-0.715	-1.194	0	0	0	6.928	7.15	-0.222
730.5	54.563	-0.723	-0.883	0	0	0	6.928	7.15	-0.222
730.6	54.507	-0.718	-0.625	0	0	0	6.928	7.15	-0.222
730.7	54.451	-0.718	-0.579	0	0	0	6.928	7.15	-0.222
730.8	54.395	-0.718	-0.664	0	0	0	6.928	7.15	-0.222
730.9	54.339	-0.713	-0.773	0	0	0	6.928	7.15	-0.222
731	54.283	-0.73	-1.003	0	0	0	6.928	7.15	-0.222
731.1	54.221	-0.73	0.127	0	0	0	6.928	7.15	-0.222
731.2	54.171	-0.715	-0.953	0	0	0	6.928	7.15	-0.222
731.3	54.115	-0.72	-0.678	0	0	0	6.928	7.15	-0.222
731.4	54.059	-0.728	-1.328	0	0	0	6.928	7.15	-0.222
731.5	53.997	-0.725	-0.427	0	0	0	6.928	7.15	-0.222
731.6	53.941	-0.72	-0.516	0	0	0	6.928	7.15	-0.222
731.7	53.892	-0.728	-0.844	0	0	0	6.928	7.15	-0.222
731.8	53.829	-0.728	-0.706	0	0.87	0	6.928	7.15	-0.222
731.9	53.78	-0.713	-0.678	0	1.07	0	6.928	7.15	-0.222
732	53.724	-0.71	-1.328	0	1.15	0	6.928	7.15	-0.222
732.1	53.674	-0.713	-0.953	0	1.62	0	6.928	7.15	-0.222
732.2	53.618	-0.723	-1.102	0	1.96	0	6.928	7.15	-0.222
732.3	53.562	-0.715	-0.692	0	2.55	0	6.928	7.15	-0.222
732.4	53.512	-0.715	-0.855	0	2.55	0	6.928	7.15	-0.222
732.5	53.463	-0.738	-1.028	0	2.55	0	6.928	7.15	-0.222
732.6	53.413	-0.73	-0.138	0	2.55	0	6.929	7.15	-0.222
732.7	53.363	-0.713	-0.6	0	2.54	0	6.929	7.151	-0.222
732.8	53.314	-0.715	-1.183	0	2.55	0	6.929	7.151	-0.222

732.9	53.264	-0.715	-0.353	0	2.54	0	6.929	7.151	-0.222
733	53.214	-0.72	-0.54	0	2.53	0	6.929	7.151	-0.222
733.1	53.158	-0.72	-0.745	0	2.55	0	6.929	7.151	-0.222
733.2	53.109	-0.71	-0.932	0	2.54	0	6.929	7.151	-0.222
733.3	53.059	-0.713	-0.441	0	2.54	0	6.929	7.151	-0.222
733.4	53.009	-0.71	-1.028	0	2.6	0	6.929	7.151	-0.222
733.5	52.959	-0.715	-0.788	0	2.7	0	6.929	7.151	-0.222
733.6	52.91	-0.73	-1.014	0	2.7	0	6.929	7.151	-0.222
733.7	52.86	-0.733	-0.371	0	2.71	0	6.929	7.151	-0.222
733.8	52.804	-0.733	-0.629	0	2.72	0	6.929	7.151	-0.222
733.9	52.761	-0.728	-1.028	0	2.72	0	6.929	7.151	-0.222
734	52.705	-0.73	-0.844	0	2.72	0	6.93	7.151	-0.222
734.1	52.655	-0.728	-0.427	0	2.91	0	6.93	7.152	-0.222
734.2	52.611	-0.725	-0.689	0	3.13	0	6.93	7.152	-0.222
734.3	52.556	-0.72	-0.823	0	3.18	0	6.93	7.152	-0.222
734.4	52.506	-0.715	-0.735	0	3.19	0	6.93	7.152	-0.222
734.5	52.456	-0.728	-0.717	0	3.19	0	6.93	7.152	-0.222
734.6	52.413	-0.72	-0.678	0	3.18	0	6.93	7.152	-0.222
734.7	52.363	-0.718	-0.872	0	3.28	0	6.93	7.152	-0.222
734.8	52.307	-0.718	-1.165	0	3.67	0	6.93	7.152	-0.222
734.9	52.264	-0.705	-0.286	0	3.81	0	6.93	7.152	-0.222
735	52.214	-0.71	-0.858	0	3.95	0	6.93	7.152	-0.222
735.1	52.17	-0.73	-0.844	0	3.94	0	6.931	7.152	-0.222
735.2	52.121	-0.735	-0.314	0	3.93	0	6.931	7.153	-0.222
735.3	52.071	-0.745	-0.456	0	3.93	0	6.931	7.153	-0.222
735.4	52.027	-0.753	-0.915	0	3.93	0	6.931	7.153	-0.222
735.5	51.984	-0.74	0.032	0	3.92	0	6.931	7.153	-0.222
735.6	51.94	-0.73	-0.929	0	3.92	0	6.931	7.153	-0.222
735.7	51.891	-0.728	-1.402	0	3.91	0	6.931	7.153	-0.222
735.8	51.841	-0.715	-0.646	0	3.5	0	6.931	7.153	-0.222
735.9	51.798	-0.718	-0.689	0	3.38	0	6.931	7.153	-0.222
736	51.754	-0.713	-0.791	0	2.81	0	6.932	7.153	-0.222
736.1	51.704	-0.715	-0.788	0	1.73	0	6.932	7.153	-0.222
736.2	51.655	-0.715	-0.936	0	0.97	0	6.932	7.153	-0.222
736.3	51.605	-0.71	-0.353	0	0	0	6.932	7.154	-0.222
736.4	51.549	-0.723	-0.985	0	0	0	6.932	7.154	-0.222
736.5	51.499	-0.718	-0.897	0	0	0	6.932	7.154	-0.222
736.6	51.443	-0.703	-0.297	0	0	0	6.932	7.154	-0.222
736.7	51.394	-0.713	-1.328	0	0	0	6.932	7.154	-0.222
736.8	51.338	-0.713	-0.544	0	0	0	6.932	7.154	-0.222
736.9	51.288	-0.73	-0.749	0	0	0	6.932	7.154	-0.222
737	51.238	-0.72	-0.441	0	0	0	6.932	7.154	-0.222
737.1	51.182	-0.72	-0.844	0	0	0	6.932	7.154	-0.222
737.2	51.126	-0.755	-1.423	0	0	0	6.932	7.154	-0.222
737.3	51.07	-0.788	-0.48	0	0	0	6.932	7.154	-0.222
737.4	51.021	-0.768	0.148	0	0	0	6.932	7.154	-0.222
737.5	50.971	-0.723	-0.473	0	0	0	6.932	7.154	-0.222

737.6	50.921	-0.713	-1.451	0	0	0	6.932	7.154	-0.222
737.7	50.865	-0.713	-1.328	0	-0.88	0	6.932	7.154	-0.222
737.8	50.81	-0.713	-0.456	0	-7.84	0	6.931	7.154	-0.222
737.9	50.741	-0.705	-0.83	0	-11.39	0	6.931	7.154	-0.222
738	50.66	-0.713	-0.953	0	-12.8	0	6.931	7.154	-0.223
738.1	50.573	-0.728	-0.745	0	-14.12	0	6.93	7.154	-0.223
738.2	50.493	-0.723	-0.484	0	-17.81	0	6.93	7.154	-0.224
738.3	50.406	-0.73	-0.788	0	-20.6	0	6.929	7.154	-0.224
738.4	50.306	-0.745	-1.031	0	-23.7	0	6.929	7.154	-0.225
738.5	50.201	-0.735	-0.357	0	-27.97	0	6.928	7.154	-0.226
738.6	50.083	-0.715	-0.657	0	-33.8	0	6.927	7.154	-0.227
738.7	49.958	-0.718	-1.338	0	-40.11	0	6.926	7.154	-0.228
738.8	49.822	-0.725	-0.54	0	-43.93	0	6.925	7.154	-0.229
738.9	49.672	-0.735	-0.54	0	-44.32	0	6.923	7.154	-0.23
739	49.523	-0.75	-0.6	0	-44.14	0	6.922	7.154	-0.231
739.1	49.374	-0.745	-0.466	0	-43.94	0	6.921	7.154	-0.233
739.2	49.219	-0.728	0.088	0	-43.87	0	6.92	7.154	-0.234
739.3	49.07	-0.715	-1.183	0	-43.55	0	6.918	7.154	-0.235
739.4	48.921	-0.708	-0.844	0	-33.55	0	6.917	7.154	-0.236
739.5	48.771	-0.705	-0.788	0	-25.08	0	6.917	7.154	-0.237
739.6	48.653	-0.73	-0.929	0	-24.17	0	6.916	7.154	-0.237
739.7	48.542	-0.75	-0.466	0	-24.04	0	6.915	7.154	-0.238
739.8	48.436	-0.75	-0.138	0	-24.25	0	6.915	7.154	-0.239
739.9	48.33	-0.718	-0.872	0	-25.41	0	6.914	7.154	-0.239
740	48.225	-0.728	-1.155	0	-25.76	0	6.913	7.154	-0.24
740.1	48.113	-0.75	-0.66	0	-25.83	0	6.913	7.154	-0.241
740.2	48.001	-0.738	-0.071	0	-23.56	0	6.912	7.154	-0.242
740.3	47.889	-0.715	-0.357	0	-14.46	0	6.912	7.154	-0.242
740.4	47.783	-0.718	-1.353	0	-10.13	0	6.911	7.154	-0.242
740.5	47.709	-0.715	-0.678	0	-7.25	0	6.911	7.154	-0.242
740.6	47.634	-0.718	-0.597	0	-6.06	0	6.911	7.154	-0.243
740.7	47.566	-0.723	-0.953	0	-5.11	0	6.911	7.154	-0.243
740.8	47.498	-0.723	-0.516	0	-5.11	0	6.911	7.154	-0.243
740.9	47.435	-0.685	-0.689	0	-5.72	0	6.91	7.154	-0.243
741	47.367	-0.685	-1.194	0	-10.1	0	6.91	7.154	-0.243
741.1	47.299	-0.708	-1.028	0	-13.38	0	6.91	7.154	-0.244
741.2	47.212	-0.703	-0.381	0	-14.63	0	6.909	7.154	-0.244
741.3	47.119	-0.71	-0.343	0	-14.83	0	6.909	7.154	-0.244
741.4	47.025	-0.73	-0.953	0	-14.81	0	6.909	7.154	-0.245
741.5	46.938	-0.73	-0.385	0	-15.02	0	6.908	7.154	-0.245
741.6	46.851	-0.71	-0.357	0	-15.81	0	6.908	7.154	-0.246
741.7	46.764	-0.708	-1.264	0	-16.03	0	6.907	7.154	-0.246
741.8	46.671	-0.718	-1.278	0	-15.98	0	6.907	7.154	-0.247
741.9	46.578	-0.723	-0.339	0	-15.96	0	6.906	7.154	-0.247
742	46.491	-0.715	-0.41	0	-15.95	0	6.906	7.154	-0.248
742.1	46.398	-0.713	-0.516	0	-15.88	0	6.906	7.154	-0.248
742.2	46.311	-0.728	-1.028	0	-15.92	0	6.905	7.154	-0.248

742.3	46.218	-0.738	-0.501	0	-15.84	0	6.905	7.154	-0.249
742.4	46.131	-0.74	-0.191	0	-16.05	0	6.904	7.154	-0.249
742.5	46.037	-0.735	-0.703	0	-17.51	0	6.904	7.154	-0.25
742.6	45.95	-0.723	-0.625	0	-19.27	0	6.903	7.154	-0.25
742.7	45.851	-0.723	-0.802	0	-20.74	0	6.903	7.154	-0.251
742.8	45.745	-0.723	-0.717	0	-21.04	0	6.902	7.154	-0.251
742.9	45.646	-0.74	-0.742	0	-21.02	0	6.901	7.154	-0.252
743	45.547	-0.73	-0.311	0	-21.02	0	6.901	7.154	-0.253
743.1	45.441	-0.718	-0.671	0	-21.98	0	6.9	7.154	-0.253
743.2	45.341	-0.715	-1.335	0	-23.82	0	6.9	7.154	-0.254
743.3	45.23	-0.72	-0.54	0	-25.89	0	6.899	7.154	-0.255
743.4	45.118	-0.713	-0.6	0	-28.02	0	6.898	7.154	-0.255
743.5	45	-0.71	-0.844	0	-30.46	0	6.897	7.154	-0.256
743.6	44.875	-0.713	-0.922	0	-32.8	0	6.896	7.154	-0.257
743.7	44.745	-0.72	-0.614	0	-37.2	0	6.895	7.154	-0.258
743.8	44.608	-0.72	-0.872	0	-46.31	0	6.894	7.154	-0.259
743.9	44.453	-0.738	-0.441	0	-57.33	0	6.892	7.154	-0.261
744	44.273	-0.71	-0.441	0	-63.32	0	6.891	7.154	-0.263
744.1	44.061	-0.703	-0.759	0	-64.59	0	6.889	7.154	-0.265
744.2	43.844	-0.71	-1.345	0	-65.86	0	6.887	7.154	-0.266
744.3	43.626	-0.703	-0.54	0	-69.22	0	6.885	7.154	-0.268
744.4	43.397	-0.69	-0.473	0	-73.5	0	6.883	7.154	-0.27
744.5	43.16	-0.683	-1.268	0	-76.6	0	6.881	7.154	-0.273
744.6	42.906	-0.695	-0.971	0	-83.27	0	6.879	7.154	-0.275
744.7	42.645	-0.713	-0.516	0	-89.95	0	6.876	7.154	-0.277
744.8	42.353	-0.723	-0.29	0	-91.74	0	6.874	7.154	-0.28
744.9	42.042	-0.713	-0.516	0	-91.61	0	6.871	7.154	-0.282
745	41.725	-0.71	-0.968	0	-90.7	0	6.869	7.154	-0.285
745.1	41.402	-0.708	-0.953	0	-89.82	0	6.866	7.154	-0.287
745.2	41.085	-0.71	-0.357	0	-88.92	0	6.864	7.154	-0.29
745.3	40.774	-0.713	-0.83	0	-87.77	0	6.861	7.154	-0.292
745.4	40.457	-0.708	-0.381	0	-85.99	0	6.859	7.154	-0.295
745.5	40.141	-0.685	-0.703	0	-83.44	0	6.856	7.154	-0.297
745.6	39.83	-0.695	-1.003	0	-67.61	0	6.855	7.154	-0.299
745.7	39.532	-0.728	-1.031	0	-59.46	0	6.853	7.154	-0.301
745.8	39.252	-0.728	0.343	0	-59.3	0	6.851	7.154	-0.302
745.9	38.985	-0.74	-0.29	0	-61.32	0	6.85	7.154	-0.304
746	38.736	-0.745	-0.886	0	-61.64	0	6.848	7.154	-0.306
746.1	38.475	-0.723	-0.385	0	-62.12	0	6.846	7.154	-0.307
746.2	38.171	-0.693	-0.802	0	-62.06	0	6.844	7.154	-0.309
746.3	37.848	-0.713	-1.494	0	-61.8	0	6.843	7.154	-0.311
746.4	37.525	-0.738	-0.512	0	-64.76	0	6.841	7.154	-0.313
746.5	37.208	-0.728	0.272	0	-74.33	0	6.839	7.154	-0.315
746.6	36.878	-0.713	-0.498	0	-83.05	0	6.836	7.154	-0.317
746.7	36.543	-0.723	-1.208	0	-81.81	0	6.834	7.154	-0.319
746.8	36.214	-0.723	-0.558	0	-80.84	0	6.832	7.154	-0.322
746.9	35.903	-0.715	-0.357	0	-79.99	0	6.83	7.154	-0.324

747	35.586	-0.7	-0.788	0	-79.15	0	6.828	7.154	-0.326
747.1	35.275	-0.705	-1.427	0	-78.43	0	6.825	7.154	-0.328
747.2	34.965	-0.718	-0.191	0	-71.91	0	6.823	7.154	-0.33
747.3	34.641	-0.725	-0.371	0	-65.63	0	6.822	7.154	-0.332
747.4	34.306	-0.728	-0.413	0	-65.54	0	6.82	7.154	-0.334
747.5	33.952	-0.72	-0.516	0	-68.25	0	6.818	7.154	-0.336
747.6	33.641	-0.718	-0.844	0	-67.11	0	6.816	7.154	-0.338
747.7	33.355	-0.703	-0.72	0	-67.03	0	6.814	7.154	-0.339
747.8	33.088	-0.703	-0.777	0	-66.99	0	6.812	7.154	-0.341
747.9	32.808	-0.703	-0.788	0	-67.48	0	6.81	7.154	-0.343
748	32.51	-0.708	-0.54	0	-68.38	0	6.808	7.154	-0.345
748.1	32.243	-0.723	-0.943	0	-73.89	0	6.806	7.154	-0.347
748.2	31.951	-0.718	-0.184	0	-79.41	0	6.804	7.154	-0.349
748.3	31.622	-0.708	-0.399	0	-81.62	0	6.802	7.154	-0.352
748.4	31.28	-0.703	-0.858	0	-81.48	0	6.8	7.154	-0.354
748.5	30.932	-0.7	-0.692	0	-80.51	0	6.797	7.154	-0.356
748.6	30.584	-0.703	-0.706	0	-78.94	0	6.795	7.154	-0.358
748.7	30.248	-0.705	-0.554	0	-77.39	0	6.793	7.154	-0.36
748.8	29.907	-0.705	-0.646	0	-75.32	0	6.791	7.154	-0.363
748.9	29.565	-0.708	-0.357	0	-73.61	0	6.789	7.154	-0.365
749	29.223	-0.715	-0.456	0	-72.46	0	6.787	7.154	-0.367
749.1	28.888	-0.72	-0.717	0	-71.5	0	6.785	7.154	-0.369
749.2	28.552	-0.72	-0.184	0	-68.04	0	6.783	7.154	-0.37
749.3	28.223	-0.718	-0.943	0	-64.59	0	6.781	7.154	-0.372
749.4	27.9	-0.708	-0.618	0	-63.03	0	6.78	7.154	-0.374
749.5	27.595	-0.703	-0.689	0	-60.2	0	6.778	7.154	-0.376
749.6	27.291	-0.718	-0.816	0	-59.21	0	6.776	7.154	-0.377
749.7	26.968	-0.733	-0.678	0	-58.21	0	6.775	7.154	-0.379
749.8	26.7	-0.733	-0.127	0	-53.41	0	6.773	7.154	-0.38
749.9	26.408	-0.723	-0.692	0	-47.75	0	6.772	7.154	-0.382
750	26.141	-0.73	-0.872	0	-44.56	0	6.771	7.154	-0.383
750.1	25.893	-0.738	-0.717	0	-41.91	0	6.769	7.154	-0.384
750.2	25.656	-0.728	-0.127	0	-38.65	0	6.768	7.154	-0.385
750.3	25.427	-0.733	-0.777	0	-36.25	0	6.767	7.154	-0.386
750.4	25.221	-0.738	-0.869	0	-35.13	0	6.766	7.154	-0.387
750.5	25.023	-0.733	-0.205	0	-34.9	0	6.765	7.154	-0.388
750.6	24.818	-0.73	-0.72	0	-34.46	0	6.764	7.154	-0.389
750.7	24.625	-0.718	-0.6	0	-34.41	0	6.763	7.154	-0.39
750.8	24.426	-0.708	-0.671	0	-34.22	0	6.762	7.154	-0.391
750.9	24.227	-0.723	-0.968	0	-31.06	0	6.762	7.154	-0.392
751	24.016	-0.725	-0.685	0	-28.06	0	6.761	7.154	-0.393
751.1	23.786	-0.72	-0.544	0	-25.92	0	6.76	7.154	-0.393
751.2	23.544	-0.728	-0.943	0	-21.03	0	6.76	7.154	-0.394
751.3	23.301	-0.73	-0.908	0	-14.65	0	6.759	7.154	-0.394
751.4	23.078	-0.723	-0.844	0	-28.98	0	6.758	7.154	-0.395
751.5	22.866	-0.723	-0.773	0	-29.51	0	6.758	7.154	-0.396
751.6	22.655	-0.723	-0.996	0	-29.99	0	6.757	7.154	-0.397

751.7	22.438	-0.72	-0.427	0	-31.65	0	6.756	7.154	-0.398
751.8	22.214	-0.72	-0.802	0	-36.21	0	6.755	7.154	-0.399
751.9	21.978	-0.715	-0.897	0	-38.88	0	6.754	7.154	-0.4
752	21.736	-0.715	-0.886	0	-36.1	0	6.753	7.154	-0.401
752.1	21.499	-0.73	-0.501	0	-34.76	0	6.752	7.154	-0.402
752.2	21.282	-0.74	-0.554	0	-34.49	0	6.751	7.154	-0.403
752.3	21.064	-0.723	-0.47	0	-34.54	0	6.75	7.154	-0.404
752.4	20.847	-0.718	-0.855	0	-35.97	0	6.749	7.154	-0.405
752.5	20.623	-0.725	-1.112	0	-36.72	0	6.748	7.154	-0.406
752.6	20.387	-0.725	-0.607	0	-36.36	0	6.747	7.154	-0.407
752.7	20.145	-0.715	-0.456	0	-35.8	0	6.746	7.154	-0.408
752.8	19.909	-0.715	-1.056	0	-35.37	0	6.745	7.154	-0.409
752.9	19.666	-0.695	-0.978	0	-35.65	0	6.744	7.154	-0.41
753	19.43	-0.695	-1.042	0	-39.22	0	6.743	7.154	-0.411
753.1	19.176	-0.723	-1.172	0	-41.58	0	6.742	7.154	-0.412
753.2	18.896	-0.74	-0.332	0	-40.82	0	6.74	7.154	-0.413
753.3	18.604	-0.728	0.025	0	-38.98	0	6.739	7.154	-0.414
753.4	18.318	-0.72	-0.872	0	-37.96	0	6.738	7.154	-0.415
753.5	18.038	-0.72	-1.36	0	-35.49	0	6.737	7.154	-0.416
753.6	17.771	-0.71	-0.692	0	-33.78	0	6.736	7.154	-0.417
753.7	17.504	-0.72	-0.791	0	-33.02	0	6.735	7.154	-0.418
753.8	17.237	-0.728	-0.897	0	-31.95	0	6.735	7.154	-0.419
753.9	16.988	-0.735	-0.053	0	-30.79	0	6.734	7.154	-0.42
754	16.727	-0.745	-0.816	0	-28.24	0	6.733	7.154	-0.421
754.1	16.479	-0.725	-0.325	0	-25.17	0	6.732	7.154	-0.421
754.2	16.249	-0.72	-0.77	0	-23.32	0	6.732	7.154	-0.422
754.3	16.038	-0.728	-1.017	0	-22.69	0	6.731	7.154	-0.423
754.4	15.826	-0.735	-0.385	0	-22.33	0	6.73	7.154	-0.423
754.5	15.615	-0.718	-0.371	0	-21.62	0	6.73	7.154	-0.424
754.6	15.404	-0.715	-0.855	0	-18.93	0	6.729	7.154	-0.424
754.7	15.193	-0.725	-0.953	0	-16.83	0	6.729	7.154	-0.425
754.8	14.981	-0.725	-0.371	0	-15.19	0	6.728	7.154	-0.425
754.9	14.726	-0.708	-0.53	0	-13.6	0	6.728	7.154	-0.426
755	14.453	-0.718	-1.487	0	-8.26	0	6.728	7.154	-0.426
755.1	14.142	-0.735	-0.614	0	-1.58	0	6.728	7.154	-0.426
755.2	13.888	-0.735	-0.304	0	-14.71	0	6.727	7.154	-0.426
755.3	13.608	-0.743	-0.777	0	-16.32	0	6.727	7.154	-0.427
755.4	13.335	-0.753	-0.791	0	-17.63	0	6.726	7.154	-0.427
755.5	13.055	-0.743	0.039	0	-21.39	0	6.726	7.154	-0.428
755.6	12.757	-0.733	-0.731	0	-25.28	0	6.725	7.154	-0.428
755.7	12.452	-0.738	-1.031	0	-24.51	0	6.724	7.154	-0.429
755.8	12.148	-0.738	-0.441	0	-22.02	0	6.724	7.154	-0.43
755.9	11.881	-0.73	-0.487	0	-21.17	0	6.723	7.154	-0.43
756	11.638	-0.725	-0.791	0	-20.6	0	6.723	7.154	-0.431
756.1	11.384	-0.738	-0.968	0	-19.99	0	6.722	7.154	-0.431
756.2	11.135	-0.738	-0.516	0	-18.84	0	6.722	7.154	-0.432
756.3	10.893	-0.73	-0.501	0	-16.63	0	6.721	7.154	-0.432

756.4	10.65	-0.728	-0.957	0	-15.23	0	6.721	7.154	-0.433
756.5	10.451	-0.725	-0.826	0	-14.83	0	6.72	7.154	-0.433
756.6	10.228	-0.72	-0.59	0	-14.6	0	6.72	7.154	-0.434
756.7	10.01	-0.715	-0.47	0	-14.28	0	6.719	7.154	-0.434
756.8	9.805	-0.72	-1.045	0	-14	0	6.719	7.154	-0.434
756.9	9.588	-0.718	-0.385	0	-13.61	0	6.719	7.154	-0.435
757	9.37	-0.71	-0.671	0	-13.17	0	6.718	7.154	-0.435
757.1	9.128	-0.713	-0.929	0	-12.9	0	6.718	7.154	-0.436
757.2	8.929	-0.718	-0.826	0	-12.89	0	6.718	7.154	-0.436
757.3	8.712	-0.72	-0.576	0	-13.08	0	6.717	7.154	-0.436
757.4	8.482	-0.723	-0.706	0	-13.13	0	6.717	7.154	-0.437
757.5	8.239	-0.72	-0.54	0	-12.91	0	6.716	7.154	-0.437
757.6	7.991	-0.718	-0.897	0	-11.9	0	6.716	7.154	-0.437
757.7	7.736	-0.723	-0.614	0	-10.66	0	6.716	7.154	-0.438
757.8	7.475	-0.723	-0.886	0	-9.38	0	6.716	7.154	-0.438
757.9	7.195	-0.743	-0.629	0	-8.19	0	6.715	7.154	-0.438
758	6.885	-0.723	-0.424	0	-7	0	6.715	7.154	-0.438
758.1	6.574	-0.71	-0.872	0	-5.78	0	6.715	7.154	-0.439
758.2	6.27	-0.72	-1.197	0	-4.49	0	6.715	7.154	-0.439
758.3	5.99	-0.715	-0.72	0	-3.63	0	6.715	7.154	-0.439
758.4	5.704	-0.695	-0.134	0	-2.78	0	6.715	7.154	-0.439
758.5	5.449	-0.7	-0.999	0	-2.17	0	6.715	7.154	-0.439
758.6	5.182	-0.715	-0.706	0	-1.57	0	6.715	7.154	-0.439
758.7	4.915	-0.728	-0.385	0	-1.08	0	6.715	7.154	-0.439
758.8	4.685	-0.728	-0.173	0	-0.68	0	6.715	7.154	-0.439
758.9	4.493	-0.718	-0.441	0	0	0	6.715	7.154	-0.439
759	4.312	-0.723	-1.36	0	0	0	6.715	7.154	-0.439
759.1	4.132	-0.715	-0.484	0	0	0	6.715	7.154	-0.439
759.2	3.952	-0.71	-0.788	0	0	0	6.715	7.154	-0.439
759.3	3.784	-0.723	-1.176	0	0.56	0	6.715	7.154	-0.439
759.4	3.623	-0.72	-0.219	0	0.64	0	6.715	7.154	-0.439
759.5	3.473	-0.72	-0.706	0	0.68	0	6.715	7.154	-0.439
759.6	3.312	-0.713	-0.706	0	0.7	0	6.715	7.154	-0.439
759.7	3.15	-0.713	-0.872	0	0.71	0	6.715	7.154	-0.439
759.8	2.995	-0.715	-1.028	0	0.73	0	6.715	7.154	-0.439
759.9	2.84	-0.718	-0.399	0	0.75	0	6.715	7.154	-0.439
760	2.684	-0.713	-0.544	0	0.75	0	6.715	7.154	-0.439
760.1	2.523	-0.705	-0.417	0	0.74	0	6.715	7.154	-0.439
760.2	2.38	-0.708	-0.749	0	0.74	0	6.715	7.154	-0.439
760.3	2.243	-0.73	-0.805	0	0.68	0	6.715	7.154	-0.439
760.4	2.113	-0.723	-0.205	0	0.66	0	6.715	7.154	-0.439
760.5	1.988	-0.7	-0.173	0	0.7	0	6.715	7.154	-0.439
760.6	1.864	-0.713	-1.243	0	0.84	0	6.715	7.154	-0.439
760.7	1.752	-0.75	-1.081	0	0.93	0	6.715	7.154	-0.439
760.8	1.653	-0.75	0.184	0	1	0	6.715	7.154	-0.439
760.9	1.553	-0.745	0.057	0	1.05	0	6.715	7.154	-0.439
761	1.466	-0.73	-1.155	0	1.11	0	6.715	7.154	-0.439

761.1	1.379	-0.713	-0.925	0	1.16	0	6.715	7.154	-0.439
761.2	1.305	-0.698	-1.13	0	1.18	0	6.715	7.154	-0.439
761.3	1.237	-0.705	-1.293	0	1.23	0	6.715	7.154	-0.439
761.4	1.162	-0.713	-0.703	0	1.21	0	6.715	7.154	-0.439
761.5	1.087	-0.715	-0.47	0	1.18	0	6.715	7.154	-0.439
761.6	0.982	-0.705	-0.47	0	1.17	0	6.715	7.154	-0.439
761.7	0.839	-0.69	-0.929	0	1.26	0	6.715	7.154	-0.439
761.8	0.708	-0.69	-1.045	0	1.32	0	6.715	7.154	-0.439
761.9	0.541	-0.715	-0.971	0	1.34	0	6.715	7.154	-0.439
762	0.36	-0.72	-0.233	0	1.46	0	6.715	7.154	-0.439
762.1	0.217	-0.713	-0.088	0	1.54	0	6.715	7.154	-0.439
762.2	0.143	-0.71	-0.837	0	1.51	0	6.715	7.154	-0.439
762.3	0	-0.718	-0.925	0	1.45	0	6.715	7.154	-0.439
762.4	0	-0.703	-0.399	0	1.4	0	6.715	7.154	-0.439
762.5	0	-0.708	-0.971	0	1.35	0	6.715	7.154	-0.439
762.6	0	-0.723	-1.01	0	1.38	0	6.716	7.154	-0.439
762.7	0	-0.723	0.011	0	1.38	0	6.716	7.155	-0.439
762.8	0	-0.723	-0.957	0	1.38	0	6.716	7.155	-0.439
762.9	0	-0.713	-0.925	0	1.66	0	6.716	7.155	-0.439
763	0	-0.698	-0.562	0	1.78	0	6.716	7.155	-0.439
763.1	0	-0.718	-1.127	0	1.89	0	6.716	7.155	-0.439
763.2	0	-0.743	-0.971	0	2.01	0	6.716	7.155	-0.439
763.3	0	-0.733	0.17	0	1.58	0	6.716	7.155	-0.439
763.4	0	-0.725	-0.646	0	1.41	0	6.716	7.155	-0.439
763.5	0	-0.713	-0.805	0	1.41	0	6.716	7.155	-0.439
763.6	0	-0.713	-1.035	0	1.4	0	6.716	7.155	-0.439
763.7	0	-0.71	-0.558	0	1.4	0	6.716	7.155	-0.439
763.8	0	-0.71	-0.805	0	1.41	0	6.716	7.155	-0.439
763.9	0	-0.71	-0.883	0	1.43	0	6.716	7.155	-0.439
764	0	-0.708	-0.29	0	1.43	0	6.716	7.155	-0.439
764.1	0	-0.715	-0.886	0	1.43	0	6.716	7.155	-0.439
764.2	0	-0.72	-0.413	0	1.43	0	6.716	7.155	-0.439
764.3	0	-0.723	-0.399	0	1.43	0	6.716	7.155	-0.439
764.4	0	-0.723	-0.72	0	1.44	0	6.716	7.155	-0.439
764.5	0	-0.718	-0.731	0	1.45	0	6.716	7.155	-0.439
764.6	0	-0.708	-0.445	0	1.45	0	6.716	7.155	-0.439
764.7	0	-0.713	-1.105	0	1.44	0	6.716	7.155	-0.439
764.8	0	-0.713	-0.72	0	1.45	0	6.716	7.155	-0.439
764.9	0	-0.698	-0.766	0	1.45	0	6.716	7.155	-0.439
765	0	-0.72	-1.045	0	1.25	0	6.717	7.155	-0.439
765.05	0	-0.73	-0.413	0	1.43	0	6.717	7.156	-0.439
765.05	0	-0.723	-0.032	0	1.47	0	6.717	7.156	-0.439
765.05	0	-0.73	-1.13	0	1.74	0	6.717	7.156	-0.439
765.05	0	-0.723	-0.113	0	1.75	0	6.717	7.156	-0.439
0	0	-0.67	-0.275	0	0	0	0	0	0
0	0	-0.67	-0.275	0	1.46	0	0	0	0
0	0	-0.67	-0.275	0	1.47	0	0	0	0

0	0	-0.713	1.088	0	1.47	0	0	0	0
0.1	0	-0.713	-0.064	0	1.46	0	0	0	0
0.2	0	-0.713	1.158	0	1.44	0	0	0	0
0.3	0	-0.688	1.059	0	1.42	0	0	0	0
0.4	0	-0.708	1.056	0	1.4	0	0	0	0
0.5	0	-0.708	0.572	0	1.38	0	0	0	0
0.6	0	-0.7	-0.134	0	1.36	0	0	0	0
0.7	0	-0.708	-1.19	0	1.33	0	0	0	0
0.8	0	-0.708	-0.498	0	1.32	0	0	0	0
0.9	0	-0.71	-0.745	0	1.32	0	0	0	0
1	0	-0.708	-0.749	0	1.29	0	0	0	0
1.1	0	-0.708	-0.749	0	1.27	0	0	0	0
1.2	0	-0.705	-0.586	0	1.26	0	0	0	0
1.3	0	-0.698	-1.074	0	1.26	0	0.001	0.001	0
1.4	0	-0.693	-0.915	0	1.23	0	0.001	0.001	0
1.5	0	-0.695	-0.54	0	1.26	0	0.001	0.001	0
1.6	0	-0.703	-0.833	0	1.67	0	0.001	0.001	0
1.7	0	-0.703	-0.915	0	1.75	0	0.001	0.001	0
1.8	0	-0.708	0.053	0	1.67	0	0.001	0.001	0
1.9	0	-0.695	-0.915	0	1.74	0	0.001	0.001	0
2	0	-0.695	-0.982	0	1.84	0	0.001	0.001	0
2.1	0	-0.695	-0.59	0	2.11	0	0.001	0.001	0
2.2	0	-0.695	-0.614	0	2.89	0	0.001	0.001	0
2.3	0	-0.69	-0.915	0	4.65	0	0.001	0.001	0
2.4	0	-0.693	-0.632	0	6.47	0	0.001	0.001	0
2.5	0	-0.688	-0.664	0	7.21	0	0.001	0.001	0
2.6	0.155	-0.688	-0.66	0	7.16	0	0.002	0.002	0
2.7	0.28	-0.71	-0.826	0	7.46	0	0.002	0.002	0
2.8	0.435	-0.713	-0.304	0	8.2	0	0.002	0.002	0
2.9	0.615	-0.713	-0.275	0	9.54	0	0.002	0.002	0
3	0.833	-0.693	-0.343	0	10.67	0	0.003	0.003	0
3.1	1.075	-0.7	-0.901	0	11.63	0	0.003	0.003	0
3.2	1.33	-0.7	-0.388	0	12.47	0	0.003	0.003	0
3.3	1.609	-0.708	-0.47	0	13.42	0	0.004	0.004	0
3.4	1.926	-0.695	-0.385	0	14.84	0	0.004	0.004	0
3.5	2.175	-0.695	-0.569	0	16.77	0	0.005	0.005	0
3.6	2.454	-0.703	-0.703	0	19.29	0	0.005	0.005	0
3.7	2.74	-0.708	-0.47	0	21.97	0	0.006	0.006	0
3.8	3.057	-0.708	-0.159	0	24.32	0	0.006	0.006	0
3.9	3.38	-0.703	-0.501	0	25.99	0	0.007	0.007	0
4	3.722	-0.7	-0.424	0	28.14	0	0.008	0.008	0
4.1	4.076	-0.7	-0.911	0	30.55	0	0.009	0.009	0
4.2	4.424	-0.71	-0.272	0	34.41	0	0.01	0.01	0
4.3	4.816	-0.683	-0.745	0	38.75	0	0.011	0.011	0
4.4	5.207	-0.683	-0.83	0	41.63	0	0.012	0.012	0
4.5	5.623	-0.715	-0.41	0	43.81	0	0.013	0.013	0
4.6	6.058	-0.698	-0.021	0	44.85	0	0.014	0.014	0

4.7	6.493	-0.698	-1.07	0	46.45	0	0.016	0.016	0
4.8	6.947	-0.695	-0.83	0	49.87	0	0.017	0.017	0
4.9	7.357	-0.71	-0.745	0	51.73	0	0.019	0.019	0
5	7.767	-0.71	-0.745	0	53.02	0	0.02	0.02	0
5.1	8.177	-0.68	-0.095	0	54.85	0	0.022	0.022	0
5.2	8.587	-0.68	-1.483	0	56.19	0	0.023	0.023	0
5.3	8.991	-0.695	-0.791	0	57.45	0	0.025	0.025	0
5.4	9.395	-0.72	0.071	0	59.13	0	0.026	0.026	0
5.5	9.774	-0.715	-0.915	0	64.6	0	0.028	0.028	0
5.6	10.166	-0.715	-0.343	0	72.82	0	0.03	0.03	0
5.7	10.507	-0.678	-1.155	0	83.09	0	0.032	0.032	0
5.8	10.88	-0.7	-1.236	0	82.71	0	0.035	0.035	0
5.9	11.197	-0.7	-0.551	0	60.57	0	0.036	0.036	0
6	11.526	-0.72	-0.099	0	61.58	0	0.038	0.038	0
6.1	11.887	-0.695	-0.413	0	62.05	0	0.04	0.04	0
6.2	12.229	-0.695	-1.074	0	63.2	0	0.042	0.042	0
6.3	12.564	-0.698	-1.24	0	63.48	0	0.043	0.043	0
6.4	12.893	-0.69	-1.24	0	63.19	0	0.045	0.045	0
6.5	13.223	-0.69	-0.554	0	64.46	0	0.047	0.047	0
6.6	13.546	-0.71	-1.038	0	66.53	0	0.049	0.049	0
6.7	13.863	-0.695	-0.014	0	69.86	0	0.051	0.051	0
6.8	14.186	-0.695	-1.059	0	70.56	0	0.053	0.053	0
6.9	14.521	-0.693	-1.119	0	71.34	0	0.055	0.055	0
7	14.851	-0.695	-0.749	0	72.12	0	0.057	0.057	0
7.1	15.186	-0.695	-0.646	0	72.84	0	0.059	0.059	0
7.2	15.516	-0.698	-0.795	0	72.63	0	0.061	0.061	0
7.3	15.845	-0.71	-0.586	0	72.63	0	0.063	0.063	0
7.4	16.162	-0.723	-0.198	0	71.25	0	0.065	0.065	0
7.5	16.466	-0.705	-0.29	0	72.09	0	0.067	0.067	0
7.6	16.765	-0.695	-1.074	0	72.63	0	0.069	0.069	0
7.7	17.057	-0.695	-1.278	0	74.1	0	0.071	0.071	0
7.8	17.349	-0.698	-0.749	0	77.98	0	0.073	0.073	0
7.9	17.628	-0.698	-0.604	0	80.57	0	0.075	0.075	0
8	17.902	-0.698	-0.911	0	88.54	0	0.078	0.078	0
8.1	18.125	-0.7	-0.307	0	78.45	0	0.08	0.08	0
8.2	18.337	-0.7	-0.795	0	61.62	0	0.082	0.082	0
8.3	18.548	-0.703	-0.629	0	60.64	0	0.083	0.083	0
8.4	18.765	-0.708	-1.074	0	58.36	0	0.085	0.085	0
8.5	18.97	-0.72	-0.664	0	58.82	0	0.086	0.086	0
8.6	19.169	-0.72	0.057	0	59.84	0	0.088	0.088	0
8.7	19.368	-0.72	-0.816	0	60.99	0	0.09	0.09	0
8.8	19.573	-0.708	-0.47	0	61.8	0	0.092	0.092	0
8.9	19.778	-0.708	-0.745	0	62.06	0	0.093	0.093	0
9	19.983	-0.708	-1.07	0	64.27	0	0.095	0.095	0
9.1	20.188	-0.688	-0.166	0	64.23	0	0.097	0.097	0
9.2	20.4	-0.688	-0.957	0	65.65	0	0.099	0.099	0
9.3	20.617	-0.708	-0.915	0	66.36	0	0.101	0.101	0

9.4	20.828	-0.72	-0.915	0	68.6	0	0.102	0.102	0
9.5	21.046	-0.72	-0.371	0	69.32	0	0.104	0.104	0
9.6	21.27	-0.72	-0.876	0	69.76	0	0.106	0.106	0
9.7	21.487	-0.718	-0.731	0	70.2	0	0.108	0.108	0
9.8	21.711	-0.718	-0.244	0	70.77	0	0.11	0.11	0
9.9	21.928	-0.718	-1.112	0	70.13	0	0.112	0.112	0
10	22.146	-0.73	-0.59	0	69.3	0	0.114	0.114	0
10.1	22.357	-0.73	0.067	0	68.7	0	0.116	0.116	0
10.2	22.568	-0.723	-0.427	0	68.56	0	0.118	0.118	0
10.3	22.773	-0.685	-1.649	0	67.72	0	0.12	0.12	0
10.4	22.972	-0.693	-1.116	0	67.17	0	0.122	0.122	0
10.5	23.171	-0.703	0.067	0	66.96	0	0.123	0.123	0
10.6	23.364	-0.703	-0.911	0	67.37	0	0.125	0.125	0
10.7	23.556	-0.703	-0.83	0	67.8	0	0.127	0.127	0
10.8	23.749	-0.698	-0.328	0	68.15	0	0.129	0.129	0
10.9	23.935	-0.698	-0.918	0	68.51	0	0.131	0.131	0
11	24.122	-0.698	-0.816	0	68.86	0	0.133	0.133	0
11.1	24.308	-0.693	-0.629	0	69.3	0	0.135	0.135	0
11.2	24.501	-0.693	-0.745	0	69.61	0	0.137	0.137	0
11.3	24.687	-0.715	-0.494	0	67	0	0.139	0.139	0
11.4	24.873	-0.718	-0.173	0	60.18	0	0.14	0.14	0
11.5	25.047	-0.708	-0.459	0	53.99	0	0.142	0.142	0
11.6	25.209	-0.708	-1.24	0	52.3	0	0.143	0.143	0
11.7	25.346	-0.71	-0.897	0	52.36	0	0.145	0.145	0
11.8	25.476	-0.718	-0.745	0	52.35	0	0.146	0.146	0
11.9	25.607	-0.718	-0.41	0	53.2	0	0.148	0.148	0
12	25.737	-0.703	-0.745	0	55.64	0	0.149	0.149	0
12.1	25.855	-0.71	-1.236	0	61.69	0	0.151	0.151	0
12.2	25.986	-0.71	-0.509	0	67.95	0	0.153	0.153	0
12.3	26.104	-0.705	-0.427	0	56.3	0	0.154	0.154	0
12.4	26.222	-0.705	-0.509	0	49.75	0	0.156	0.156	0
12.5	26.321	-0.705	-0.893	0	48.57	0	0.157	0.157	0
12.6	26.433	-0.71	-0.897	0	47.44	0	0.158	0.158	0
12.7	26.545	-0.7	-0.731	0	47.19	0	0.16	0.16	0
12.8	26.651	-0.7	-0.844	0	47.81	0	0.161	0.161	0
12.9	26.75	-0.723	-0.816	0	48.02	0	0.162	0.162	0
13	26.862	-0.723	-0.099	0	48.3	0	0.164	0.164	0
13.1	26.968	-0.723	-0.735	0	48.69	0	0.165	0.165	0
13.2	27.073	-0.715	-0.982	0	49.58	0	0.166	0.166	0
13.3	27.179	-0.71	-0.83	0	49.67	0	0.168	0.168	0
13.4	27.284	-0.708	-0.438	0	50.28	0	0.169	0.169	0
13.5	27.396	-0.705	-0.897	0	51.13	0	0.171	0.171	0
13.6	27.508	-0.71	-0.911	0	51.66	0	0.172	0.172	0
13.7	27.626	-0.71	-0.367	0	52.03	0	0.174	0.174	0
13.8	27.738	-0.68	-1.141	0	52.01	0	0.175	0.175	0
13.9	27.85	-0.695	-0.646	0	52.01	0	0.176	0.176	0
14	27.962	-0.695	-0.272	0	51.96	0	0.178	0.178	0

14.1	28.074	-0.703	-0.597	0	52.97	0	0.179	0.179	0
14.2	28.185	-0.703	-0.586	0	53.04	0	0.181	0.181	0
14.3	28.297	-0.695	-0.731	0	53.07	0	0.182	0.182	0
14.4	28.415	-0.713	-0.911	0	52.99	0	0.184	0.184	0
14.5	28.527	-0.7	-0.011	0	54.08	0	0.185	0.185	0
14.6	28.639	-0.7	-0.749	0	54.02	0	0.187	0.187	0
14.7	28.751	-0.705	-0.893	0	54.08	0	0.188	0.188	0
14.8	28.869	-0.7	-0.159	0	53.94	0	0.19	0.19	0
14.9	28.981	-0.7	-0.671	0	53.97	0	0.191	0.191	0
15	29.093	-0.698	-0.685	0	53.86	0	0.193	0.193	0
15.1	29.204	-0.7	-0.339	0	53.92	0	0.194	0.194	0
15.2	29.316	-0.7	-0.427	0	53.99	0	0.196	0.196	0
15.3	29.428	-0.698	-0.59	0	53.98	0	0.197	0.197	0
15.4	29.534	-0.688	-0.586	0	53.95	0	0.199	0.199	0
15.5	29.646	-0.688	-0.953	0	53.92	0	0.2	0.2	0
15.6	29.751	-0.7	-0.717	0	53.81	0	0.202	0.202	0
15.7	29.857	-0.693	-0.145	0	52.78	0	0.203	0.203	0
15.8	29.963	-0.693	-0.526	0	51.93	0	0.205	0.205	0
15.9	30.068	-0.71	-1.236	0	51.65	0	0.206	0.206	0
16	30.168	-0.713	-0.18	0	50.71	0	0.208	0.208	0
16.1	30.267	-0.713	-0.653	0	49.12	0	0.209	0.209	0
16.2	30.366	-0.705	-0.41	0	47.22	0	0.21	0.21	0
16.3	30.46	-0.69	-0.925	0	45.68	0	0.211	0.211	0
16.4	30.547	-0.693	-0.996	0	44.34	0	0.213	0.213	0
16.5	30.627	-0.718	-0.081	0	41.62	0	0.214	0.214	0
16.6	30.708	-0.703	-0.381	0	40.44	0	0.215	0.215	0
16.7	30.783	-0.703	-1.18	0	38	0	0.216	0.216	0
16.8	30.845	-0.695	-0.996	0	36.48	0	0.217	0.217	0
16.9	30.907	-0.693	-0.802	0	36.66	0	0.218	0.218	0
17	30.963	-0.693	-0.925	0	38.68	0	0.219	0.219	0
17.1	31.019	-0.713	-0.569	0	41.78	0	0.22	0.22	0
17.2	31.069	-0.713	-0.484	0	44.01	0	0.222	0.222	0
17.3	31.124	-0.72	-0.569	0	37.63	0	0.223	0.223	0
17.4	31.18	-0.708	-0.586	0	33.95	0	0.224	0.224	0
17.5	31.236	-0.73	-1.056	0	33.81	0	0.224	0.224	0
17.6	31.286	-0.73	0.23	0	34.12	0	0.225	0.225	0
17.7	31.33	-0.703	-0.614	0	34.58	0	0.226	0.226	0
17.8	31.379	-0.705	-0.731	0	34.7	0	0.227	0.227	0
17.9	31.429	-0.705	-0.731	0	34.98	0	0.228	0.228	0
18	31.485	-0.71	-0.364	0	34.94	0	0.229	0.229	0
18.1	31.535	-0.715	-0.569	0	35.55	0	0.23	0.23	0
18.2	31.584	-0.715	-0.653	0	37.53	0	0.231	0.231	0
18.3	31.634	-0.718	-0.509	0	37.84	0	0.232	0.232	0
18.4	31.702	-0.705	-0.452	0	37.84	0	0.233	0.233	0
18.5	31.758	-0.705	-1.059	0	37.79	0	0.234	0.234	0
18.6	31.814	-0.698	-0.41	0	37.82	0	0.236	0.236	0
18.7	31.876	-0.673	-0.244	0	37.88	0	0.237	0.237	0

18.8	31.932	-0.673	-1.413	0	37.65	0	0.238	0.238	0
18.9	31.994	-0.705	-0.759	0	36.76	0	0.239	0.239	0
19	32.05	-0.705	0.067	0	35.44	0	0.24	0.24	0
19.1	32.106	-0.705	-0.399	0	35.44	0	0.241	0.241	0
19.2	32.156	-0.705	-0.925	0	35.46	0	0.242	0.242	0
19.3	32.206	-0.703	-0.41	0	35.81	0	0.243	0.243	0
19.4	32.255	-0.698	-0.883	0	36.58	0	0.244	0.244	0
19.5	32.311	-0.705	-0.731	0	37.86	0	0.245	0.245	0
19.6	32.361	-0.71	-0.682	0	37.85	0	0.246	0.246	0
19.7	32.417	-0.71	-0.321	0	37.88	0	0.247	0.247	0
19.8	32.473	-0.683	-0.749	0	37.85	0	0.248	0.248	0
19.9	32.529	-0.685	-1.13	0	37.85	0	0.249	0.249	0
20	32.591	-0.685	-0.939	0	37.91	0	0.25	0.25	0
20.1	32.641	-0.7	-0.477	0	37.88	0	0.251	0.251	0
20.2	32.697	-0.7	-0.968	0	37.88	0	0.252	0.252	0
20.3	32.752	-0.725	-0.357	0	37.9	0	0.253	0.253	0
20.4	32.808	-0.695	-0.569	0	37.85	0	0.254	0.254	0
20.5	32.864	-0.683	-1.25	0	37.93	0	0.255	0.255	0
20.6	32.92	-0.683	-1.582	0	38.01	0	0.256	0.256	0
20.7	32.976	-0.708	-0.802	0	37.89	0	0.257	0.257	0
20.8	33.032	-0.703	-0.523	0	37.92	0	0.258	0.258	0
20.9	33.082	-0.703	-0.258	0	37.97	0	0.259	0.259	0
21	33.132	-0.723	-1.25	0	37.86	0	0.26	0.26	0
21.1	33.187	-0.735	-0.392	0	37.9	0	0.261	0.261	0
21.2	33.243	-0.735	-0.053	0	37.91	0	0.263	0.263	0
21.3	33.299	-0.695	-0.975	0	37.99	0	0.264	0.264	0
21.4	33.349	-0.698	-1.059	0	38.05	0	0.265	0.265	0
21.5	33.405	-0.698	-0.629	0	37.88	0	0.266	0.266	0
21.6	33.461	-0.695	-0.643	0	37.9	0	0.267	0.267	0
21.7	33.511	-0.7	-0.713	0	37.95	0	0.268	0.268	0
21.8	33.566	-0.7	-0.773	0	37.84	0	0.269	0.269	0
21.9	33.616	-0.7	-0.745	0	37.9	0	0.27	0.27	0
22	33.666	-0.7	-0.48	0	37.87	0	0.271	0.271	0
22.1	33.722	-0.7	-0.413	0	37.8	0	0.272	0.272	0
22.2	33.772	-0.703	-0.816	0	37.86	0	0.273	0.273	0
22.3	33.821	-0.703	-0.653	0	37.92	0	0.274	0.274	0
22.4	33.877	-0.685	-0.883	0	37.77	0	0.275	0.275	0
22.5	33.927	-0.698	-1.021	0	37.82	0	0.276	0.276	0
22.6	33.977	-0.703	-0.194	0	37.85	0	0.277	0.277	0
22.7	34.026	-0.703	-0.731	0	37.8	0	0.278	0.278	0
22.8	34.076	-0.693	-0.675	0	37.84	0	0.279	0.279	0
22.9	34.126	-0.705	-1.116	0	37.84	0	0.28	0.28	0
23	34.182	-0.705	-0.339	0	37.79	0	0.281	0.281	0
23.1	34.231	-0.73	-0.452	0	37.84	0	0.283	0.283	0
23.2	34.275	-0.73	-0.314	0	37.88	0	0.284	0.284	0
23.3	34.331	-0.71	-0.735	0	37.93	0	0.285	0.285	0
23.4	34.38	-0.695	-1.197	0	37.94	0	0.286	0.286	0

23.5	34.424	-0.708	-0.911	0	37.84	0	0.287	0.287	0
23.6	34.48	-0.708	0.004	0	37.84	0	0.288	0.288	0
23.7	34.53	-0.703	-0.498	0	37.9	0	0.289	0.289	0
23.8	34.573	-0.703	-0.901	0	37.91	0	0.29	0.29	0
23.9	34.623	-0.703	-0.367	0	37.9	0	0.291	0.291	0
24	34.673	-0.693	-0.629	0	38	0	0.292	0.292	0
24.1	34.722	-0.703	-1.056	0	38.06	0	0.293	0.293	0
24.2	34.772	-0.703	-0.466	0	37.97	0	0.294	0.294	0
24.3	34.822	-0.725	-0.569	0	37.97	0	0.295	0.295	0
24.4	34.865	-0.703	-0.484	0	37.65	0	0.296	0.296	0
24.5	34.921	-0.703	-1.254	0	36.94	0	0.297	0.297	0
24.6	34.965	-0.688	-1.197	0	37.01	0	0.298	0.298	0
24.7	35.008	-0.7	-0.47	0	37.07	0	0.299	0.299	0
24.8	35.052	-0.7	-0.48	0	36.99	0	0.3	0.3	0
24.9	35.101	-0.708	-0.583	0	37.87	0	0.301	0.301	0
25	35.145	-0.723	-0.484	0	38.28	0	0.302	0.302	0
25.1	35.188	-0.723	-0.646	0	38.08	0	0.303	0.303	0
25.2	35.232	-0.715	-0.441	0	37.92	0	0.305	0.305	0
25.3	35.281	-0.698	-1.356	0	37.74	0	0.306	0.306	0
25.4	35.331	-0.693	-0.558	0	37.72	0	0.307	0.307	0
25.5	35.368	-0.708	-0.883	0	36.85	0	0.308	0.308	0
25.6	35.412	-0.7	-0.438	0	35.3	0	0.309	0.309	0
25.7	35.462	-0.7	-0.452	0	32.48	0	0.31	0.31	0
25.8	35.505	-0.685	-1.056	0	28.69	0	0.31	0.31	0
25.9	35.53	-0.68	-0.703	0	22.51	0	0.311	0.311	0
26	35.561	-0.68	-0.456	0	18.48	0	0.311	0.311	0
26.1	35.567	-0.69	-1.13	0	18.24	0	0.312	0.312	0
26.2	35.567	-0.69	-0.48	0	18.13	0	0.312	0.312	0
26.3	35.574	-0.695	-0.516	0	18.2	0	0.313	0.313	0
26.4	35.574	-0.715	-0.675	0	18.19	0	0.314	0.314	0
26.5	35.58	-0.725	-0.438	0	18.21	0	0.314	0.314	0
26.6	35.58	-0.725	-0.109	0	18.68	0	0.315	0.315	0
26.7	35.586	-0.703	-0.576	0	18.94	0	0.315	0.315	0
26.8	35.586	-0.693	-0.554	0	19.39	0	0.316	0.316	0
26.9	35.592	-0.693	-1.197	0	20.39	0	0.316	0.316	0
27	35.592	-0.688	-0.484	0	21.66	0	0.317	0.317	0
27.1	35.598	-0.68	-0.484	0	22.39	0	0.317	0.317	0
27.2	35.605	-0.68	-0.745	0	23.3	0	0.318	0.318	0
27.3	35.605	-0.685	-1.13	0	18.33	0	0.319	0.319	0
27.4	35.605	-0.705	-1.045	0	17.12	0	0.319	0.319	0
27.5	35.617	-0.705	0.014	0	17.48	0	0.32	0.32	0
27.6	35.617	-0.698	-0.583	0	17.97	0	0.32	0.32	0
27.7	35.617	-0.695	-0.826	0	18.51	0	0.321	0.321	0
27.8	35.617	-0.695	-0.773	0	18.55	0	0.321	0.321	0
27.9	35.623	-0.695	-0.484	0	18.79	0	0.322	0.322	0
28	35.629	-0.695	-0.6	0	18.39	0	0.322	0.322	0
28.1	35.629	-0.695	-0.629	0	15.5	0	0.322	0.322	0

28.2	35.636	-0.683	-0.763	0	11.43	0	0.323	0.323	0
28.3	35.629	-0.68	-1.01	0	9.03	0	0.323	0.323	0
28.4	35.617	-0.693	-0.629	0	6.69	0	0.323	0.323	0
28.5	35.598	-0.703	-0.286	0	5.22	0	0.323	0.323	0
28.6	35.574	-0.693	-0.675	0	4.06	0	0.324	0.324	0
28.7	35.549	-0.693	-0.999	0	3.06	0	0.324	0.324	0
28.8	35.518	-0.698	-0.675	0	2.13	0	0.324	0.324	0
28.9	35.48	-0.708	-0.597	0	1.25	0	0.324	0.324	0
29	35.449	-0.708	-0.275	0	0.56	0	0.324	0.324	0
29.1	35.412	-0.71	-0.745	0	0	0	0.324	0.324	0
29.2	35.368	-0.71	-0.685	0	0	0	0.324	0.324	0
29.3	35.331	-0.7	-1.398	0	0	0	0.324	0.324	0
29.4	35.288	-0.71	-0.544	0	0	0	0.324	0.324	0
29.5	35.25	-0.703	-0.41	0	0	0	0.324	0.324	0
29.6	35.207	-0.703	-1.13	0	0	0	0.324	0.324	0
29.7	35.17	-0.69	-0.788	0	0	0	0.324	0.324	0
29.8	35.132	-0.695	-0.498	0	0	0	0.324	0.324	0
29.9	35.089	-0.695	-1.158	0	0	0	0.324	0.324	0
30	35.052	-0.7	-0.155	0	0	0	0.324	0.324	0
30.1	35.014	-0.7	-0.583	0	0	0	0.324	0.324	0
30.2	34.971	-0.7	-0.999	0	0	0	0.324	0.324	0
30.3	34.933	-0.705	-0.396	0	0	0	0.324	0.324	0
30.4	34.896	-0.69	-0.311	0	0	0	0.324	0.324	0
30.5	34.859	-0.69	-0.971	0	0	0	0.324	0.324	0
30.6	34.815	-0.708	-0.802	0	0	0	0.324	0.324	0
30.7	34.778	-0.723	-0.258	0	0	0	0.324	0.324	0
30.8	34.735	-0.723	-0.424	0	0	0	0.324	0.324	0
30.9	34.697	-0.71	-0.258	0	1.7	0	0.324	0.324	0
31	34.66	-0.705	-1.052	0	3.7	0	0.324	0.324	0
31.1	34.623	-0.705	-0.812	0	8.51	0	0.324	0.324	0
31.2	34.592	-0.715	-0.268	0	12.81	0	0.325	0.325	0
31.3	34.579	-0.71	-0.554	0	15.09	0	0.325	0.325	0
31.4	34.567	-0.71	-0.554	0	16.37	0	0.326	0.326	0
31.5	34.567	-0.71	-1.035	0	18.55	0	0.326	0.326	0
31.6	34.567	-0.725	-0.731	0	20.89	0	0.327	0.327	0
31.7	34.567	-0.725	-0.569	0	23.83	0	0.327	0.327	0
31.8	34.579	-0.703	-0.48	0	23.94	0	0.328	0.328	0
31.9	34.598	-0.708	-1.042	0	24	0	0.329	0.329	0
32	34.61	-0.708	-0.643	0	24.05	0	0.329	0.329	0
32.1	34.629	-0.698	-0.925	0	24.05	0	0.33	0.33	0
32.2	34.648	-0.698	-0.911	0	24.08	0	0.331	0.331	0
32.3	34.666	-0.705	-0.48	0	24.09	0	0.331	0.331	0
32.4	34.685	-0.7	-0.731	0	24.13	0	0.332	0.332	0
32.5	34.697	-0.7	-0.466	0	22.34	0	0.333	0.333	0
32.6	34.716	-0.7	-1.123	0	19.38	0	0.333	0.333	0
32.7	34.728	-0.698	-0.554	0	17.69	0	0.334	0.334	0
32.8	34.735	-0.713	-0.897	0	17.77	0	0.334	0.334	0

32.9	34.741	-0.713	-0.544	0	17.68	0	0.335	0.335	0
33	34.741	-0.695	-0.095	0	18.35	0	0.335	0.335	0
33.1	34.747	-0.693	-1.282	0	20.16	0	0.336	0.336	0
33.2	34.753	-0.693	-1.254	0	22.76	0	0.336	0.336	0
33.3	34.76	-0.723	-0.396	0	24.5	0	0.337	0.337	0
33.4	34.772	-0.715	-0.424	0	25.98	0	0.338	0.338	0
33.5	34.791	-0.715	-0.583	0	28.48	0	0.338	0.338	0
33.6	34.815	-0.69	-1.07	0	33.3	0	0.339	0.339	0
33.7	34.84	-0.71	-1.116	0	36.21	0	0.34	0.34	0
33.8	34.884	-0.71	-0.48	0	37.58	0	0.341	0.341	0
33.9	34.921	-0.698	-0.258	0	39.65	0	0.343	0.343	0
34	34.971	-0.698	-0.883	0	40	0	0.344	0.344	0
34.1	35.027	-0.698	-1.003	0	40.75	0	0.345	0.345	0
34.2	35.076	-0.703	-0.424	0	42.68	0	0.346	0.346	0
34.3	35.126	-0.713	-0.424	0	42.92	0	0.347	0.347	0
34.4	35.188	-0.713	-0.424	0	43	0	0.348	0.348	0
34.5	35.244	-0.693	-0.745	0	43.33	0	0.35	0.35	0
34.6	35.3	-0.693	-0.985	0	44.41	0	0.351	0.351	0
34.7	35.362	-0.693	-0.83	0	45.96	0	0.352	0.352	0
34.8	35.418	-0.713	-0.554	0	45.9	0	0.353	0.353	0
34.9	35.48	-0.713	-0.583	0	45.86	0	0.355	0.355	0
35	35.549	-0.713	-0.788	0	45.93	0	0.356	0.356	0
35.1	35.611	-0.708	-0.731	0	45.14	0	0.357	0.357	0
35.2	35.673	-0.708	-0.572	0	44.83	0	0.358	0.358	0
35.3	35.735	-0.698	-1.169	0	43.56	0	0.36	0.36	0
35.4	35.791	-0.693	-0.911	0	42.41	0	0.361	0.361	0
35.5	35.853	-0.695	-0.597	0	40.22	0	0.362	0.362	0
35.6	35.903	-0.695	-0.756	0	38.72	0	0.363	0.363	0
35.7	35.959	-0.703	-0.311	0	36.46	0	0.364	0.364	0
35.8	36.002	-0.72	-0.745	0	35.22	0	0.365	0.365	0
35.9	36.046	-0.72	-0.343	0	34.51	0	0.366	0.366	0
36	36.083	-0.713	-0.572	0	34.18	0	0.367	0.367	0
36.1	36.12	-0.7	-0.826	0	34.02	0	0.368	0.368	0
36.2	36.158	-0.7	-0.911	0	33.15	0	0.369	0.369	0
36.3	36.189	-0.703	-1.127	0	32.39	0	0.37	0.37	0
36.4	36.22	-0.715	-1.07	0	31.13	0	0.371	0.371	0
36.5	36.251	-0.715	-0.042	0	26.83	0	0.371	0.371	0
36.6	36.282	-0.695	-0.675	0	21.88	0	0.372	0.372	0
36.7	36.301	-0.705	-1.427	0	21.03	0	0.372	0.372	0
36.8	36.307	-0.705	-0.258	0	21.03	0	0.373	0.373	0
36.9	36.313	-0.718	-0.632	0	20.25	0	0.374	0.374	0
37	36.319	-0.713	-0.314	0	20.19	0	0.374	0.374	0
37.1	36.325	-0.713	-0.731	0	20.13	0	0.375	0.375	0
37.2	36.332	-0.713	-0.66	0	21.28	0	0.375	0.375	0
37.3	36.338	-0.69	-0.72	0	22.05	0	0.376	0.376	0
37.4	36.344	-0.69	-0.802	0	23.03	0	0.377	0.377	0
37.5	36.35	-0.703	-0.911	0	23.48	0	0.377	0.377	0

37.6	36.363	-0.703	-0.311	0	24.57	0	0.378	0.378	0
37.7	36.369	-0.703	-0.569	0	24.75	0	0.379	0.379	0
37.8	36.387	-0.693	-1.042	0	25.36	0	0.379	0.379	0
37.9	36.4	-0.698	-0.918	0	25.38	0	0.38	0.38	0
38	36.419	-0.698	-0.597	0	25.38	0	0.381	0.381	0
38.1	36.437	-0.698	-0.667	0	25.42	0	0.381	0.381	0
38.2	36.45	-0.698	-0.424	0	25.47	0	0.382	0.382	0
38.3	36.468	-0.695	-0.671	0	25.89	0	0.383	0.383	0
38.4	36.481	-0.735	-0.745	0	25.56	0	0.384	0.384	0
38.5	36.493	-0.73	0.413	0	24.92	0	0.384	0.384	0
38.6	36.512	-0.73	-0.258	0	23.75	0	0.385	0.385	0
38.7	36.524	-0.693	-1.045	0	23.8	0	0.386	0.386	0
38.8	36.537	-0.703	-1.194	0	23.79	0	0.386	0.386	0
38.9	36.549	-0.703	-0.258	0	23.88	0	0.387	0.387	0
39	36.561	-0.703	-0.597	0	24.03	0	0.388	0.388	0
39.1	36.574	-0.685	-0.381	0	24.58	0	0.388	0.388	0
39.2	36.586	-0.685	-1.328	0	24.51	0	0.389	0.389	0
39.3	36.599	-0.71	-0.35	0	24.53	0	0.39	0.39	0
39.4	36.611	-0.698	-0.378	0	24.56	0	0.39	0.39	0
39.5	36.624	-0.698	-0.901	0	24.49	0	0.391	0.391	0
39.6	36.642	-0.685	-1.105	0	24.58	0	0.392	0.392	0
39.7	36.655	-0.695	-0.911	0	24.54	0	0.392	0.392	0
39.8	36.667	-0.695	-0.456	0	24.55	0	0.393	0.393	0
39.9	36.68	-0.713	-0.396	0	24.55	0	0.394	0.394	0
40	36.692	-0.713	-0.554	0	24.51	0	0.394	0.394	0
40.1	36.711	-0.713	-0.424	0	24.55	0	0.395	0.395	0
40.2	36.723	-0.693	-0.925	0	24.53	0	0.396	0.396	0
40.3	36.735	-0.69	-0.759	0	24.55	0	0.396	0.396	0
40.4	36.754	-0.7	-0.424	0	24.39	0	0.397	0.397	0
40.5	36.767	-0.693	-0.625	0	24.39	0	0.398	0.398	0
40.6	36.779	-0.7	-1.165	0	24.45	0	0.398	0.398	0
40.7	36.791	-0.7	-0.378	0	24.41	0	0.399	0.399	0
40.8	36.81	-0.698	-0.583	0	24.48	0	0.4	0.4	0
40.9	36.822	-0.695	-0.717	0	24.42	0	0.4	0.4	0
41	36.835	-0.695	-0.925	0	24.49	0	0.401	0.401	0
41.1	36.847	-0.69	-0.759	0	24.46	0	0.402	0.402	0
41.2	36.86	-0.69	-0.325	0	24.17	0	0.403	0.403	0
41.3	36.878	-0.695	-0.614	0	23.76	0	0.403	0.403	0
41.4	36.891	-0.703	-0.597	0	23.76	0	0.404	0.404	0
41.5	36.903	-0.703	-0.583	0	23.8	0	0.404	0.404	0
41.6	36.916	-0.703	-0.424	0	23.78	0	0.405	0.405	0
41.7	36.928	-0.7	-0.798	0	23.77	0	0.406	0.406	0
41.8	36.941	-0.715	-0.911	0	23.82	0	0.406	0.406	0
41.9	36.947	-0.715	-0.067	0	23.79	0	0.407	0.407	0
42	36.959	-0.703	-0.526	0	23.79	0	0.408	0.408	0
42.1	36.972	-0.703	-0.957	0	22.78	0	0.408	0.408	0
42.2	36.984	-0.703	-0.816	0	22.42	0	0.409	0.409	0

42.3	36.996	-0.713	-0.452	0	21.43	0	0.41	0.41	0
42.4	37.003	-0.7	-0.367	0	21.46	0	0.41	0.41	0
42.5	37.009	-0.7	-0.925	0	21.01	0	0.411	0.411	0
42.6	37.015	-0.69	-0.713	0	20.71	0	0.411	0.411	0
42.7	37.021	-0.675	-0.66	0	20.74	0	0.412	0.412	0
42.8	37.028	-0.675	-0.84	0	20.66	0	0.413	0.413	0
42.9	37.034	-0.708	-1.056	0	20.76	0	0.413	0.413	0
43	37.04	-0.74	-0.095	0	19.87	0	0.414	0.414	0
43.1	37.04	-0.74	0.244	0	19.9	0	0.414	0.414	0
43.2	37.046	-0.74	-0.099	0	19.84	0	0.415	0.415	0
43.3	37.046	-0.7	-1.554	0	19.77	0	0.415	0.415	0
43.4	37.052	-0.693	-1.25	0	18.93	0	0.416	0.416	0
43.5	37.052	-0.733	-0.085	0	17.66	0	0.416	0.416	0
43.6	37.052	-0.703	0.23	0	16.67	0	0.417	0.417	0
43.7	37.052	-0.703	-1.663	0	16.73	0	0.417	0.417	0
43.8	37.046	-0.72	-1.07	0	16.7	0	0.418	0.418	0
43.9	37.046	-0.718	-0.244	0	16.67	0	0.418	0.418	0
44	37.04	-0.718	-0.494	0	16.73	0	0.419	0.419	0
44.1	37.04	-0.693	-0.964	0	16.59	0	0.419	0.419	0
44.2	37.034	-0.693	-0.802	0	16.14	0	0.42	0.42	0
44.3	37.028	-0.69	-0.897	0	16.17	0	0.42	0.42	0
44.4	37.021	-0.685	-0.258	0	16.08	0	0.42	0.42	0
44.5	37.021	-0.7	-0.773	0	15.62	0	0.421	0.421	0
44.6	37.015	-0.7	-0.925	0	15.58	0	0.421	0.421	0
44.7	37.009	-0.723	0.021	0	16.13	0	0.422	0.422	0
44.8	37.003	-0.698	-0.286	0	16.18	0	0.422	0.422	0
44.9	37.003	-0.698	-1.328	0	16.09	0	0.423	0.423	0
45	36.996	-0.7	-1.059	0	16.16	0	0.423	0.423	0
45.1	36.99	-0.69	-0.583	0	16.12	0	0.424	0.424	0
45.2	36.984	-0.69	-0.554	0	16.14	0	0.424	0.424	0
45.3	36.978	-0.688	-1.07	0	16.14	0	0.424	0.424	0
45.4	36.978	-0.685	-1.042	0	16.54	0	0.425	0.425	0
45.5	36.972	-0.685	-0.759	0	16.71	0	0.425	0.425	0
45.6	36.972	-0.695	-0.925	0	16.61	0	0.426	0.426	0
45.7	36.972	-0.7	-0.689	0	17.43	0	0.426	0.426	0
45.8	36.965	-0.7	-0.413	0	17.91	0	0.427	0.427	0
45.9	36.959	-0.698	-0.625	0	19.12	0	0.427	0.427	0
46	36.959	-0.705	-0.851	0	20.16	0	0.428	0.428	0
46.1	36.965	-0.705	-0.424	0	21.73	0	0.429	0.429	0
46.2	36.965	-0.7	-0.597	0	22.67	0	0.429	0.429	0
46.3	36.972	-0.708	-1.293	0	23.42	0	0.43	0.43	0
46.4	36.984	-0.708	-1.236	0	23.63	0	0.43	0.43	0
46.5	36.996	-0.708	0.081	0	23.69	0	0.431	0.431	0
46.6	37.003	-0.698	-0.788	0	24.01	0	0.432	0.432	0
46.7	37.015	-0.698	-1.042	0	24.43	0	0.432	0.432	0
46.8	37.028	-0.73	-1.049	0	24.59	0	0.433	0.433	0
46.9	37.04	-0.73	0.071	0	25.44	0	0.434	0.434	0

47	37.059	-0.73	-0.24	0	27.51	0	0.435	0.435	0
47.1	37.071	-0.715	-0.897	0	29.18	0	0.435	0.435	0
47.2	37.09	-0.715	-0.886	0	29.99	0	0.436	0.436	0
47.3	37.115	-0.725	-0.328	0	30.87	0	0.437	0.437	0
47.4	37.139	-0.695	-0.569	0	32.09	0	0.438	0.438	0
47.5	37.164	-0.69	-1.144	0	32.23	0	0.439	0.439	0
47.6	37.195	-0.69	-0.897	0	34	0	0.44	0.44	0
47.7	37.226	-0.693	-0.554	0	35.52	0	0.441	0.441	0
47.8	37.257	-0.708	-0.597	0	36.18	0	0.442	0.442	0
47.9	37.295	-0.708	-0.583	0	36.23	0	0.443	0.443	0
48	37.332	-0.703	-0.095	0	36.62	0	0.444	0.444	0
48.1	37.369	-0.695	-0.897	0	37.62	0	0.445	0.445	0
48.2	37.407	-0.695	-0.897	0	38.16	0	0.446	0.446	0
48.3	37.45	-0.71	-0.685	0	40.34	0	0.447	0.447	0
48.4	37.494	-0.715	-0.713	0	43.74	0	0.448	0.448	0
48.5	37.537	-0.715	-0.198	0	45.09	0	0.45	0.45	0
48.6	37.587	-0.7	-0.47	0	47.07	0	0.451	0.451	0
48.7	37.643	-0.71	-0.816	0	48.24	0	0.452	0.452	0
48.8	37.705	-0.71	-0.816	0	50.2	0	0.454	0.454	0
48.9	37.761	-0.723	-0.194	0	51.05	0	0.455	0.455	0
49	37.829	-0.73	-0.512	0	51.82	0	0.456	0.456	0
49.1	37.897	-0.73	-0.597	0	52.34	0	0.458	0.458	0
49.2	37.966	-0.713	-0.798	0	52.27	0	0.459	0.459	0
49.3	38.028	-0.693	-1.123	0	53.46	0	0.461	0.461	0
49.4	38.102	-0.693	-1.208	0	53.95	0	0.462	0.462	0
49.5	38.171	-0.7	-0.583	0	56.36	0	0.464	0.464	0
49.6	38.239	-0.7	-0.438	0	56.74	0	0.466	0.466	0
49.7	38.314	-0.7	-0.569	0	56.66	0	0.467	0.467	0
49.8	38.388	-0.705	-0.925	0	56.7	0	0.469	0.469	0
49.9	38.463	-0.703	-0.452	0	56.65	0	0.47	0.47	0
50	38.537	-0.703	-0.759	0	56.74	0	0.472	0.472	0
50.1	38.612	-0.698	-0.438	0	56.65	0	0.473	0.473	0
50.2	38.687	-0.698	-0.713	0	56.75	0	0.475	0.475	0
50.3	38.767	-0.693	-1.222	0	56.72	0	0.477	0.477	0
50.4	38.842	-0.7	-0.802	0	56.81	0	0.478	0.478	0
50.5	38.916	-0.71	-0.41	0	57.79	0	0.48	0.48	0
50.6	38.985	-0.71	-0.597	0	58.34	0	0.481	0.481	0
50.7	39.066	-0.708	-0.23	0	59.06	0	0.483	0.483	0
50.8	39.14	-0.703	-1.098	0	59.39	0	0.485	0.485	0
50.9	39.221	-0.703	-0.897	0	60.4	0	0.486	0.486	0
51	39.302	-0.72	-0.438	0	61.28	0	0.488	0.488	0
51.1	39.376	-0.71	-0.272	0	61.25	0	0.49	0.49	0
51.2	39.463	-0.71	-0.682	0	59.57	0	0.491	0.491	0
51.3	39.544	-0.71	-0.911	0	56.99	0	0.493	0.493	0
51.4	39.625	-0.703	-0.911	0	54.19	0	0.494	0.494	0
51.5	39.693	-0.703	-1.098	0	53.45	0	0.496	0.496	0
51.6	39.762	-0.695	-0.844	0	53.52	0	0.497	0.497	0

51.7	39.824	-0.703	-0.925	0	53.55	0	0.499	0.499	0
51.8	39.892	-0.703	-0.039	0	54.48	0	0.5	0.5	0
51.9	39.954	-0.723	-0.54	0	55.27	0	0.502	0.502	0
52	40.023	-0.72	-0.438	0	55.68	0	0.504	0.504	0
52.1	40.078	-0.72	-0.682	0	55.69	0	0.505	0.505	0
52.2	40.153	-0.71	-0.646	0	56.22	0	0.507	0.507	0
52.3	40.221	-0.7	-0.646	0	57.16	0	0.508	0.508	0
52.4	40.29	-0.69	-0.964	0	58.38	0	0.51	0.51	0
52.5	40.358	-0.693	-0.911	0	59.52	0	0.511	0.511	0
52.6	40.426	-0.68	-0.54	0	60.8	0	0.513	0.513	0
52.7	40.501	-0.68	-0.802	0	61.08	0	0.515	0.515	0
52.8	40.576	-0.705	-1.229	0	61.15	0	0.517	0.517	0
52.9	40.656	-0.713	-0.095	0	61.06	0	0.518	0.518	0
53	40.725	-0.713	-0.226	0	61.1	0	0.52	0.52	0
53.1	40.799	-0.713	-1.01	0	61.07	0	0.522	0.522	0
53.2	40.88	-0.713	-0.816	0	61.06	0	0.523	0.523	0
53.3	40.955	-0.728	0.141	0	61.07	0	0.525	0.525	0
53.4	41.029	-0.703	-0.939	0	61.04	0	0.527	0.527	0
53.5	41.097	-0.71	-1.056	0	61.12	0	0.528	0.528	0
53.6	41.172	-0.71	-0.438	0	61.06	0	0.53	0.53	0
53.7	41.247	-0.713	-0.025	0	61.07	0	0.532	0.532	0
53.8	41.321	-0.73	-0.925	0	60.96	0	0.534	0.534	0
53.9	41.396	-0.73	0.261	0	60.95	0	0.535	0.535	0
54	41.464	-0.71	-0.925	0	59.91	0	0.537	0.537	0
54.1	41.539	-0.733	-1.084	0	59.79	0	0.539	0.539	0
54.2	41.607	-0.733	-0.095	0	58.61	0	0.54	0.54	0
54.3	41.675	-0.723	-0.424	0	56.65	0	0.542	0.542	0
54.4	41.744	-0.715	-0.396	0	55.57	0	0.543	0.543	0
54.5	41.812	-0.715	-1.006	0	55.41	0	0.545	0.545	0
54.6	41.868	-0.73	-0.727	0	55.45	0	0.546	0.546	0
54.7	41.93	-0.718	0.155	0	55.53	0	0.548	0.548	0
54.8	41.992	-0.718	-0.325	0	55.38	0	0.549	0.549	0
54.9	42.048	-0.685	-1.222	0	55.54	0	0.551	0.551	0
55	42.11	-0.72	-1.169	0	54.74	0	0.553	0.553	0
55.1	42.172	-0.72	0.057	0	54.47	0	0.554	0.554	0
55.2	42.235	-0.733	-0.113	0	54.46	0	0.556	0.556	0
55.3	42.284	-0.72	-1.01	0	54.48	0	0.557	0.557	0
55.4	42.353	-0.713	-0.968	0	54.52	0	0.559	0.559	0
55.5	42.402	-0.723	-0.653	0	54.38	0	0.56	0.56	0
55.6	42.465	-0.71	-0.494	0	54.45	0	0.562	0.562	0
55.7	42.52	-0.71	-0.911	0	54.45	0	0.563	0.563	0
55.8	42.576	-0.7	-0.731	0	54.39	0	0.565	0.565	0
55.9	42.632	-0.708	-0.643	0	54.48	0	0.566	0.566	0
56	42.688	-0.708	-0.339	0	54.44	0	0.568	0.568	0
56.1	42.744	-0.7	-0.759	0	54.39	0	0.569	0.569	0
56.2	42.806	-0.7	-0.759	0	54.46	0	0.571	0.571	0
56.3	42.862	-0.7	-0.819	0	55.29	0	0.572	0.572	0

56.4	42.918	-0.703	-0.364	0	56.15	0	0.574	0.574	0
56.5	42.974	-0.698	-0.392	0	57.62	0	0.575	0.575	0
56.6	43.036	-0.698	-1.116	0	57.5	0	0.577	0.577	0
56.7	43.092	-0.728	-0.54	0	57.7	0	0.579	0.579	0
56.8	43.154	-0.705	0.057	0	58.43	0	0.58	0.58	0
56.9	43.216	-0.705	-0.897	0	58.4	0	0.582	0.582	0
57	43.279	-0.71	-1.07	0	58.46	0	0.583	0.583	0
57.1	43.341	-0.718	-0.597	0	58.3	0	0.585	0.585	0
57.2	43.403	-0.718	-0.095	0	57.55	0	0.587	0.587	0
57.3	43.465	-0.693	-0.759	0	56.53	0	0.588	0.588	0
57.4	43.527	-0.695	-0.759	0	55.31	0	0.59	0.59	0
57.5	43.577	-0.695	-0.982	0	54.99	0	0.591	0.591	0
57.6	43.639	-0.708	-0.109	0	53.92	0	0.593	0.593	0
57.7	43.689	-0.703	-0.109	0	52.76	0	0.594	0.594	0
57.8	43.745	-0.703	-1.25	0	51.92	0	0.596	0.596	0
57.9	43.794	-0.71	-0.477	0	51.81	0	0.597	0.597	0
58	43.844	-0.705	-0.456	0	51.28	0	0.599	0.599	0
58.1	43.887	-0.705	-0.597	0	50.88	0	0.6	0.6	0
58.2	43.937	-0.7	-1.07	0	48.84	0	0.601	0.601	0
58.3	43.987	-0.713	-0.554	0	47.26	0	0.603	0.603	0
58.4	44.024	-0.713	-0.583	0	46.17	0	0.604	0.604	0
58.5	44.068	-0.708	-0.745	0	46.06	0	0.605	0.605	0
58.6	44.105	-0.715	-0.438	0	46.04	0	0.606	0.606	0
58.7	44.142	-0.715	-0.54	0	46.08	0	0.608	0.608	0
58.8	44.179	-0.713	-0.194	0	45.56	0	0.609	0.609	0
58.9	44.223	-0.715	-0.685	0	43.48	0	0.61	0.61	0
59	44.254	-0.715	-0.583	0	40.13	0	0.611	0.611	0
59.1	44.291	-0.72	-0.731	0	39.09	0	0.612	0.612	0
59.2	44.316	-0.72	-0.353	0	37.7	0	0.613	0.613	0
59.3	44.341	-0.718	-0.996	0	36.87	0	0.614	0.614	0
59.4	44.366	-0.72	-0.396	0	36.89	0	0.616	0.616	0
59.5	44.385	-0.71	-0.424	0	36.97	0	0.617	0.617	0
59.6	44.403	-0.71	-0.968	0	36.93	0	0.618	0.618	0
59.7	44.428	-0.695	-0.66	0	36.98	0	0.619	0.619	0
59.8	44.453	-0.705	-0.911	0	36.95	0	0.62	0.62	0
59.9	44.472	-0.705	-0.66	0	37	0	0.621	0.621	0
60	44.49	-0.693	-0.424	0	37.01	0	0.622	0.622	0
60.1	44.509	-0.695	-0.975	0	37.05	0	0.623	0.623	0
60.2	44.534	-0.695	-1.07	0	36.83	0	0.624	0.624	0
60.3	44.552	-0.713	-0.438	0	36.83	0	0.625	0.625	0
60.4	44.571	-0.73	-0.438	0	36.57	0	0.626	0.626	0
60.5	44.596	-0.73	-0.41	0	35.37	0	0.627	0.627	0
60.6	44.614	-0.715	-0.23	0	35.15	0	0.628	0.628	0
60.7	44.633	-0.723	-0.911	0	34.63	0	0.629	0.629	0
60.8	44.646	-0.723	-0.35	0	33.71	0	0.63	0.63	0
60.9	44.664	-0.69	-0.682	0	33.69	0	0.631	0.631	0
61	44.677	-0.698	-1.564	0	33.73	0	0.632	0.632	0

61.1	44.689	-0.698	-0.452	0	33.72	0	0.632	0.632	0
61.2	44.708	-0.71	-0.424	0	33.76	0	0.633	0.633	0
61.3	44.72	-0.72	-0.54	0	33.77	0	0.634	0.634	0
61.4	44.739	-0.715	-0.424	0	33.68	0	0.635	0.635	0
61.5	44.751	-0.703	-1.24	0	33.53	0	0.636	0.636	0
61.6	44.77	-0.705	-0.583	0	33.53	0	0.637	0.637	0
61.7	44.782	-0.705	-1.07	0	33.56	0	0.638	0.638	0
61.8	44.795	-0.723	-0.314	0	33.53	0	0.639	0.639	0
61.9	44.807	-0.73	-0.583	0	33.57	0	0.64	0.64	0
62	44.826	-0.73	-0.3	0	33.54	0	0.641	0.641	0
62.1	44.838	-0.725	-0.851	0	33.59	0	0.642	0.642	0
62.2	44.851	-0.725	-0.569	0	33.55	0	0.643	0.643	0
62.3	44.863	-0.708	-1.042	0	33.6	0	0.644	0.644	0
62.4	44.875	-0.72	-1.07	0	33.57	0	0.645	0.645	0
62.5	44.894	-0.708	-0.095	0	33.6	0	0.646	0.646	0
62.6	44.906	-0.708	-1.151	0	33.89	0	0.646	0.646	0
62.7	44.919	-0.695	-0.911	0	34.49	0	0.647	0.647	0
62.8	44.931	-0.708	-0.805	0	34.48	0	0.648	0.648	0
62.9	44.95	-0.708	-0.272	0	34.8	0	0.649	0.649	0
63	44.969	-0.693	-0.364	0	35.37	0	0.65	0.65	0
63.1	44.981	-0.713	-0.837	0	36.08	0	0.651	0.651	0
63.2	45	-0.713	-0.339	0	36.04	0	0.652	0.652	0
63.3	45.018	-0.7	0.173	0	36.1	0	0.653	0.653	0
63.4	45.037	-0.703	0.258	0	36.07	0	0.654	0.654	0
63.5	45.056	-0.703	-0.925	0	36.54	0	0.655	0.655	0
63.6	45.068	-0.713	-0.583	0	37.72	0	0.656	0.656	0
63.7	45.093	-0.72	-0.629	0	37.66	0	0.657	0.657	0
63.8	45.112	-0.72	-0.699	0	38.49	0	0.658	0.658	0
63.9	45.13	-0.718	-0.569	0	40.16	0	0.66	0.66	0
64	45.155	-0.703	-1.035	0	42.95	0	0.661	0.661	0
64.1	45.18	-0.703	-1.035	0	43.31	0	0.662	0.662	0
64.2	45.211	-0.703	-0.883	0	43.33	0	0.663	0.663	0
64.3	45.242	-0.708	-0.639	0	44	0	0.664	0.664	0
64.4	45.267	-0.713	-0.745	0	44.01	0	0.666	0.666	0
64.5	45.298	-0.69	-0.597	0	44.09	0	0.667	0.667	0
64.6	45.329	-0.695	-1.021	0	44.09	0	0.668	0.668	0
64.7	45.36	-0.695	-0.911	0	44.13	0	0.669	0.669	0
64.8	45.397	-0.72	0.099	0	44.15	0	0.671	0.671	0
64.9	45.428	-0.7	-0.335	0	45.34	0	0.672	0.672	0
65	45.46	-0.7	-1.056	0	45.99	0	0.673	0.673	0
65.1	45.491	-0.7	-1.236	0	46.01	0	0.674	0.674	0
65.2	45.528	-0.7	-0.392	0	45.99	0	0.676	0.676	0
65.3	45.559	-0.705	-0.569	0	46.06	0	0.677	0.677	0
65.4	45.596	-0.715	-0.095	0	46.07	0	0.678	0.678	0
65.5	45.627	-0.705	0.018	0	46	0	0.679	0.679	0
65.6	45.665	-0.705	-0.865	0	45.92	0	0.681	0.681	0
65.7	45.702	-0.718	-1.01	0	46.01	0	0.682	0.682	0

65.8	45.733	-0.718	-0.272	0	45.99	0	0.683	0.683	0
65.9	45.764	-0.718	-0.72	0	46.05	0	0.685	0.685	0
66	45.801	-0.725	-0.731	0	46.07	0	0.686	0.686	0
66.1	45.832	-0.708	-0.244	0	46.15	0	0.687	0.687	0
66.2	45.863	-0.708	-0.862	0	46	0	0.688	0.688	0
66.3	45.894	-0.735	-0.996	0	45.12	0	0.69	0.69	0
66.4	45.932	-0.728	-0.911	0	44.59	0	0.691	0.691	0
66.5	45.963	-0.728	0.032	0	43.37	0	0.692	0.692	0
66.6	45.994	-0.693	-1.745	0	42.36	0	0.693	0.693	0
66.7	46.019	-0.703	-0.953	0	42.29	0	0.694	0.694	0
66.8	46.05	-0.703	-0.438	0	42.33	0	0.696	0.696	0
66.9	46.075	-0.72	-0.597	0	42.31	0	0.697	0.697	0
67	46.1	-0.72	-0.583	0	42.17	0	0.698	0.698	0
67.1	46.131	-0.72	-0.865	0	42.17	0	0.699	0.699	0
67.2	46.155	-0.713	-0.664	0	42.18	0	0.7	0.7	0
67.3	46.18	-0.693	-0.731	0	42.21	0	0.702	0.702	0
67.4	46.205	-0.693	-0.731	0	42.25	0	0.703	0.703	0
67.5	46.23	-0.723	-1.222	0	42.26	0	0.704	0.704	0
67.6	46.255	-0.723	-0.484	0	42.28	0	0.705	0.705	0
67.7	46.286	-0.723	-0.258	0	42.29	0	0.706	0.706	0
67.8	46.305	-0.695	-0.865	0	41.88	0	0.707	0.707	0
67.9	46.336	-0.713	-0.939	0	40.73	0	0.709	0.709	0
68	46.361	-0.713	-0.424	0	39.12	0	0.71	0.71	0
68.1	46.379	-0.738	-0.215	0	37.87	0	0.711	0.711	0
68.2	46.404	-0.738	-0.463	0	37.08	0	0.712	0.712	0
68.3	46.416	-0.715	-0.731	0	36.56	0	0.713	0.713	0
68.4	46.441	-0.72	-0.667	0	35.98	0	0.714	0.714	0
68.5	46.454	-0.718	-0.583	0	36.08	0	0.715	0.715	0
68.6	46.466	-0.718	-0.745	0	36.01	0	0.716	0.716	0
68.7	46.485	-0.723	-0.689	0	36.13	0	0.717	0.717	0
68.8	46.497	-0.743	-1.155	0	36.73	0	0.718	0.718	0
68.9	46.516	-0.743	0.23	0	36.96	0	0.719	0.719	0
69	46.528	-0.71	-0.54	0	37.73	0	0.72	0.72	0
69.1	46.541	-0.718	-1.222	0	38.27	0	0.721	0.721	0
69.2	46.559	-0.718	-0.526	0	40.72	0	0.722	0.722	0
69.3	46.578	-0.708	-0.759	0	41.15	0	0.723	0.723	0
69.4	46.603	-0.705	-0.759	0	41.18	0	0.724	0.724	0
69.5	46.628	-0.705	-0.865	0	41.15	0	0.725	0.725	0
69.6	46.653	-0.715	-0.731	0	41.21	0	0.727	0.727	0
69.7	46.671	-0.728	-0.554	0	41.22	0	0.728	0.728	0
69.8	46.69	-0.728	-0.328	0	41.26	0	0.729	0.729	0
69.9	46.715	-0.713	-0.54	0	41.29	0	0.73	0.73	0
70	46.74	-0.715	-0.731	0	41.31	0	0.731	0.731	0
70.1	46.764	-0.715	-0.897	0	41.33	0	0.732	0.732	0
70.2	46.783	-0.718	-0.625	0	41.35	0	0.733	0.733	0
70.3	46.808	-0.715	-0.897	0	40.84	0	0.735	0.735	0
70.4	46.833	-0.718	-0.498	0	40.23	0	0.736	0.736	0

70.5	46.851	-0.718	-0.897	0	38.9	0	0.737	0.737	0
70.6	46.876	-0.718	-0.604	0	37.81	0	0.738	0.738	0
70.7	46.895	-0.718	-0.198	0	36.96	0	0.739	0.739	0
70.8	46.914	-0.71	-1.187	0	36.27	0	0.74	0.74	0
70.9	46.926	-0.72	-0.745	0	35.37	0	0.741	0.741	0
71	46.938	-0.72	0.17	0	34.46	0	0.742	0.742	0
71.1	46.951	-0.713	-0.766	0	33.92	0	0.743	0.743	0
71.2	46.963	-0.713	-0.569	0	33.91	0	0.744	0.744	0
71.3	46.976	-0.715	-0.569	0	33.46	0	0.745	0.745	0
71.4	46.982	-0.713	-0.816	0	33.13	0	0.746	0.746	0
71.5	46.988	-0.713	-0.731	0	33.14	0	0.746	0.746	0
71.6	47.001	-0.713	-0.897	0	33.16	0	0.747	0.747	0
71.7	47.007	-0.71	-0.583	0	33.18	0	0.748	0.748	0
71.8	47.019	-0.715	-1.187	0	32.95	0	0.749	0.749	0
71.9	47.025	-0.715	-0.494	0	32.9	0	0.75	0.75	0
72	47.032	-0.713	-0.639	0	32.82	0	0.751	0.751	0
72.1	47.038	-0.713	-0.816	0	32.75	0	0.752	0.752	0
72.2	47.044	-0.713	-0.466	0	32.69	0	0.753	0.753	0
72.3	47.056	-0.7	-0.911	0	32.7	0	0.754	0.754	0
72.4	47.063	-0.698	-0.911	0	32.73	0	0.755	0.755	0
72.5	47.069	-0.698	-0.41	0	32.73	0	0.756	0.756	0
72.6	47.081	-0.703	-0.897	0	32.76	0	0.757	0.757	0
72.7	47.088	-0.7	-0.717	0	32.82	0	0.757	0.757	0
72.8	47.094	-0.7	-0.982	0	32.95	0	0.758	0.758	0
72.9	47.1	-0.688	-0.731	0	32.25	0	0.759	0.759	0
73	47.106	-0.698	-0.731	0	31.35	0	0.76	0.76	0
73.1	47.119	-0.698	-0.982	0	30.54	0	0.761	0.761	0
73.2	47.119	-0.718	-0.569	0	29.55	0	0.762	0.762	0
73.3	47.125	-0.733	-0.212	0	28.53	0	0.763	0.763	0
73.4	47.125	-0.735	-0.526	0	27.87	0	0.763	0.763	0
73.5	47.125	-0.705	-0.685	0	27.57	0	0.764	0.764	0
73.6	47.125	-0.705	-1.367	0	27.6	0	0.765	0.765	0
73.7	47.125	-0.705	-0.816	0	27.58	0	0.766	0.766	0
73.8	47.125	-0.71	-0.41	0	27.57	0	0.766	0.766	0
73.9	47.125	-0.7	-0.667	0	27.56	0	0.767	0.767	0
74	47.125	-0.7	-1.042	0	27.59	0	0.768	0.768	0
74.1	47.119	-0.718	-0.717	0	27.56	0	0.769	0.769	0
74.2	47.125	-0.718	-0.526	0	27.54	0	0.769	0.769	0
74.3	47.119	-0.72	-0.653	0	27.61	0	0.77	0.77	0
74.4	47.119	-0.72	-0.554	0	27.55	0	0.771	0.771	0
74.5	47.119	-0.718	-0.554	0	28.07	0	0.772	0.772	0
74.6	47.119	-0.718	-0.731	0	28.3	0	0.773	0.773	0
74.7	47.112	-0.708	-0.731	0	28.29	0	0.773	0.773	0
74.8	47.119	-0.71	-1.021	0	28.48	0	0.774	0.774	0
74.9	47.119	-0.71	-0.311	0	28.39	0	0.775	0.775	0
75	47.119	-0.683	-0.646	0	28.45	0	0.776	0.776	0
75.1	47.112	-0.705	-1.25	0	28.36	0	0.776	0.776	0

75.2	47.119	-0.705	-0.396	0	27.63	0	0.777	0.777	0
75.3	47.119	-0.708	0.258	0	27.63	0	0.778	0.778	0
75.4	47.112	-0.718	0.258	0	27.62	0	0.779	0.779	0
75.5	47.112	-0.718	-1.042	0	27.61	0	0.78	0.78	0
75.6	47.112	-0.718	-0.244	0	27.58	0	0.78	0.78	0
75.7	47.112	-0.71	-0.47	0	27.22	0	0.781	0.781	0
75.8	47.106	-0.71	-1.165	0	26.39	0	0.782	0.782	0
75.9	47.106	-0.715	-0.554	0	25.95	0	0.783	0.783	0
76	47.1	-0.715	-0.802	0	25.33	0	0.783	0.783	0
76.1	47.1	-0.715	-0.717	0	25.37	0	0.784	0.784	0
76.2	47.094	-0.7	-0.851	0	25.06	0	0.785	0.785	0
76.3	47.088	-0.685	-1.222	0	24.65	0	0.785	0.785	0
76.4	47.081	-0.705	-0.41	0	24.46	0	0.786	0.786	0
76.5	47.075	-0.703	-0.41	0	23.8	0	0.787	0.787	0
76.6	47.069	-0.718	-1.127	0	23.09	0	0.787	0.787	0
76.7	47.063	-0.718	-0.569	0	22.59	0	0.788	0.788	0
76.8	47.056	-0.713	-0.258	0	22.51	0	0.789	0.789	0
76.9	47.044	-0.705	-0.717	0	22.47	0	0.789	0.789	0
77	47.038	-0.705	-0.731	0	22.49	0	0.79	0.79	0
77.1	47.025	-0.72	-0.731	0	22.46	0	0.79	0.79	0
77.2	47.013	-0.72	-0.523	0	22.44	0	0.791	0.791	0
77.3	47.007	-0.71	-0.067	0	22.44	0	0.792	0.792	0
77.4	46.994	-0.703	-0.731	0	22.42	0	0.792	0.792	0
77.5	46.988	-0.708	-0.731	0	22.44	0	0.793	0.793	0
77.6	46.982	-0.708	-0.968	0	22.89	0	0.794	0.794	0
77.7	46.969	-0.735	-0.396	0	23.02	0	0.794	0.794	0
77.8	46.963	-0.743	-0.095	0	23.05	0	0.795	0.795	0
77.9	46.951	-0.743	-0.636	0	23.03	0	0.795	0.795	0
78	46.945	-0.708	-0.494	0	23.06	0	0.796	0.796	0
78.1	46.932	-0.718	-1.176	0	24.14	0	0.797	0.797	0
78.2	46.926	-0.718	-0.396	0	24.3	0	0.797	0.797	0
78.3	46.92	-0.728	-0.434	0	24.53	0	0.798	0.798	0
78.4	46.914	-0.713	-0.35	0	25.07	0	0.799	0.799	0
78.5	46.907	-0.713	-0.883	0	25.19	0	0.8	0.8	0
78.6	46.901	-0.72	-1.268	0	25.13	0	0.8	0.8	0
78.7	46.895	-0.723	-0.685	0	25.16	0	0.801	0.801	0
78.8	46.895	-0.723	-0.244	0	25.13	0	0.802	0.802	0
78.9	46.889	-0.72	-1.127	0	25.18	0	0.802	0.802	0
79	46.882	-0.728	-0.653	0	25.1	0	0.803	0.803	0
79.1	46.876	-0.728	-0.413	0	25.18	0	0.804	0.804	0
79.2	46.876	-0.74	-1.006	0	25.71	0	0.804	0.804	0
79.3	46.87	-0.705	-0.396	0	27.57	0	0.805	0.805	0
79.4	46.864	-0.705	-0.396	0	29.98	0	0.806	0.806	0
79.5	46.864	-0.705	-0.957	0	32.53	0	0.807	0.807	0
79.6	46.87	-0.698	-0.261	0	33.48	0	0.808	0.808	0
79.7	46.876	-0.698	-1.127	0	33.68	0	0.809	0.809	0
79.8	46.889	-0.725	-0.48	0	33.69	0	0.81	0.81	0

79.9	46.895	-0.728	-0.215	0	33.69	0	0.811	0.811	0
80	46.907	-0.728	-0.597	0	33.69	0	0.812	0.812	0
80.1	46.914	-0.713	-0.816	0	33.7	0	0.813	0.813	0
80.2	46.926	-0.713	-0.554	0	33.41	0	0.813	0.813	0
80.3	46.938	-0.723	-0.717	0	32.94	0	0.814	0.814	0
80.4	46.945	-0.718	-1.091	0	32.88	0	0.815	0.815	0
80.5	46.957	-0.718	-1.006	0	33.12	0	0.816	0.816	0
80.6	46.963	-0.718	-0.671	0	33.74	0	0.817	0.817	0
80.7	46.969	-0.705	-0.625	0	34.14	0	0.818	0.818	0
80.8	46.982	-0.71	-0.731	0	34.47	0	0.819	0.819	0
80.9	46.994	-0.71	-0.717	0	34.48	0	0.82	0.82	0
81	47.007	-0.728	-0.011	0	34.43	0	0.821	0.821	0
81.1	47.013	-0.71	-0.526	0	34.5	0	0.822	0.822	0
81.2	47.025	-0.71	-0.883	0	34.45	0	0.823	0.823	0
81.3	47.038	-0.7	-1.042	0	34.51	0	0.824	0.824	0
81.4	47.05	-0.705	-1.042	0	34.5	0	0.825	0.825	0
81.5	47.063	-0.705	-0.639	0	34.53	0	0.826	0.826	0
81.6	47.069	-0.715	-0.466	0	34.2	0	0.827	0.827	0
81.7	47.081	-0.715	-0.703	0	33.67	0	0.828	0.828	0
81.8	47.088	-0.715	-0.498	0	33.66	0	0.829	0.829	0
81.9	47.1	-0.703	-0.512	0	33.7	0	0.83	0.83	0
82	47.112	-0.713	-1.194	0	33.65	0	0.83	0.83	0
82.1	47.119	-0.713	-0.59	0	33.71	0	0.831	0.831	0
82.2	47.131	-0.725	-0.396	0	33.67	0	0.832	0.832	0
82.3	47.137	-0.73	-0.597	0	33.71	0	0.833	0.833	0
82.4	47.15	-0.713	-0.802	0	33.71	0	0.834	0.834	0
82.5	47.156	-0.718	-1.127	0	33.7	0	0.835	0.835	0
82.6	47.162	-0.728	-0.466	0	33.72	0	0.836	0.836	0
82.7	47.175	-0.728	-0.554	0	33.74	0	0.837	0.837	0
82.8	47.181	-0.735	-0.717	0	33.38	0	0.838	0.838	0
82.9	47.193	-0.738	-0.554	0	32.49	0	0.839	0.839	0
83	47.206	-0.738	-0.968	0	31.62	0	0.84	0.84	0
83.1	47.206	-0.743	-0.314	0	30.63	0	0.841	0.841	0
83.2	47.218	-0.743	-0.883	0	29.64	0	0.841	0.841	0
83.3	47.218	-0.74	-0.756	0	28.82	0	0.842	0.842	0
83.4	47.224	-0.743	-0.258	0	28.7	0	0.843	0.843	0
83.5	47.224	-0.728	-0.343	0	28	0	0.844	0.844	0
83.6	47.224	-0.728	-1.028	0	27.46	0	0.845	0.845	0
83.7	47.224	-0.73	-0.869	0	26.82	0	0.845	0.845	0
83.8	47.224	-0.72	-0.381	0	26.17	0	0.846	0.846	0
83.9	47.218	-0.72	-0.703	0	25.91	0	0.847	0.847	0
84	47.218	-0.745	-1.014	0	25.94	0	0.847	0.847	0
84.1	47.212	-0.748	-0.396	0	25.94	0	0.848	0.848	0
84.2	47.212	-0.748	0.014	0	25.92	0	0.849	0.849	0
84.3	47.206	-0.733	-1.635	0	26.55	0	0.85	0.85	0
84.4	47.199	-0.753	-1.466	0	27.09	0	0.85	0.85	0
84.5	47.199	-0.753	-0.184	0	27.49	0	0.851	0.851	0

84.6	47.193	-0.713	-0.823	0	27.99	0	0.852	0.852	0
84.7	47.193	-0.698	-1.006	0	28.16	0	0.853	0.853	0
84.8	47.193	-0.698	-1.194	0	28.13	0	0.854	0.854	0
84.9	47.193	-0.708	-0.703	0	28.15	0	0.854	0.854	0
85	47.193	-0.71	-0.554	0	28.14	0	0.855	0.855	0
85.1	47.193	-0.71	-1.112	0	28.18	0	0.856	0.856	0
85.2	47.193	-0.72	-0.201	0	28.12	0	0.857	0.857	0
85.3	47.193	-0.723	-0.717	0	28.16	0	0.857	0.857	0
85.4	47.193	-0.728	-0.54	0	28.04	0	0.858	0.858	0
85.5	47.193	-0.728	-0.869	0	27.29	0	0.859	0.859	0
85.6	47.193	-0.738	-0.869	0	26.49	0	0.86	0.86	0
85.7	47.193	-0.738	-0.226	0	25.9	0	0.86	0.86	0
85.8	47.193	-0.743	-0.851	0	25.9	0	0.861	0.861	0
85.9	47.187	-0.748	-0.703	0	25.62	0	0.862	0.862	0
86	47.181	-0.748	-0.381	0	25.42	0	0.863	0.863	0
86.1	47.175	-0.743	-0.876	0	25.45	0	0.863	0.863	0
86.2	47.175	-0.733	-1.187	0	24.95	0	0.864	0.864	0
86.3	47.168	-0.74	-0.809	0	24.27	0	0.865	0.865	0
86.4	47.162	-0.735	-0.978	0	22.81	0	0.865	0.865	0
86.5	47.156	-0.73	-0.953	0	21.28	0	0.866	0.866	0
86.6	47.143	-0.73	-0.788	0	19.98	0	0.866	0.866	0
86.7	47.137	-0.735	-0.922	0	19.64	0	0.867	0.867	0
86.8	47.119	-0.74	-0.54	0	19.63	0	0.867	0.867	0
86.9	47.106	-0.74	-0.367	0	19.63	0	0.868	0.868	0
87	47.088	-0.7	-0.657	0	19.62	0	0.869	0.869	0
87.1	47.075	-0.703	-1.194	0	17.6	0	0.869	0.869	0
87.2	47.063	-0.703	-1.176	0	15.26	0	0.869	0.869	0
87.3	47.038	-0.73	-0.625	0	13.55	0	0.87	0.87	0
87.4	47.019	-0.725	-0.54	0	12.76	0	0.87	0.87	0
87.5	46.988	-0.725	-0.657	0	12.65	0	0.871	0.871	0
87.6	46.963	-0.718	-1.303	0	12.74	0	0.871	0.871	0
87.7	46.938	-0.713	-0.727	0	11.47	0	0.871	0.871	0
87.8	46.907	-0.713	-0.501	0	7.8	0	0.871	0.871	0
87.9	46.882	-0.715	-0.703	0	5.79	0	0.872	0.872	0
88	46.845	-0.718	-0.844	0	3.49	0	0.872	0.872	0
88.1	46.808	-0.718	-0.452	0	1.88	0	0.872	0.872	0
88.2	46.758	-0.723	-0.576	0	0.69	0	0.872	0.872	0
88.3	46.715	-0.71	-0.66	0	0	0	0.872	0.872	0
88.4	46.665	-0.71	-0.66	0	0	0	0.872	0.872	0
88.5	46.615	-0.725	-0.936	0	0	0	0.872	0.872	0
88.6	46.566	-0.723	-0.554	0	0	0	0.872	0.872	0
88.7	46.516	-0.723	-0.54	0	0.88	0	0.872	0.872	0
88.8	46.466	-0.695	-0.703	0	2.23	0	0.872	0.872	0
88.9	46.423	-0.693	-1.028	0	3.78	0	0.872	0.872	0
89	46.373	-0.693	-0.703	0	4.78	0	0.872	0.872	0
89.1	46.336	-0.7	-0.618	0	5.43	0	0.872	0.872	0
89.2	46.292	-0.7	-0.526	0	7.2	0	0.873	0.873	0

89.3	46.255	-0.7	-0.689	0	8.39	0	0.873	0.873	0
89.4	46.218	-0.71	-0.381	0	9.76	0	0.873	0.873	0
89.5	46.187	-0.7	-0.381	0	11.05	0	0.873	0.873	0
89.6	46.155	-0.7	-0.777	0	12.61	0	0.874	0.874	0
89.7	46.124	-0.71	-1.095	0	14.97	0	0.874	0.874	0
89.8	46.1	-0.715	-0.381	0	16.63	0	0.875	0.875	0
89.9	46.081	-0.715	-0.381	0	18.08	0	0.875	0.875	0
90	46.062	-0.71	-0.717	0	18.98	0	0.876	0.876	0
90.1	46.05	-0.713	-0.689	0	19.55	0	0.876	0.876	0
90.2	46.037	-0.713	-0.869	0	20.65	0	0.877	0.877	0
90.3	46.019	-0.7	-0.526	0	22.97	0	0.877	0.877	0
90.4	46.013	-0.703	-0.526	0	24.54	0	0.878	0.878	0
90.5	46	-0.703	-0.869	0	25.98	0	0.879	0.879	0
90.6	46	-0.713	-0.727	0	27.03	0	0.879	0.879	0
90.7	46	-0.715	-0.643	0	28.16	0	0.88	0.88	0
90.8	46	-0.715	-0.869	0	29.32	0	0.881	0.881	0
90.9	46	-0.728	-0.689	0	29.37	0	0.882	0.882	0
91	46.006	-0.723	-0.509	0	30.21	0	0.883	0.883	0
91.1	46.013	-0.723	-0.731	0	31.13	0	0.884	0.884	0
91.2	46.019	-0.718	-0.851	0	32.43	0	0.884	0.884	0
91.3	46.025	-0.688	-0.883	0	34.01	0	0.885	0.885	0
91.4	46.037	-0.688	-0.883	0	35.15	0	0.886	0.886	0
91.5	46.05	-0.723	-0.611	0	35	0	0.887	0.887	0
91.6	46.062	-0.735	-0.215	0	35.43	0	0.888	0.888	0
91.7	46.081	-0.735	-0.283	0	36.33	0	0.889	0.889	0
91.8	46.093	-0.718	-1.264	0	37.13	0	0.89	0.89	0
91.9	46.106	-0.733	-1.335	0	37.96	0	0.891	0.891	0
92	46.124	-0.733	0.131	0	38.26	0	0.893	0.893	0
92.1	46.143	-0.705	-0.689	0	39.81	0	0.894	0.894	0
92.2	46.168	-0.705	-1.18	0	43.32	0	0.895	0.895	0
92.3	46.187	-0.725	-0.505	0	43.65	0	0.896	0.896	0
92.4	46.218	-0.725	-0.643	0	44.19	0	0.897	0.897	0
92.5	46.242	-0.703	-0.643	0	48.07	0	0.899	0.899	0
92.6	46.274	-0.703	-1.141	0	50.9	0	0.9	0.9	0
92.7	46.311	-0.73	-1.264	0	52.36	0	0.901	0.901	0
92.8	46.348	-0.728	0.06	0	52.72	0	0.903	0.903	0
92.9	46.392	-0.728	-0.629	0	53.36	0	0.904	0.904	0
93	46.435	-0.71	-0.689	0	53.35	0	0.906	0.906	0
93.1	46.485	-0.71	-1.014	0	52.5	0	0.907	0.907	0
93.2	46.522	-0.71	-1.084	0	51.91	0	0.909	0.909	0
93.3	46.566	-0.713	-0.526	0	51.39	0	0.91	0.91	0
93.4	46.609	-0.71	-0.526	0	51.37	0	0.912	0.912	0
93.5	46.653	-0.71	-0.922	0	51.25	0	0.913	0.913	0
93.6	46.69	-0.738	-0.569	0	51.47	0	0.915	0.915	0
93.7	46.733	-0.713	-0.067	0	52.36	0	0.916	0.916	0
93.8	46.771	-0.713	-1.148	0	52.36	0	0.917	0.917	0
93.9	46.814	-0.723	-1.66	0	52.46	0	0.919	0.919	0

94	46.858	-0.713	-0.484	0	50.76	0	0.92	0.92	0
94.1	46.901	-0.713	-0.201	0	45.6	0	0.922	0.922	0
94.2	46.938	-0.703	-1.059	0	39.49	0	0.923	0.923	0
94.3	46.963	-0.705	-0.35	0	38.29	0	0.924	0.924	0
94.4	46.988	-0.713	-0.689	0	38.39	0	0.925	0.925	0
94.5	47.001	-0.705	-0.526	0	38.35	0	0.926	0.926	0
94.6	47.019	-0.705	-1.014	0	39.02	0	0.927	0.927	0
94.7	47.038	-0.705	-0.554	0	39.09	0	0.928	0.928	0
94.8	47.056	-0.74	-0.689	0	39.08	0	0.929	0.929	0
94.9	47.075	-0.728	-0.24	0	39.03	0	0.93	0.93	0
95	47.094	-0.728	-0.946	0	39.06	0	0.931	0.931	0
95.1	47.119	-0.725	-0.795	0	39.07	0	0.932	0.932	0
95.2	47.137	-0.725	-0.611	0	39.08	0	0.933	0.933	0
95.3	47.156	-0.71	-0.484	0	39.09	0	0.935	0.935	0
95.4	47.168	-0.713	-1.056	0	39.12	0	0.936	0.936	0
95.5	47.187	-0.738	-1.056	0	39.12	0	0.937	0.937	0
95.6	47.212	-0.738	-0.201	0	39.74	0	0.938	0.938	0
95.7	47.23	-0.693	0.004	0	39.87	0	0.939	0.939	0
95.8	47.249	-0.713	-2.016	0	39.94	0	0.94	0.94	0
95.9	47.268	-0.713	-1.014	0	39.92	0	0.941	0.941	0
96	47.286	-0.705	0.102	0	39.99	0	0.942	0.942	0
96.1	47.305	-0.705	-1.18	0	40.91	0	0.943	0.943	0
96.2	47.324	-0.71	-0.837	0	40.87	0	0.945	0.945	0
96.3	47.348	-0.71	-0.35	0	40.87	0	0.946	0.946	0
96.4	47.367	-0.685	-0.346	0	40.87	0	0.947	0.947	0
96.5	47.386	-0.685	-1.338	0	40.89	0	0.948	0.948	0
96.6	47.411	-0.713	-1.067	0	40.9	0	0.949	0.949	0
96.7	47.429	-0.728	-0.335	0	41.14	0	0.95	0.95	0
96.8	47.454	-0.728	-0.41	0	41.89	0	0.951	0.951	0
96.9	47.479	-0.713	-0.494	0	43.24	0	0.953	0.953	0
97	47.504	-0.725	-1.338	0	43.79	0	0.954	0.954	0
97.1	47.529	-0.725	-0.307	0	44.6	0	0.955	0.955	0
97.2	47.554	-0.733	-0.35	0	45.2	0	0.956	0.956	0
97.3	47.578	-0.743	-0.653	0	45.52	0	0.958	0.958	0
97.4	47.609	-0.743	-0.35	0	46.26	0	0.959	0.959	0
97.5	47.634	-0.7	-1.18	0	46.5	0	0.96	0.96	0
97.6	47.659	-0.708	-1.324	0	46.49	0	0.961	0.961	0
97.7	47.69	-0.708	-0.396	0	47.42	0	0.963	0.963	0
97.8	47.721	-0.715	-0.184	0	48.73	0	0.964	0.964	0
97.9	47.752	-0.7	-0.512	0	49.41	0	0.965	0.965	0
98	47.79	-0.7	-1.038	0	49.96	0	0.967	0.967	0
98.1	47.821	-0.728	-0.869	0	50.57	0	0.968	0.968	0
98.2	47.858	-0.728	-0.699	0	52.1	0	0.97	0.97	0
98.3	47.895	-0.728	-0.54	0	52.11	0	0.971	0.971	0
98.4	47.933	-0.735	-0.78	0	52.13	0	0.973	0.973	0
98.5	47.97	-0.733	-0.671	0	52.16	0	0.974	0.974	0
98.6	48.007	-0.733	-0.321	0	52.21	0	0.975	0.975	0

98.7	48.051	-0.74	-1.25	0	51.19	0	0.977	0.977	0
98.8	48.088	-0.755	-0.671	0	49.48	0	0.978	0.978	0
98.9	48.125	-0.755	0.318	0	49.25	0	0.98	0.98	0
99	48.156	-0.703	-0.943	0	49.32	0	0.981	0.981	0
99.1	48.187	-0.703	-1.49	0	49.37	0	0.982	0.982	0
99.2	48.225	-0.703	-0.731	0	49.35	0	0.984	0.984	0
99.3	48.256	-0.708	-0.516	0	49.23	0	0.985	0.985	0
99.4	48.287	-0.7	-0.572	0	49.27	0	0.987	0.987	0
99.5	48.324	-0.7	-0.766	0	49.28	0	0.988	0.988	0
99.6	48.355	-0.698	-0.738	0	49.32	0	0.989	0.989	0
99.7	48.386	-0.723	-0.717	0	49.35	0	0.991	0.991	0
99.8	48.417	-0.723	-0.325	0	49.38	0	0.992	0.992	0
99.9	48.455	-0.72	-0.512	0	49.11	0	0.993	0.993	0
100	48.479	-0.708	-0.689	0	49.21	0	0.995	0.995	0
100.1	48.51	-0.708	-1.324	0	49.22	0	0.996	0.996	0
100.2	48.542	-0.71	-0.551	0	49.29	0	0.997	0.997	0
100.3	48.579	-0.718	-0.653	0	49.27	0	0.999	0.999	0
100.4	48.61	-0.718	-0.629	0	49.35	0	1	1	0
100.5	48.641	-0.71	-1.338	0	49.23	0	1.002	1.002	0
100.6	48.672	-0.705	-0.826	0	49.12	0	1.003	1.003	0
100.7	48.703	-0.705	-0.569	0	49.14	0	1.004	1.004	0
100.8	48.734	-0.71	-0.632	0	49.16	0	1.006	1.006	0
100.9	48.765	-0.683	-0.537	0	49.2	0	1.007	1.007	0
101	48.796	-0.683	-1.515	0	48.71	0	1.008	1.008	0
101.1	48.827	-0.713	-1.123	0	47.38	0	1.01	1.01	0
101.2	48.858	-0.713	-0.025	0	47.02	0	1.011	1.011	0
101.3	48.883	-0.698	-0.184	0	46.2	0	1.012	1.012	0
101.4	48.908	-0.7	-1.028	0	46.24	0	1.014	1.014	0
101.5	48.933	-0.718	-1.024	0	46.45	0	1.015	1.015	0
101.6	48.964	-0.718	-0.24	0	46.53	0	1.016	1.016	0
101.7	48.989	-0.728	-0.78	0	45.94	0	1.017	1.017	0
101.8	49.02	-0.723	-0.727	0	44.23	0	1.019	1.019	0
101.9	49.045	-0.723	-0.54	0	42.8	0	1.02	1.02	0
102	49.07	-0.713	-1.208	0	42.48	0	1.021	1.021	0
102.1	49.088	-0.715	-0.752	0	41.99	0	1.022	1.022	0
102.2	49.107	-0.715	-0.851	0	40.4	0	1.023	1.023	0
102.3	49.126	-0.708	-0.622	0	39.35	0	1.024	1.024	0
102.4	49.144	-0.708	-0.537	0	38.51	0	1.025	1.025	0
102.5	49.157	-0.708	-0.54	0	37.26	0	1.027	1.027	0
102.6	49.169	-0.698	-0.911	0	35.89	0	1.028	1.028	0
102.7	49.182	-0.718	-1.028	0	34.86	0	1.028	1.028	0
102.8	49.188	-0.718	-0.18	0	33.97	0	1.029	1.029	0
102.9	49.194	-0.715	-0.459	0	33.54	0	1.03	1.03	0
103	49.2	-0.728	-1.109	0	33.54	0	1.031	1.031	0
103.1	49.2	-0.728	-0.124	0	33.41	0	1.032	1.032	0
103.2	49.206	-0.725	-0.689	0	33.3	0	1.033	1.033	0
103.3	49.213	-0.743	-0.622	0	32.55	0	1.034	1.034	0

103.4	49.213	-0.743	-0.512	0	31.94	0	1.035	1.035	0
103.5	49.219	-0.75	-0.717	0	29.8	0	1.036	1.036	0
103.6	49.219	-0.75	-0.671	0	28.17	0	1.037	1.037	0
103.7	49.219	-0.75	-0.064	0	27.29	0	1.037	1.037	0
103.8	49.213	-0.693	-1.398	0	27.34	0	1.038	1.038	0
103.9	49.213	-0.71	-1.349	0	27.28	0	1.039	1.039	0
104	49.2	-0.71	-0.78	0	26.54	0	1.04	1.04	0
104.1	49.2	-0.703	-0.184	0	26.19	0	1.04	1.04	0
104.2	49.194	-0.703	-0.929	0	25.62	0	1.041	1.041	0
104.3	49.188	-0.68	-1.194	0	25.65	0	1.042	1.042	0
104.4	49.175	-0.703	-0.586	0	25.61	0	1.042	1.042	0
104.5	49.175	-0.718	-0.558	0	25.61	0	1.043	1.043	0
104.6	49.163	-0.718	0.131	0	25.57	0	1.044	1.044	0
104.7	49.157	-0.683	-0.696	0	24.88	0	1.045	1.045	0
104.8	49.15	-0.693	-1.335	0	24.24	0	1.045	1.045	0
104.9	49.138	-0.693	-0.837	0	24.23	0	1.046	1.046	0
105	49.126	-0.703	-0.36	0	24.31	0	1.047	1.047	0
105.1	49.119	-0.71	-1.031	0	24.95	0	1.047	1.047	0
105.2	49.107	-0.71	-0.78	0	25.3	0	1.048	1.048	0
105.3	49.101	-0.715	-0.78	0	26.36	0	1.049	1.049	0
105.4	49.095	-0.718	-0.696	0	26.24	0	1.049	1.049	0
105.5	49.082	-0.718	-0.653	0	26.32	0	1.05	1.05	0
105.6	49.076	-0.683	-0.865	0	26.24	0	1.051	1.051	0
105.7	49.07	-0.703	-1.254	0	26.31	0	1.052	1.052	0
105.8	49.063	-0.703	0.018	0	26.24	0	1.052	1.052	0
105.9	49.057	-0.71	-0.558	0	26.29	0	1.053	1.053	0
106	49.051	-0.728	-0.742	0	26.29	0	1.054	1.054	0
106.1	49.045	-0.728	-0.378	0	26.23	0	1.055	1.055	0
106.2	49.039	-0.745	-0.208	0	26.29	0	1.055	1.055	0
106.3	49.032	-0.713	-1.024	0	26.22	0	1.056	1.056	0
106.4	49.026	-0.713	-0.999	0	26.3	0	1.057	1.057	0
106.5	49.02	-0.715	-0.198	0	26.23	0	1.057	1.057	0
106.6	49.014	-0.715	-0.671	0	26.26	0	1.058	1.058	0
106.7	49.001	-0.715	-0.946	0	26.4	0	1.059	1.059	0
106.8	49.001	-0.72	-0.54	0	27.43	0	1.06	1.06	0
106.9	48.989	-0.705	-0.374	0	28.19	0	1.06	1.06	0
107	48.983	-0.705	-0.985	0	28.81	0	1.061	1.061	0
107.1	48.983	-0.715	-0.862	0	30.61	0	1.062	1.062	0
107.2	48.983	-0.715	-0.622	0	33.67	0	1.063	1.063	0
107.3	48.976	-0.708	-0.498	0	34.91	0	1.064	1.064	0
107.4	48.983	-0.705	-0.657	0	35.47	0	1.065	1.065	0
107.5	48.995	-0.713	-0.682	0	36.13	0	1.066	1.066	0
107.6	49.008	-0.713	-0.696	0	36.23	0	1.067	1.067	0
107.7	49.014	-0.708	-0.208	0	36.2	0	1.068	1.068	0
107.8	49.026	-0.7	-0.78	0	36.12	0	1.069	1.069	0
107.9	49.032	-0.7	-1.413	0	36.2	0	1.07	1.07	0
108	49.045	-0.71	-0.053	0	36.16	0	1.071	1.071	0

108.1	49.057	-0.703	-0.607	0	36.24	0	1.072	1.072	0
108.2	49.063	-0.703	-1.042	0	36.22	0	1.073	1.073	0
108.3	49.07	-0.725	-0.537	0	36.24	0	1.074	1.074	0
108.4	49.082	-0.708	-0.512	0	36.23	0	1.075	1.075	0
108.5	49.095	-0.708	-0.961	0	36.26	0	1.076	1.076	0
108.6	49.101	-0.703	-0.685	0	36.26	0	1.077	1.077	0
108.7	49.113	-0.705	-0.643	0	36.27	0	1.078	1.078	0
108.8	49.126	-0.705	-0.78	0	36.28	0	1.079	1.079	0
108.9	49.132	-0.69	-0.572	0	36.28	0	1.08	1.08	0
109	49.144	-0.693	-0.862	0	36.33	0	1.081	1.081	0
109.1	49.15	-0.693	-0.939	0	36.31	0	1.082	1.082	0
109.2	49.163	-0.705	-0.318	0	36.34	0	1.083	1.083	0
109.3	49.175	-0.698	-0.614	0	36.32	0	1.084	1.084	0
109.4	49.182	-0.698	-0.696	0	36.39	0	1.085	1.085	0
109.5	49.194	-0.71	-0.54	0	36.34	0	1.086	1.086	0
109.6	49.2	-0.703	-0.47	0	36.38	0	1.087	1.087	0
109.7	49.213	-0.703	-0.862	0	36.35	0	1.088	1.088	0
109.8	49.219	-0.71	-0.569	0	36.4	0	1.089	1.089	0
109.9	49.225	-0.718	-0.583	0	36.37	0	1.09	1.09	0
110	49.237	-0.718	-0.696	0	36.44	0	1.091	1.091	0
110.1	49.25	-0.723	-0.049	0	36.39	0	1.092	1.092	0
110.2	49.262	-0.723	-0.212	0	36.45	0	1.093	1.093	0
110.3	49.269	-0.708	-0.999	0	36.4	0	1.094	1.094	0
110.4	49.281	-0.708	-0.685	0	36.29	0	1.095	1.095	0
110.5	49.287	-0.71	-0.682	0	36.17	0	1.096	1.096	0
110.6	49.3	-0.71	-0.713	0	36.23	0	1.097	1.097	0
110.7	49.312	-0.718	-1.151	0	36.18	0	1.098	1.098	0
110.8	49.318	-0.708	-0.862	0	36.24	0	1.099	1.099	0
110.9	49.324	-0.708	-0.268	0	36.22	0	1.1	1.1	0
111	49.337	-0.723	-1.123	0	36.23	0	1.101	1.101	0
111.1	49.343	-0.723	-0.498	0	36.24	0	1.102	1.102	0
111.2	49.356	-0.71	-0.879	0	36.26	0	1.103	1.103	0
111.3	49.368	-0.703	-0.929	0	36.23	0	1.104	1.104	0
111.4	49.374	-0.708	-1.095	0	36.26	0	1.105	1.105	0
111.5	49.387	-0.708	-0.512	0	36.25	0	1.106	1.106	0
111.6	49.393	-0.698	-0.696	0	36.29	0	1.107	1.107	0
111.7	49.405	-0.703	-0.837	0	36.28	0	1.108	1.108	0
111.8	49.411	-0.703	-0.501	0	36.29	0	1.109	1.109	0
111.9	49.418	-0.703	-0.865	0	35.86	0	1.11	1.11	0
112	49.43	-0.693	-0.699	0	35.32	0	1.111	1.111	0
112.1	49.443	-0.693	-0.819	0	35.36	0	1.112	1.112	0
112.2	49.449	-0.695	-0.54	0	34.85	0	1.113	1.113	0
112.3	49.455	-0.718	-0.424	0	34.73	0	1.114	1.114	0
112.4	49.461	-0.718	-0.339	0	34.68	0	1.115	1.115	0
112.5	49.467	-0.698	-1.028	0	33.97	0	1.116	1.116	0
112.6	49.474	-0.705	-1.275	0	34	0	1.117	1.117	0
112.7	49.48	-0.705	-0.459	0	34	0	1.118	1.118	0

112.8	49.486	-0.723	-0.908	0	33.34	0	1.119	1.119	0
112.9	49.492	-0.718	-0.124	0	33.15	0	1.12	1.12	0
113	49.492	-0.718	-0.607	0	32.87	0	1.121	1.121	0
113.1	49.498	-0.71	-1.607	0	32.41	0	1.122	1.122	0
113.2	49.498	-0.71	-0.569	0	32.09	0	1.123	1.123	0
113.3	49.505	-0.72	-0.459	0	31.47	0	1.123	1.123	0
113.4	49.505	-0.718	-0.795	0	31.49	0	1.124	1.124	0
113.5	49.505	-0.705	-0.819	0	31.01	0	1.125	1.125	0
113.6	49.511	-0.705	-1.01	0	30.82	0	1.126	1.126	0
113.7	49.511	-0.708	-0.819	0	30.78	0	1.127	1.127	0
113.8	49.511	-0.715	-0.742	0	30.83	0	1.128	1.128	0
113.9	49.511	-0.715	-0.212	0	30.79	0	1.129	1.129	0
114	49.511	-0.693	-0.999	0	30.81	0	1.129	1.129	0
114.1	49.511	-0.693	-0.678	0	30.79	0	1.13	1.13	0
114.2	49.511	-0.68	-1.028	0	30.8	0	1.131	1.131	0
114.3	49.511	-0.703	-0.374	0	30.8	0	1.132	1.132	0
114.4	49.511	-0.7	-0.374	0	30.56	0	1.133	1.133	0
114.5	49.511	-0.7	-0.696	0	29.3	0	1.134	1.134	0
114.6	49.505	-0.7	-0.494	0	27.85	0	1.134	1.134	0
114.7	49.505	-0.695	-0.54	0	26.31	0	1.135	1.135	0
114.8	49.498	-0.695	-0.671	0	25.45	0	1.136	1.136	0
114.9	49.492	-0.703	-0.699	0	24.71	0	1.137	1.137	0
115	49.486	-0.715	-0.378	0	23.3	0	1.137	1.137	0
115.1	49.474	-0.715	-0.378	0	22.45	0	1.138	1.138	0
115.2	49.461	-0.718	-0.78	0	22.34	0	1.138	1.138	0
115.3	49.449	-0.723	-1.024	0	21.74	0	1.139	1.139	0
115.4	49.436	-0.723	-1.109	0	21.75	0	1.14	1.14	0
115.5	49.424	-0.705	-0.629	0	21.02	0	1.14	1.14	0
115.6	49.405	-0.698	-1.014	0	19.94	0	1.141	1.141	0
115.7	49.387	-0.698	-0.879	0	18.43	0	1.141	1.141	0
115.8	49.374	-0.713	-0.699	0	17.05	0	1.142	1.142	0
115.9	49.349	-0.72	-0.311	0	15.32	0	1.142	1.142	0
116	49.331	-0.72	-0.851	0	15.12	0	1.143	1.143	0
116.1	49.3	-0.725	-0.622	0	15.1	0	1.143	1.143	0
116.2	49.281	-0.725	-0.554	0	15.22	0	1.143	1.143	0
116.3	49.25	-0.695	-0.89	0	15.29	0	1.144	1.144	0
116.4	49.225	-0.683	-0.657	0	15.23	0	1.144	1.144	0
116.5	49.2	-0.673	-0.653	0	15.25	0	1.145	1.145	0
116.6	49.175	-0.673	-1.024	0	15.27	0	1.145	1.145	0
116.7	49.15	-0.695	-0.583	0	15.21	0	1.146	1.146	0
116.8	49.126	-0.7	-0.35	0	15.26	0	1.146	1.146	0
116.9	49.101	-0.7	-0.713	0	15.21	0	1.146	1.146	0
117	49.076	-0.713	-0.258	0	15.24	0	1.147	1.147	0
117.1	49.051	-0.69	-0.657	0	15.21	0	1.147	1.147	0
117.2	49.026	-0.69	-1.268	0	14.6	0	1.148	1.148	0
117.3	49.001	-0.69	-0.611	0	14.65	0	1.148	1.148	0
117.4	48.976	-0.685	-0.611	0	14.64	0	1.149	1.149	0

117.5	48.945	-0.685	-0.837	0	14.62	0	1.149	1.149	0
117.6	48.921	-0.715	-0.378	0	14.64	0	1.149	1.149	0
117.7	48.896	-0.693	-0.025	0	14.61	0	1.15	1.15	0
117.8	48.865	-0.693	-1.028	0	14.63	0	1.15	1.15	0
117.9	48.84	-0.708	-1.028	0	14.64	0	1.151	1.151	0
118	48.815	-0.708	-0.622	0	14.59	0	1.151	1.151	0
118.1	48.79	-0.708	-0.466	0	14.61	0	1.151	1.151	0
118.2	48.765	-0.715	-0.427	0	14.6	0	1.152	1.152	0
118.3	48.74	-0.7	-0.512	0	14.6	0	1.152	1.152	0
118.4	48.709	-0.693	-1.208	0	14.63	0	1.153	1.153	0
118.5	48.684	-0.7	-0.378	0	14.58	0	1.153	1.153	0
118.6	48.66	-0.695	-0.671	0	14.56	0	1.153	1.153	0
118.7	48.635	-0.695	-0.643	0	14.43	0	1.154	1.154	0
118.8	48.61	-0.698	-1.208	0	14.51	0	1.154	1.154	0
118.9	48.585	-0.71	-0.699	0	14.7	0	1.155	1.155	0
119	48.56	-0.71	-0.364	0	14.64	0	1.155	1.155	0
119.1	48.535	-0.703	-0.865	0	14.55	0	1.155	1.155	0
119.2	48.504	-0.703	-0.922	0	13.42	0	1.156	1.156	0
119.3	48.486	-0.708	-0.512	0	12.7	0	1.156	1.156	0
119.4	48.455	-0.693	-0.865	0	12.73	0	1.156	1.156	0
119.5	48.423	-0.685	-0.865	0	12.76	0	1.157	1.157	0
119.6	48.399	-0.685	-1.109	0	12.93	0	1.157	1.157	0
119.7	48.368	-0.72	-0.35	0	12.95	0	1.158	1.158	0
119.8	48.343	-0.708	-0.226	0	12.9	0	1.158	1.158	0
119.9	48.312	-0.708	-0.851	0	12.93	0	1.158	1.158	0
120	48.287	-0.713	-1.042	0	12.91	0	1.159	1.159	0
120.1	48.256	-0.708	-0.427	0	12.9	0	1.159	1.159	0
120.2	48.231	-0.708	-0.17	0	12.93	0	1.159	1.159	0
120.3	48.2	-0.68	-1.515	0	12.88	0	1.16	1.16	0
120.4	48.175	-0.685	-1.515	0	12.88	0	1.16	1.16	0
120.5	48.144	-0.685	-0.667	0	12.33	0	1.16	1.16	0
120.6	48.119	-0.678	-0.851	0	11.96	0	1.161	1.161	0
120.7	48.088	-0.678	-0.526	0	11.99	0	1.161	1.161	0
120.8	48.057	-0.678	-1.208	0	11.98	0	1.161	1.161	0
120.9	48.032	-0.715	-0.35	0	11.95	0	1.162	1.162	0
121	48.001	-0.7	-0.212	0	11.97	0	1.162	1.162	0
121.1	47.97	-0.7	-0.936	0	11.95	0	1.162	1.162	0
121.2	47.939	-0.68	-1.19	0	11.94	0	1.163	1.163	0
121.3	47.914	-0.683	-0.961	0	11.94	0	1.163	1.163	0
121.4	47.883	-0.683	-0.989	0	11.92	0	1.163	1.163	0
121.5	47.858	-0.69	-0.039	0	11.93	0	1.164	1.164	0
121.6	47.827	-0.68	-0.558	0	11.92	0	1.164	1.164	0
121.7	47.796	-0.68	-0.795	0	11.9	0	1.164	1.164	0
121.8	47.771	-0.683	-1.042	0	11.93	0	1.165	1.165	0
121.9	47.74	-0.7	-0.512	0	12.11	0	1.165	1.165	0
122	47.709	-0.7	-0.378	0	12.08	0	1.165	1.165	0
122.1	47.684	-0.685	-0.184	0	12.59	0	1.166	1.166	0

122.2	47.653	-0.685	-1.042	0	12.93	0	1.166	1.166	0
122.3	47.622	-0.713	-0.869	0	13.45	0	1.166	1.166	0
122.4	47.597	-0.695	-0.671	0	13.46	0	1.167	1.167	0
122.5	47.572	-0.693	-0.667	0	13.57	0	1.167	1.167	0
122.6	47.547	-0.693	-1.056	0	14.75	0	1.168	1.168	0
122.7	47.522	-0.715	-0.24	0	16.06	0	1.168	1.168	0
122.8	47.498	-0.69	-0.049	0	18.81	0	1.169	1.169	0
122.9	47.479	-0.69	-1.268	0	21.69	0	1.169	1.169	0
123	47.46	-0.69	-0.925	0	24.57	0	1.17	1.17	0
123.1	47.448	-0.698	-0.6	0	26.54	0	1.171	1.171	0
123.2	47.442	-0.698	-0.244	0	26.97	0	1.171	1.171	0
123.3	47.442	-0.708	-0.551	0	27.52	0	1.172	1.172	0
123.4	47.435	-0.708	-0.526	0	28.42	0	1.173	1.173	0
123.5	47.435	-0.708	-0.35	0	30.08	0	1.174	1.174	0
123.6	47.435	-0.69	-0.999	0	31.09	0	1.175	1.175	0
123.7	47.442	-0.693	-0.95	0	32.55	0	1.176	1.176	0
123.8	47.448	-0.693	-0.671	0	33.26	0	1.176	1.176	0
123.9	47.454	-0.715	-0.554	0	33.66	0	1.177	1.177	0
124	47.467	-0.705	-0.039	0	34.41	0	1.178	1.178	0
124.1	47.473	-0.705	-0.837	0	34.67	0	1.179	1.179	0
124.2	47.485	-0.69	-0.968	0	35.37	0	1.18	1.18	0
124.3	47.491	-0.685	-0.957	0	35.38	0	1.181	1.181	0
124.4	47.504	-0.685	-1.042	0	35.43	0	1.182	1.182	0
124.5	47.522	-0.695	-0.396	0	35.41	0	1.183	1.183	0
124.6	47.529	-0.705	-0.554	0	35.44	0	1.184	1.184	0
124.7	47.541	-0.705	-0.636	0	35.25	0	1.185	1.185	0
124.8	47.554	-0.715	-0.554	0	35.26	0	1.186	1.186	0
124.9	47.566	-0.71	-0.54	0	34.37	0	1.187	1.187	0
125	47.578	-0.71	-0.953	0	34.39	0	1.188	1.188	0
125.1	47.585	-0.698	-0.84	0	34.35	0	1.189	1.189	0
125.2	47.597	-0.698	-0.812	0	34.43	0	1.19	1.19	0
125.3	47.603	-0.69	-0.957	0	34.38	0	1.191	1.191	0
125.4	47.616	-0.683	-0.53	0	34.42	0	1.192	1.192	0
125.5	47.628	-0.698	-0.611	0	34.4	0	1.193	1.193	0
125.6	47.641	-0.698	-0.798	0	34.43	0	1.194	1.194	0
125.7	47.647	-0.695	-0.109	0	34.25	0	1.195	1.195	0
125.8	47.659	-0.688	-0.798	0	33.42	0	1.196	1.196	0
125.9	47.665	-0.688	-1.593	0	32.62	0	1.197	1.197	0
126	47.672	-0.715	-0.311	0	31.97	0	1.198	1.198	0
126.1	47.678	-0.703	-0.396	0	31.07	0	1.198	1.198	0
126.2	47.684	-0.703	-0.879	0	30	0	1.199	1.199	0
126.3	47.69	-0.708	-1.056	0	29.2	0	1.2	1.2	0
126.4	47.69	-0.708	-1.028	0	28.46	0	1.201	1.201	0
126.5	47.696	-0.708	-0.064	0	27.79	0	1.202	1.202	0
126.6	47.696	-0.685	-1.056	0	27.74	0	1.202	1.202	0
126.7	47.69	-0.708	-1.014	0	27.72	0	1.203	1.203	0
126.8	47.69	-0.708	-0.494	0	27.74	0	1.204	1.204	0

126.9	47.69	-0.708	0.145	0	27.72	0	1.205	1.205	0
127	47.69	-0.695	-1.017	0	27.71	0	1.205	1.205	0
127.1	47.69	-0.695	-0.936	0	27.73	0	1.206	1.206	0
127.2	47.684	-0.7	-0.893	0	27.71	0	1.207	1.207	0
127.3	47.69	-0.73	-0.286	0	27.74	0	1.208	1.208	0
127.4	47.684	-0.73	-0.286	0	27.69	0	1.209	1.209	0
127.5	47.684	-0.708	-0.554	0	27.73	0	1.209	1.209	0
127.6	47.684	-0.685	-0.717	0	27.71	0	1.21	1.21	0
127.7	47.684	-0.685	-1.699	0	27.74	0	1.211	1.211	0
127.8	47.684	-0.695	-0.611	0	27.72	0	1.212	1.212	0
127.9	47.678	-0.715	-0.554	0	27.7	0	1.212	1.212	0
128	47.678	-0.715	0.215	0	27.72	0	1.213	1.213	0
128.1	47.678	-0.683	-0.897	0	27.68	0	1.214	1.214	0
128.2	47.678	-0.683	-1.522	0	27.71	0	1.215	1.215	0
128.3	47.672	-0.71	-0.215	0	27.69	0	1.215	1.215	0
128.4	47.672	-0.7	-0.159	0	27.72	0	1.216	1.216	0
128.5	47.665	-0.698	-1.056	0	27.68	0	1.217	1.217	0
128.6	47.665	-0.698	-0.696	0	27.71	0	1.218	1.218	0
128.7	47.665	-0.683	-0.713	0	27.7	0	1.219	1.219	0
128.8	47.665	-0.68	-0.961	0	27.21	0	1.219	1.219	0
128.9	47.665	-0.68	-0.883	0	26.83	0	1.22	1.22	0
129	47.665	-0.695	-0.265	0	26.84	0	1.221	1.221	0
129.1	47.659	-0.695	-0.593	0	26.85	0	1.222	1.222	0
129.2	47.653	-0.695	-0.689	0	27.03	0	1.222	1.222	0
129.3	47.653	-0.698	-0.879	0	27.05	0	1.223	1.223	0
129.4	47.653	-0.7	-0.876	0	27.03	0	1.224	1.224	0
129.5	47.647	-0.7	-0.456	0	27.02	0	1.225	1.225	0
129.6	47.647	-0.693	-0.717	0	27.02	0	1.225	1.225	0
129.7	47.647	-0.693	-0.456	0	27.01	0	1.226	1.226	0
129.8	47.641	-0.693	-0.569	0	27.05	0	1.227	1.227	0
129.9	47.641	-0.685	-0.717	0	27	0	1.228	1.228	0
130	47.634	-0.685	-0.689	0	27.02	0	1.228	1.228	0
130.1	47.634	-0.685	-0.922	0	27.01	0	1.229	1.229	0
130.2	47.634	-0.708	-0.053	0	27	0	1.23	1.23	0
130.3	47.628	-0.708	-0.215	0	27.01	0	1.231	1.231	0
130.4	47.628	-0.708	-1.003	0	27.02	0	1.231	1.231	0
130.5	47.628	-0.708	-0.41	0	27.19	0	1.232	1.232	0
130.6	47.622	-0.728	-1.017	0	27.72	0	1.233	1.233	0
130.7	47.622	-0.728	-0.611	0	27.67	0	1.234	1.234	0
130.8	47.622	-0.733	-0.314	0	27.71	0	1.234	1.234	0
130.9	47.622	-0.723	-0.943	0	28.32	0	1.235	1.235	0
131	47.616	-0.723	-0.713	0	28.34	0	1.236	1.236	0
131.1	47.622	-0.713	-1.303	0	28.33	0	1.237	1.237	0
131.2	47.622	-0.713	-0.731	0	28.31	0	1.237	1.237	0
131.3	47.622	-0.713	-0.41	0	28.33	0	1.238	1.238	0
131.4	47.622	-0.72	-1.014	0	28.83	0	1.239	1.239	0
131.5	47.622	-0.713	-0.929	0	29.7	0	1.24	1.24	0

131.6	47.622	-0.713	-0.244	0	29.68	0	1.241	1.241	0
131.7	47.628	-0.703	-1.218	0	29.82	0	1.242	1.242	0
131.8	47.628	-0.705	-0.54	0	30.35	0	1.242	1.242	0
131.9	47.628	-0.705	-0.703	0	30.33	0	1.243	1.243	0
132	47.634	-0.69	-0.145	0	30.58	0	1.244	1.244	0
132.1	47.634	-0.688	-1.084	0	31.84	0	1.245	1.245	0
132.2	47.641	-0.688	-0.897	0	32.24	0	1.246	1.246	0
132.3	47.647	-0.685	-0.364	0	32.23	0	1.247	1.247	0
132.4	47.653	-0.693	-0.335	0	32.18	0	1.248	1.248	0
132.5	47.659	-0.693	-1.331	0	32.27	0	1.249	1.249	0
132.6	47.665	-0.708	0.071	0	31.57	0	1.249	1.249	0
132.7	47.672	-0.69	-0.283	0	30.08	0	1.25	1.25	0
132.8	47.672	-0.69	-1.194	0	29.23	0	1.251	1.251	0
132.9	47.678	-0.69	-0.717	0	28.28	0	1.252	1.252	0
133	47.678	-0.703	-0.742	0	27.11	0	1.253	1.253	0
133.1	47.678	-0.703	-0.932	0	26.07	0	1.253	1.253	0
133.2	47.672	-0.75	-0.138	0	25.23	0	1.254	1.254	0
133.3	47.672	-0.735	0.413	0	24.32	0	1.255	1.255	0
133.4	47.665	-0.735	0.328	0	23.22	0	1.255	1.255	0
133.5	47.653	-0.718	-1.522	0	22.82	0	1.256	1.256	0
133.6	47.647	-0.725	-0.897	0	21.53	0	1.257	1.257	0
133.7	47.634	-0.725	-0.222	0	18.25	0	1.257	1.257	0
133.8	47.628	-0.7	-0.953	0	12.29	0	1.257	1.257	0
133.9	47.603	-0.705	-1.208	0	6.86	0	1.258	1.258	0
134	47.578	-0.705	-0.54	0	3.85	0	1.258	1.258	0
134.1	47.535	-0.698	-0.498	0	2.03	0	1.258	1.258	0
134.2	47.498	-0.698	-1.056	0	0.8	0	1.258	1.258	0
134.3	47.448	-0.708	-0.968	0	0	0	1.258	1.258	0
134.4	47.392	-0.693	-0.703	0	0	0	1.258	1.258	0
134.5	47.348	-0.688	-0.731	0	0	0	1.258	1.258	0
134.6	47.299	-0.688	-0.957	0	0	0	1.258	1.258	0
134.7	47.249	-0.698	-0.381	0	0	0	1.258	1.258	0
134.8	47.199	-0.698	-0.703	0	0	0	1.258	1.258	0
134.9	47.15	-0.698	-0.869	0	0	0	1.258	1.258	0
135	47.1	-0.7	-0.703	0	-2.94	0	1.258	1.258	0
135.1	47.044	-0.7	-0.745	0	-18.42	0	1.257	1.258	-0.001
135.2	46.945	-0.685	-1.028	0	-22.39	0	1.257	1.258	-0.001
135.3	46.82	-0.698	-1.508	0	-23.68	0	1.256	1.258	-0.002
135.4	46.702	-0.705	-1.398	0	-28.3	0	1.255	1.258	-0.003
135.5	46.584	-0.705	-0.215	0	-36.17	0	1.254	1.258	-0.004
135.6	46.46	-0.698	-0.851	0	-39.02	0	1.253	1.258	-0.005
135.7	46.311	-0.7	-0.957	0	-40.93	0	1.252	1.258	-0.006
135.8	46.162	-0.7	-0.526	0	-43.94	0	1.251	1.258	-0.007
135.9	46.013	-0.71	-0.745	0	-45.98	0	1.249	1.258	-0.008
136	45.857	-0.698	-0.54	0	-51.01	0	1.248	1.258	-0.01
136.1	45.689	-0.698	-0.788	0	-60.23	0	1.246	1.258	-0.011
136.2	45.509	-0.698	-0.798	0	-66.12	0	1.244	1.258	-0.013

136.3	45.304	-0.723	-0.77	0	-68.13	0	1.243	1.258	-0.015
136.4	45.087	-0.723	-0.77	0	-72.46	0	1.241	1.258	-0.017
136.5	44.857	-0.718	-0.244	0	-77.42	0	1.238	1.258	-0.019
136.6	44.621	-0.705	-0.671	0	-81.78	0	1.236	1.258	-0.022
136.7	44.36	-0.705	-1.317	0	-85.79	0	1.234	1.258	-0.024
136.8	44.093	-0.765	-0.742	0	-88.19	0	1.231	1.258	-0.026
136.9	43.813	-0.753	0.145	0	-90.38	0	1.229	1.258	-0.029
137	43.521	-0.753	0.403	0	-90.36	0	1.226	1.258	-0.031
137.1	43.223	-0.675	-2.126	0	-87.14	0	1.224	1.258	-0.034
137.2	42.918	-0.675	-1.903	0	-77.23	0	1.222	1.258	-0.036
137.3	42.614	-0.71	-0.201	0	-70.64	0	1.22	1.258	-0.038
137.4	42.365	-0.69	-1.042	0	-69.9	0	1.218	1.258	-0.04
137.5	42.129	-0.68	-1.07	0	-66.72	0	1.216	1.258	-0.042
137.6	41.887	-0.68	-1.278	0	-60.85	0	1.214	1.258	-0.044
137.7	41.638	-0.72	-0.48	0	-55.63	0	1.213	1.258	-0.045
137.8	41.377	-0.715	-0.025	0	-40.74	0	1.212	1.258	-0.046
137.9	41.16	-0.715	-0.049	0	-27.42	0	1.211	1.258	-0.047
138	40.998	-0.705	-1.451	0	-27.54	0	1.21	1.258	-0.048
138.1	40.874	-0.705	-1.028	0	-28.99	0	1.209	1.258	-0.049
138.2	40.743	-0.708	-0.381	0	-29.85	0	1.208	1.258	-0.049
138.3	40.613	-0.733	-0.583	0	-31.62	0	1.208	1.258	-0.05
138.4	40.476	-0.735	-0.554	0	-34.17	0	1.207	1.258	-0.051
138.5	40.339	-0.735	-0.717	0	-33.59	0	1.206	1.258	-0.052
138.6	40.197	-0.703	-0.629	0	-30.36	0	1.205	1.258	-0.053
138.7	40.06	-0.688	-1.014	0	-26.7	0	1.204	1.258	-0.054
138.8	39.929	-0.688	-1.208	0	-26.1	0	1.203	1.258	-0.054
138.9	39.811	-0.7	-0.23	0	-20.69	0	1.203	1.258	-0.055
139	39.699	-0.705	-0.396	0	-7.43	0	1.203	1.258	-0.055
139.1	39.6	-0.705	-0.396	0	-0.87	0	1.203	1.258	-0.055
139.2	39.538	-0.705	-0.512	0	0	0	1.203	1.258	-0.055
139.3	39.488	-0.69	-0.851	0	0	0	1.203	1.258	-0.055
139.4	39.445	-0.69	-0.908	0	0	0	1.203	1.258	-0.055
139.5	39.395	-0.723	-0.396	0	0	0	1.203	1.258	-0.055
139.6	39.358	-0.695	-0.067	0	0	0	1.203	1.258	-0.055
139.7	39.314	-0.695	-0.911	0	1.38	0	1.203	1.258	-0.055
139.8	39.271	-0.723	-1.564	0	4.96	0	1.203	1.258	-0.055
139.9	39.233	-0.728	-0.067	0	8.46	0	1.203	1.258	-0.055
140	39.196	-0.728	-0.396	0	8.95	0	1.203	1.258	-0.055
140.1	39.171	-0.718	-0.756	0	8.96	0	1.204	1.259	-0.055
140.2	39.153	-0.718	-0.717	0	8.97	0	1.204	1.259	-0.055
140.3	39.128	-0.72	-0.745	0	8.93	0	1.204	1.259	-0.055
140.4	39.103	-0.72	-0.24	0	8.82	0	1.204	1.259	-0.055
140.5	39.084	-0.708	-0.265	0	8.82	0	1.204	1.26	-0.055
140.6	39.059	-0.708	-0.957	0	9.43	0	1.205	1.26	-0.055
140.7	39.035	-0.708	-0.925	0	9.9	0	1.205	1.26	-0.055
140.8	39.016	-0.703	-0.494	0	10.98	0	1.205	1.261	-0.055
140.9	38.997	-0.703	-0.512	0	12.09	0	1.206	1.261	-0.055

141	38.979	-0.685	-0.961	0	12.82	0	1.206	1.261	-0.055
141.1	38.96	-0.688	-1.042	0	12.81	0	1.206	1.262	-0.055
141.2	38.948	-0.688	-0.759	0	12.82	0	1.207	1.262	-0.055
141.3	38.929	-0.673	-0.438	0	12.82	0	1.207	1.262	-0.055
141.4	38.916	-0.695	-0.41	0	12.82	0	1.207	1.263	-0.055
141.5	38.904	-0.695	-0.554	0	13.11	0	1.208	1.263	-0.055
141.6	38.885	-0.713	0.099	0	15.03	0	1.208	1.263	-0.055
141.7	38.873	-0.708	-0.685	0	16.21	0	1.209	1.264	-0.055
141.8	38.867	-0.708	-0.703	0	18.44	0	1.209	1.264	-0.055
141.9	38.861	-0.725	-0.816	0	20.67	0	1.21	1.265	-0.055
142	38.854	-0.723	-0.597	0	20.92	0	1.21	1.266	-0.055
142.1	38.861	-0.723	-0.184	0	21.72	0	1.211	1.266	-0.055
142.2	38.867	-0.71	-1.317	0	23.01	0	1.212	1.267	-0.055
142.3	38.873	-0.71	-0.54	0	24.21	0	1.212	1.267	-0.055
142.4	38.879	-0.71	-0.512	0	25.35	0	1.213	1.268	-0.055
142.5	38.892	-0.705	-0.968	0	27.42	0	1.214	1.269	-0.055
142.6	38.904	-0.713	-0.897	0	29.65	0	1.215	1.27	-0.055
142.7	38.916	-0.713	0.343	0	32.68	0	1.215	1.271	-0.055
142.8	38.935	-0.695	-0.883	0	37.64	0	1.217	1.272	-0.055
142.9	38.96	-0.7	-0.897	0	40.95	0	1.218	1.273	-0.055
143	38.985	-0.7	-0.717	0	41.56	0	1.219	1.274	-0.055
143.1	39.016	-0.715	-0.509	0	34.88	0	1.22	1.275	-0.055
143.2	39.047	-0.715	-0.113	0	36.25	0	1.221	1.276	-0.055
143.3	39.084	-0.705	-0.717	0	37.27	0	1.222	1.277	-0.055
143.4	39.122	-0.7	-0.968	0	37.95	0	1.223	1.278	-0.055
143.5	39.153	-0.705	-0.883	0	38.66	0	1.224	1.279	-0.055
143.6	39.19	-0.705	-0.597	0	43.2	0	1.225	1.28	-0.055
143.7	39.233	-0.713	-0.703	0	46.88	0	1.226	1.282	-0.055
143.8	39.277	-0.703	-0.569	0	48.15	0	1.228	1.283	-0.055
143.9	39.333	-0.703	-0.968	0	49.36	0	1.229	1.284	-0.055
144	39.395	-0.72	-0.802	0	51.09	0	1.231	1.286	-0.055
144.1	39.451	-0.71	-0.039	0	51.55	0	1.232	1.287	-0.055
144.2	39.519	-0.71	-0.968	0	51.63	0	1.233	1.289	-0.055
144.3	39.581	-0.713	-0.953	0	52.56	0	1.235	1.29	-0.055
144.4	39.643	-0.713	-0.869	0	54.99	0	1.236	1.292	-0.055
144.5	39.706	-0.713	-0.569	0	57.01	0	1.238	1.293	-0.055
144.6	39.774	-0.715	-1.141	0	58.36	0	1.24	1.295	-0.055
144.7	39.849	-0.705	-0.653	0	59.84	0	1.241	1.297	-0.055
144.8	39.936	-0.705	-1.172	0	60.84	0	1.243	1.298	-0.055
144.9	39.998	-0.713	-0.897	0	61.42	0	1.245	1.3	-0.055
145	40.078	-0.703	-0.152	0	62.2	0	1.246	1.302	-0.055
145.1	40.153	-0.703	-1.056	0	64.19	0	1.248	1.303	-0.055
145.2	40.24	-0.698	-0.985	0	66.02	0	1.25	1.305	-0.055
145.3	40.327	-0.715	-0.569	0	65.93	0	1.252	1.307	-0.055
145.4	40.408	-0.715	-0.653	0	65.84	0	1.254	1.309	-0.055
145.5	40.495	-0.683	-1.056	0	65.86	0	1.256	1.311	-0.055
145.6	40.582	-0.698	-1.222	0	65.85	0	1.257	1.313	-0.055

145.7	40.669	-0.698	-0.982	0	65.82	0	1.259	1.314	-0.055
145.8	40.756	-0.713	-0.198	0	65.89	0	1.261	1.316	-0.055
145.9	40.837	-0.708	-0.526	0	65.81	0	1.263	1.318	-0.055
146	40.917	-0.708	-0.731	0	65.84	0	1.265	1.32	-0.055
146.1	41.01	-0.713	-1.021	0	65.79	0	1.266	1.322	-0.055
146.2	41.097	-0.713	-0.717	0	65.69	0	1.268	1.324	-0.055
146.3	41.172	-0.715	-0.364	0	65.82	0	1.27	1.325	-0.055
146.4	41.265	-0.713	-0.569	0	66.44	0	1.272	1.327	-0.055
146.5	41.34	-0.71	-0.569	0	68.33	0	1.274	1.329	-0.055
146.6	41.421	-0.71	-0.773	0	71.95	0	1.276	1.331	-0.055
146.7	41.508	-0.698	-0.569	0	74.07	0	1.278	1.333	-0.055
146.8	41.601	-0.718	-1.01	0	75.07	0	1.28	1.335	-0.055
146.9	41.7	-0.718	-0.731	0	75.96	0	1.282	1.337	-0.055
147	41.793	-0.735	0.159	0	75.92	0	1.284	1.339	-0.055
147.1	41.893	-0.713	-0.364	0	75.98	0	1.286	1.342	-0.055
147.2	41.992	-0.713	-1.222	0	75.98	0	1.288	1.344	-0.055
147.3	42.092	-0.713	-0.851	0	75.98	0	1.291	1.346	-0.055
147.4	42.185	-0.728	-0.936	0	76	0	1.293	1.348	-0.055
147.5	42.284	-0.728	-0.364	0	76.02	0	1.295	1.35	-0.055
147.6	42.384	-0.695	-0.198	0	75.94	0	1.297	1.352	-0.055
147.7	42.477	-0.683	-1.208	0	75.96	0	1.299	1.354	-0.055
147.8	42.576	-0.683	-1.056	0	75.89	0	1.301	1.356	-0.055
147.9	42.67	-0.72	-0.569	0	75.9	0	1.303	1.358	-0.055
148	42.763	-0.743	-0.424	0	75.9	0	1.305	1.361	-0.055
148.1	42.856	-0.743	0.131	0	75.12	0	1.307	1.363	-0.055
148.2	42.955	-0.73	-0.554	0	73.84	0	1.309	1.365	-0.055
148.3	43.042	-0.7	-1.261	0	73.24	0	1.312	1.367	-0.055
148.4	43.129	-0.7	-1.176	0	71.91	0	1.314	1.369	-0.055
148.5	43.229	-0.703	-0.643	0	70.68	0	1.315	1.371	-0.055
148.6	43.303	-0.683	-0.731	0	68.62	0	1.317	1.373	-0.055
148.7	43.39	-0.683	-1.137	0	63.41	0	1.319	1.374	-0.055
148.8	43.465	-0.705	-0.982	0	59.73	0	1.321	1.376	-0.055
148.9	43.539	-0.71	-0.011	0	55.42	0	1.322	1.378	-0.055
149	43.602	-0.71	-0.198	0	54.85	0	1.324	1.379	-0.055
149.1	43.658	-0.718	-0.731	0	53.68	0	1.325	1.381	-0.055
149.2	43.707	-0.718	-0.41	0	53.74	0	1.327	1.382	-0.055
149.3	43.763	-0.703	-0.48	0	53.53	0	1.328	1.384	-0.055
149.4	43.819	-0.71	-0.886	0	53.6	0	1.33	1.385	-0.055
149.5	43.869	-0.723	-0.802	0	53.57	0	1.331	1.387	-0.055
149.6	43.919	-0.723	-0.283	0	53.63	0	1.333	1.388	-0.055
149.7	43.974	-0.715	-0.897	0	53.49	0	1.334	1.39	-0.055
149.8	44.024	-0.715	-0.936	0	53.54	0	1.336	1.391	-0.055
149.9	44.074	-0.715	-0.569	0	52.82	0	1.337	1.392	-0.055
150	44.124	-0.698	-0.883	0	49.47	0	1.339	1.394	-0.055
150.1	44.173	-0.715	-1.042	0	45.96	0	1.34	1.395	-0.055
150.2	44.217	-0.715	-0.226	0	44.83	0	1.341	1.396	-0.055
150.3	44.26	-0.718	-0.784	0	44.95	0	1.342	1.398	-0.055

150.4	44.291	-0.715	-0.699	0	44.78	0	1.344	1.399	-0.055
150.5	44.329	-0.715	-0.328	0	43.82	0	1.345	1.4	-0.055
150.6	44.366	-0.705	-0.851	0	43.45	0	1.346	1.401	-0.055
150.7	44.403	-0.7	-0.936	0	42.48	0	1.347	1.402	-0.055
150.8	44.434	-0.7	-0.897	0	41.21	0	1.348	1.404	-0.055
150.9	44.465	-0.708	-0.424	0	39.96	0	1.349	1.405	-0.055
151	44.496	-0.7	-0.328	0	39.87	0	1.351	1.406	-0.055
151.1	44.521	-0.7	-0.844	0	39.92	0	1.352	1.407	-0.055
151.2	44.546	-0.71	-0.41	0	39.96	0	1.353	1.408	-0.055
151.3	44.577	-0.713	-0.272	0	39.72	0	1.354	1.409	-0.055
151.4	44.602	-0.713	-0.272	0	35.54	0	1.355	1.41	-0.055
151.5	44.627	-0.7	-0.982	0	29.46	0	1.356	1.411	-0.055
151.6	44.646	-0.713	-0.816	0	26.32	0	1.356	1.412	-0.055
151.7	44.652	-0.713	-0.244	0	25.58	0	1.357	1.412	-0.055
151.8	44.658	-0.693	-0.731	0	25.6	0	1.358	1.413	-0.055
151.9	44.652	-0.715	-1.307	0	25.5	0	1.359	1.414	-0.055
152	44.658	-0.715	-0.653	0	25.58	0	1.359	1.415	-0.055
152.1	44.652	-0.72	-0.18	0	25.49	0	1.36	1.415	-0.055
152.2	44.658	-0.72	-0.968	0	25.54	0	1.361	1.416	-0.055
152.3	44.658	-0.715	-0.699	0	25.51	0	1.361	1.417	-0.055
152.4	44.658	-0.7	-1.021	0	24.95	0	1.362	1.417	-0.055
152.5	44.658	-0.693	-1.021	0	24.91	0	1.363	1.418	-0.055
152.6	44.658	-0.693	-1.056	0	24.4	0	1.363	1.419	-0.055
152.7	44.658	-0.713	-0.569	0	24.3	0	1.364	1.419	-0.055
152.8	44.658	-0.71	-0.452	0	24.28	0	1.365	1.42	-0.055
152.9	44.652	-0.71	-0.667	0	24.28	0	1.366	1.421	-0.055
153	44.652	-0.713	-0.996	0	24.29	0	1.366	1.421	-0.055
153.1	44.652	-0.725	-0.569	0	24.23	0	1.367	1.422	-0.055
153.2	44.652	-0.725	-0.198	0	24.86	0	1.368	1.423	-0.055
153.3	44.652	-0.703	-0.897	0	25.41	0	1.368	1.423	-0.055
153.4	44.646	-0.7	-0.897	0	25.52	0	1.369	1.424	-0.055
153.5	44.652	-0.7	-0.569	0	26.35	0	1.37	1.425	-0.055
153.6	44.652	-0.703	-0.897	0	26.49	0	1.37	1.426	-0.055
153.7	44.652	-0.685	-0.731	0	27.53	0	1.371	1.426	-0.055
153.8	44.658	-0.685	-0.939	0	28.27	0	1.372	1.427	-0.055
153.9	44.664	-0.678	-1.07	0	30.23	0	1.373	1.428	-0.055
154	44.664	-0.698	-0.731	0	31.62	0	1.374	1.429	-0.055
154.1	44.677	-0.698	-0.569	0	31.83	0	1.375	1.43	-0.055
154.2	44.689	-0.71	-0.053	0	33.01	0	1.376	1.431	-0.055
154.3	44.701	-0.703	-0.844	0	34.88	0	1.376	1.432	-0.055
154.4	44.714	-0.703	-1.119	0	35.76	0	1.377	1.433	-0.055
154.5	44.733	-0.718	-0.364	0	36.68	0	1.378	1.434	-0.055
154.6	44.751	-0.718	-0.343	0	36.88	0	1.38	1.435	-0.055
154.7	44.77	-0.718	-0.526	0	38	0	1.381	1.436	-0.055
154.8	44.795	-0.698	-0.526	0	38.24	0	1.382	1.437	-0.055
154.9	44.813	-0.685	-1.07	0	38.17	0	1.383	1.438	-0.055
155	44.838	-0.685	-1.236	0	38.36	0	1.384	1.439	-0.055

155.1	44.863	-0.7	0.085	0	38.99	0	1.385	1.44	-0.055
155.2	44.888	-0.7	-0.212	0	38.95	0	1.386	1.441	-0.055
155.3	44.913	-0.69	-0.953	0	39.01	0	1.387	1.442	-0.055
155.4	44.938	-0.715	-0.466	0	39.85	0	1.388	1.443	-0.055
155.5	44.962	-0.733	-0.551	0	41.57	0	1.389	1.444	-0.055
155.6	44.987	-0.733	-0.014	0	41.76	0	1.39	1.446	-0.055
155.7	45.018	-0.705	-0.526	0	41.93	0	1.392	1.447	-0.055
155.8	45.043	-0.693	-0.809	0	42.72	0	1.393	1.448	-0.055
155.9	45.074	-0.693	-0.982	0	42.72	0	1.394	1.449	-0.055
156	45.105	-0.705	-0.614	0	41.74	0	1.395	1.45	-0.055
156.1	45.136	-0.715	-0.569	0	40.75	0	1.396	1.451	-0.055
156.2	45.167	-0.715	-0.745	0	40.81	0	1.397	1.453	-0.055
156.3	45.192	-0.718	-0.897	0	40.23	0	1.399	1.454	-0.055
156.4	45.223	-0.71	-0.897	0	39.35	0	1.4	1.455	-0.055
156.5	45.248	-0.71	-0.667	0	37.84	0	1.401	1.456	-0.055
156.6	45.273	-0.703	-1.091	0	37.47	0	1.402	1.457	-0.055
156.7	45.292	-0.698	-0.569	0	37.28	0	1.403	1.458	-0.055
156.8	45.31	-0.698	-0.569	0	37.78	0	1.404	1.459	-0.055
156.9	45.335	-0.71	-0.897	0	38.35	0	1.405	1.46	-0.055
157	45.354	-0.715	-0.328	0	38.88	0	1.406	1.461	-0.055
157.1	45.379	-0.715	-0.569	0	39.79	0	1.407	1.462	-0.055
157.2	45.397	-0.715	-0.667	0	40.52	0	1.408	1.463	-0.055
157.3	45.422	-0.718	-0.731	0	42.85	0	1.409	1.465	-0.055
157.4	45.447	-0.718	-0.703	0	44.65	0	1.411	1.466	-0.055
157.5	45.478	-0.71	-0.583	0	45.33	0	1.412	1.467	-0.055
157.6	45.509	-0.7	-0.897	0	45.54	0	1.413	1.468	-0.055
157.7	45.547	-0.7	-0.897	0	46.59	0	1.414	1.47	-0.055
157.8	45.578	-0.708	-0.897	0	47.39	0	1.416	1.471	-0.055
157.9	45.615	-0.698	-0.3	0	47.46	0	1.417	1.472	-0.055
158	45.652	-0.698	-1.07	0	48.47	0	1.418	1.474	-0.055
158.1	45.689	-0.705	-0.569	0	48.47	0	1.42	1.475	-0.055
158.2	45.727	-0.705	-0.569	0	48.47	0	1.421	1.476	-0.055
158.3	45.764	-0.698	-0.953	0	48.46	0	1.422	1.478	-0.055
158.4	45.801	-0.688	-0.897	0	48.55	0	1.424	1.479	-0.055
158.5	45.839	-0.698	-0.897	0	48.56	0	1.425	1.48	-0.055
158.6	45.882	-0.698	-0.858	0	48.54	0	1.426	1.482	-0.055
158.7	45.913	-0.715	0.131	0	48.42	0	1.428	1.483	-0.055
158.8	45.957	-0.7	-0.466	0	48.45	0	1.429	1.484	-0.055
158.9	45.988	-0.7	-1.021	0	48.51	0	1.431	1.486	-0.055
159	46.031	-0.703	-0.731	0	48.54	0	1.432	1.487	-0.055
159.1	46.068	-0.713	-0.745	0	48.59	0	1.433	1.488	-0.055
159.2	46.106	-0.713	-0.551	0	48.47	0	1.435	1.49	-0.055
159.3	46.143	-0.715	-0.494	0	48.4	0	1.436	1.491	-0.055
159.4	46.174	-0.725	-0.494	0	47.71	0	1.437	1.492	-0.055
159.5	46.211	-0.725	-0.745	0	47.4	0	1.439	1.494	-0.055
159.6	46.249	-0.7	-0.685	0	47.33	0	1.44	1.495	-0.055
159.7	46.286	-0.723	-1.321	0	47.46	0	1.441	1.496	-0.055

159.8	46.323	-0.723	-0.463	0	47.54	0	1.442	1.498	-0.055
159.9	46.354	-0.72	0.018	0	47.57	0	1.444	1.499	-0.055
160	46.385	-0.693	-0.83	0	47.61	0	1.445	1.5	-0.055
160.1	46.423	-0.693	-1.36	0	47.52	0	1.446	1.502	-0.055
160.2	46.46	-0.703	-1.01	0	47.38	0	1.448	1.503	-0.055
160.3	46.497	-0.71	-0.039	0	47.13	0	1.449	1.504	-0.055
160.4	46.528	-0.71	-0.039	0	45.54	0	1.45	1.506	-0.055
160.5	46.566	-0.693	-0.897	0	41.71	0	1.452	1.507	-0.055
160.6	46.597	-0.698	-1.155	0	39.01	0	1.453	1.508	-0.055
160.7	46.621	-0.698	-1.042	0	37.61	0	1.454	1.509	-0.055
160.8	46.64	-0.708	0.145	0	36.18	0	1.455	1.51	-0.055
160.9	46.659	-0.703	-0.569	0	34.25	0	1.456	1.511	-0.055
161	46.671	-0.703	-1.021	0	33.43	0	1.457	1.512	-0.055
161.1	46.684	-0.705	-0.614	0	33.3	0	1.457	1.513	-0.055
161.2	46.696	-0.698	-0.731	0	33.32	0	1.458	1.514	-0.055
161.3	46.702	-0.688	-1.208	0	33.28	0	1.459	1.515	-0.055
161.4	46.715	-0.708	-1.307	0	33.32	0	1.46	1.515	-0.055
161.5	46.727	-0.72	-0.699	0	33.24	0	1.461	1.516	-0.055
161.6	46.733	-0.72	-0.109	0	33.94	0	1.462	1.517	-0.055
161.7	46.746	-0.703	-0.671	0	34.17	0	1.463	1.518	-0.055
161.8	46.758	-0.713	-1.307	0	35.04	0	1.464	1.519	-0.055
161.9	46.771	-0.713	-0.569	0	35.74	0	1.465	1.52	-0.055
162	46.783	-0.713	-0.463	0	35.77	0	1.466	1.521	-0.055
162.1	46.795	-0.713	-0.855	0	36.04	0	1.467	1.522	-0.055
162.2	46.814	-0.72	-0.509	0	36.99	0	1.468	1.523	-0.055
162.3	46.827	-0.7	-0.77	0	39.15	0	1.469	1.524	-0.055
162.4	46.845	-0.71	-0.48	0	41.41	0	1.47	1.525	-0.055
162.5	46.864	-0.71	-0.48	0	51.96	0	1.472	1.527	-0.055
162.6	46.889	-0.708	-0.816	0	71.63	0	1.474	1.529	-0.055
162.7	46.92	-0.71	-0.816	0	64.73	0	1.475	1.531	-0.055
162.8	46.957	-0.71	-0.911	0	71.92	0	1.477	1.533	-0.055
162.9	47.001	-0.72	-0.244	0	111	0	1.481	1.536	-0.055
163	47.044	-0.708	-0.685	0	92.27	0	1.483	1.538	-0.055
163.1	47.075	-0.708	-1.056	0	42.55	0	1.484	1.54	-0.055
163.2	47.112	-0.685	-0.996	0	47.15	0	1.486	1.541	-0.055
163.3	47.143	-0.377	-0.071	0	46.23	0	1.487	1.542	-0.055
163.4	47.168	-0.377	-0.071	0	45.96	0	1.488	1.543	-0.055
163.5	47.193	-0.413	8.709	0	45.89	0	1.489	1.545	-0.055
163.6	47.218	-0.56	29.082	0	46.11	0	1.491	1.546	-0.055
163.7	47.243	-0.56	25.359	0	46.56	0	1.492	1.547	-0.055
163.8	47.268	-0.448	7.285	0	46.98	0	1.493	1.549	-0.055
163.9	47.299	-0.478	13.257	0	47.35	0	1.495	1.55	-0.055
164	47.324	-0.478	15.598	0	47.65	0	1.496	1.551	-0.055
164.1	47.348	-0.388	12.975	0	47.93	0	1.497	1.553	-0.055
164.2	47.373	-0.388	14.398	0	47.92	0	1.499	1.554	-0.055
164.3	47.398	-0.3	16.277	0	47.61	0	1.5	1.555	-0.055
164.4	47.429	-0.302	21.867	0	47.36	0	1.501	1.556	-0.055

164.5	47.454	-0.3	21.952	0	47.24	0	1.503	1.558	-0.055
164.6	47.479	-0.3	22.693	0	47.36	0	1.504	1.559	-0.055
164.7	47.51	-0.292	22.326	0	47.33	0	1.505	1.56	-0.055
164.8	47.535	-0.31	22.919	0	47.14	0	1.507	1.562	-0.055
164.9	47.56	-0.31	23.541	0	47.08	0	1.508	1.563	-0.055
165	47.591	-0.345	22.947	0	46.53	0	1.509	1.564	-0.055
165.1	47.616	-0.34	22.435	0	46.1	0	1.51	1.566	-0.055
165.2	47.641	-0.34	21.192	0	45.96	0	1.512	1.567	-0.055
165.3	47.665	-0.36	20.49	0	45.88	0	1.513	1.568	-0.055
165.4	47.69	-0.357	20.49	0	45.91	0	1.514	1.569	-0.055
165.5	47.715	-0.357	20.366	0	45.93	0	1.516	1.571	-0.055
165.6	47.74	-0.332	19.278	0	45.9	0	1.517	1.572	-0.055
165.7	47.765	-0.33	19.614	0	45.92	0	1.518	1.573	-0.055
165.8	47.79	-0.33	20.451	0	45.91	0	1.519	1.575	-0.055
165.9	47.815	-0.33	20.235	0	45.97	0	1.521	1.576	-0.055
166	47.839	-0.342	20.797	0	46.04	0	1.522	1.577	-0.055
166.1	47.858	-0.342	20.687	0	46.04	0	1.523	1.578	-0.055
166.2	47.883	-0.335	20.422	0	45.83	0	1.524	1.58	-0.055
166.3	47.914	-0.33	20.687	0	45.74	0	1.526	1.581	-0.055
166.4	47.939	-0.33	20.684	0	44.56	0	1.527	1.582	-0.055
166.5	47.957	-0.34	21.203	0	42.89	0	1.528	1.583	-0.055
166.6	47.982	-0.32	20.864	0	41.47	0	1.529	1.585	-0.055
166.7	48.001	-0.32	19.324	0	40.27	0	1.53	1.586	-0.055
166.8	48.02	-0.322	20.055	0	39.12	0	1.532	1.587	-0.055
166.9	48.032	-0.332	20.309	0	38.86	0	1.533	1.588	-0.055
167	48.044	-0.332	20.772	0	38.86	0	1.534	1.589	-0.055
167.1	48.057	-0.322	19.988	0	38.86	0	1.535	1.59	-0.055
167.2	48.075	-0.322	20.235	0	38.87	0	1.536	1.591	-0.055
167.3	48.082	-0.332	20.673	0	38.32	0	1.537	1.592	-0.055
167.4	48.094	-0.327	21.023	0	36.68	0	1.538	1.593	-0.055
167.5	48.107	-0.31	21.023	0	34.19	0	1.539	1.594	-0.055
167.6	48.113	-0.31	20.422	0	30.69	0	1.54	1.595	-0.055
167.7	48.119	-0.322	20.772	0	26.97	0	1.54	1.596	-0.055
167.8	48.119	-0.317	21.037	0	24.34	0	1.541	1.596	-0.055
167.9	48.113	-0.317	20.673	0	22.96	0	1.542	1.597	-0.055
168	48.1	-0.317	20.422	0	20.36	0	1.542	1.598	-0.055
168.1	48.088	-0.332	20.504	0	18.59	0	1.543	1.598	-0.055
168.2	48.069	-0.332	21.199	0	17.42	0	1.543	1.599	-0.055
168.3	48.044	-0.32	20.687	0	14.54	0	1.544	1.599	-0.055
168.4	48.026	-0.327	20.687	0	11.46	0	1.544	1.599	-0.055
168.5	47.995	-0.327	20.504	0	11.12	0	1.544	1.6	-0.055
168.6	47.957	-0.322	20.758	0	10.48	0	1.545	1.6	-0.055
168.7	47.92	-0.317	20.235	0	10.32	0	1.545	1.6	-0.055
168.8	47.889	-0.317	20.147	0	10.3	0	1.545	1.6	-0.055
168.9	47.852	-0.33	20.38	0	9.65	0	1.545	1.601	-0.055
169	47.815	-0.317	20.988	0	8.24	0	1.546	1.601	-0.055
169.1	47.783	-0.317	20.059	0	6.76	0	1.546	1.601	-0.055

169.2	47.74	-0.317	20.408	0	5.49	0	1.546	1.601	-0.055
169.3	47.696	-0.317	20.853	0	4.12	0	1.546	1.601	-0.055
169.4	47.659	-0.317	20.938	0	3.06	0	1.546	1.601	-0.055
169.5	47.603	-0.32	20.853	0	2.42	0	1.546	1.602	-0.055
169.6	47.56	-0.325	20.67	0	2.39	0	1.546	1.602	-0.055
169.7	47.51	-0.325	20.56	0	2.41	0	1.546	1.602	-0.055
169.8	47.454	-0.322	21.079	0	2.4	0	1.547	1.602	-0.055
169.9	47.404	-0.317	20.673	0	2.39	0	1.547	1.602	-0.055
170	47.355	-0.317	20.588	0	2.39	0	1.547	1.602	-0.055
170.1	47.305	-0.335	21.108	0	2.38	0	1.547	1.602	-0.055
170.2	47.255	-0.335	21.051	0	2.4	0	1.547	1.602	-0.055
170.3	47.206	-0.307	20.924	0	2.37	0	1.547	1.602	-0.055
170.4	47.162	-0.307	20.599	0	2.37	0	1.547	1.602	-0.055
170.5	47.106	-0.332	20.603	0	2.37	0	1.547	1.602	-0.055
170.6	47.063	-0.332	21.828	0	2.38	0	1.547	1.602	-0.055
170.7	47.007	-0.31	21.461	0	2.39	0	1.547	1.602	-0.055
170.8	46.957	-0.305	20.334	0	2.38	0	1.547	1.602	-0.055
170.9	46.914	-0.305	20.419	0	2.36	0	1.547	1.602	-0.055
171	46.864	-0.317	21.404	0	2.38	0	1.547	1.603	-0.055
171.1	46.808	-0.317	20.867	0	2.36	0	1.547	1.603	-0.055
171.2	46.764	-0.322	21.122	0	2.37	0	1.547	1.603	-0.055
171.3	46.708	-0.322	20.91	0	2.38	0	1.548	1.603	-0.055
171.4	46.665	-0.337	21.461	0	2.36	0	1.548	1.603	-0.055
171.5	46.615	-0.337	21.376	0	2.37	0	1.548	1.603	-0.055
171.6	46.566	-0.315	20.995	0	2.36	0	1.548	1.603	-0.055
171.7	46.516	-0.317	21.122	0	2.35	0	1.548	1.603	-0.055
171.8	46.466	-0.317	21.122	0	2.35	0	1.548	1.603	-0.055
171.9	46.416	-0.305	20.769	0	2.34	0	1.548	1.603	-0.055
172	46.373	-0.312	20.772	0	2.36	0	1.548	1.603	-0.055
172.1	46.323	-0.312	21.072	0	2.36	0	1.548	1.603	-0.055
172.2	46.267	-0.317	21.39	0	2.36	0	1.548	1.603	-0.055
172.3	46.224	-0.307	20.952	0	2.47	0	1.548	1.603	-0.055
172.4	46.174	-0.307	20.867	0	3.02	0	1.548	1.603	-0.055
172.5	46.124	-0.335	21.39	0	3.97	0	1.548	1.604	-0.055
172.6	46.075	-0.317	21.104	0	5	0	1.549	1.604	-0.055
172.7	46.031	-0.317	20.338	0	6.14	0	1.549	1.604	-0.055
172.8	45.988	-0.312	20.673	0	7.28	0	1.549	1.604	-0.055
172.9	45.944	-0.317	20.882	0	8.51	0	1.549	1.604	-0.055
173	45.907	-0.317	21.33	0	9.05	0	1.549	1.605	-0.055
173.1	45.876	-0.307	20.952	0	9.05	0	1.55	1.605	-0.055
173.2	45.832	-0.302	20.882	0	9.04	0	1.55	1.605	-0.055
173.3	45.801	-0.317	21.662	0	9.21	0	1.55	1.605	-0.055
173.4	45.764	-0.322	21.214	0	9.53	0	1.55	1.606	-0.055
173.5	45.727	-0.33	21.217	0	10.06	0	1.551	1.606	-0.055
173.6	45.696	-0.33	21.475	0	10.28	0	1.551	1.606	-0.055
173.7	45.658	-0.325	21.655	0	10.46	0	1.551	1.606	-0.055
173.8	45.634	-0.315	21.108	0	10.45	0	1.552	1.607	-0.055

173.9	45.602	-0.315	21.57	0	10.65	0	1.552	1.607	-0.055
174	45.571	-0.317	21.457	0	10.77	0	1.552	1.607	-0.055
174.1	45.54	-0.31	21.651	0	11.68	0	1.552	1.608	-0.055
174.2	45.503	-0.31	21.475	0	12.59	0	1.553	1.608	-0.055
174.3	45.472	-0.3	20.995	0	13.19	0	1.553	1.608	-0.055
174.4	45.447	-0.29	20.995	0	14.33	0	1.554	1.609	-0.055
174.5	45.416	-0.29	21.39	0	14.86	0	1.554	1.609	-0.055
174.6	45.391	-0.297	21.853	0	14.82	0	1.554	1.61	-0.055
174.7	45.366	-0.305	21.623	0	14.86	0	1.555	1.61	-0.055
174.8	45.348	-0.305	21.754	0	15.04	0	1.555	1.61	-0.055
174.9	45.323	-0.33	21.655	0	16.4	0	1.556	1.611	-0.055
175	45.298	-0.317	21.74	0	17.6	0	1.556	1.611	-0.055
175.1	45.273	-0.317	21.655	0	19.24	0	1.557	1.612	-0.055
175.2	45.261	-0.3	21.475	0	20.05	0	1.557	1.612	-0.055
175.3	45.242	-0.292	21.316	0	20.04	0	1.558	1.613	-0.055
175.4	45.23	-0.292	21.231	0	20	0	1.558	1.614	-0.055
175.5	45.211	-0.317	21.655	0	20.04	0	1.559	1.614	-0.055
175.6	45.199	-0.32	22.015	0	20.43	0	1.56	1.615	-0.055
175.7	45.186	-0.32	21.828	0	20.43	0	1.56	1.615	-0.055
175.8	45.174	-0.322	21.362	0	20.45	0	1.561	1.616	-0.055
175.9	45.155	-0.337	21.39	0	20.45	0	1.561	1.616	-0.055
176	45.143	-0.337	21.966	0	20.44	0	1.562	1.617	-0.055
176.1	45.124	-0.33	20.867	0	20.41	0	1.562	1.618	-0.055
176.2	45.118	-0.315	21.118	0	20.44	0	1.563	1.618	-0.055
176.3	45.105	-0.305	20.882	0	20.4	0	1.563	1.619	-0.055
176.4	45.093	-0.322	21.655	0	22.32	0	1.564	1.619	-0.055
176.5	45.08	-0.325	21.57	0	23.15	0	1.565	1.62	-0.055
176.6	45.068	-0.325	21.217	0	23.22	0	1.565	1.621	-0.055
176.7	45.062	-0.322	20.518	0	23.12	0	1.566	1.621	-0.055
176.8	45.056	-0.342	21.136	0	23.2	0	1.567	1.622	-0.055
176.9	45.043	-0.342	21.623	0	22.87	0	1.567	1.623	-0.055
177	45.037	-0.34	21.009	0	20.52	0	1.568	1.623	-0.055
177.1	45.031	-0.33	20.963	0	15.68	0	1.568	1.624	-0.055
177.2	45.018	-0.33	21.051	0	12.35	0	1.569	1.624	-0.055
177.3	44.993	-0.35	20.518	0	9.86	0	1.569	1.624	-0.055
177.4	44.969	-0.352	20.574	0	8.45	0	1.569	1.624	-0.055
177.5	44.931	-0.352	21.489	0	6.47	0	1.569	1.625	-0.055
177.6	44.894	-0.32	20.313	0	4.55	0	1.569	1.625	-0.055
177.7	44.863	-0.33	20.059	0	3.22	0	1.57	1.625	-0.055
177.8	44.82	-0.33	20.839	0	2.42	0	1.57	1.625	-0.055
177.9	44.776	-0.335	21.185	0	2.31	0	1.57	1.625	-0.055
178	44.726	-0.32	21.037	0	2.32	0	1.57	1.625	-0.055
178.1	44.677	-0.32	20.352	0	2.32	0	1.57	1.625	-0.055
178.2	44.627	-0.312	20.882	0	2.33	0	1.57	1.625	-0.055
178.3	44.59	-0.307	20.786	0	2.31	0	1.57	1.625	-0.055
178.4	44.54	-0.307	20.701	0	2.33	0	1.57	1.625	-0.055
178.5	44.49	-0.31	20.783	0	2.33	0	1.57	1.625	-0.055

178.6	44.44	-0.317	20.924	0	2.32	0	1.57	1.625	-0.055
178.7	44.397	-0.317	20.98	0	2.27	0	1.57	1.625	-0.055
178.8	44.347	-0.32	20.603	0	-2.5	0	1.57	1.625	-0.055
178.9	44.291	-0.315	20.786	0	-7.18	0	1.57	1.625	-0.055
179	44.217	-0.315	20.853	0	-8.48	0	1.57	1.625	-0.056
179.1	44.136	-0.32	21.051	0	-7.9	0	1.569	1.625	-0.056
179.2	44.055	-0.327	20.797	0	-7.74	0	1.569	1.625	-0.056
179.3	43.981	-0.337	20.504	0	-7.75	0	1.569	1.625	-0.056
179.4	43.906	-0.342	20.878	0	-7.69	0	1.569	1.625	-0.057
179.5	43.825	-0.322	20.963	0	-8.98	0	1.569	1.625	-0.057
179.6	43.751	-0.322	20.631	0	-13.29	0	1.568	1.625	-0.057
179.7	43.664	-0.312	20.147	0	-16.23	0	1.568	1.625	-0.058
179.8	43.564	-0.327	20.504	0	-17.55	0	1.567	1.625	-0.058
179.9	43.471	-0.327	21.316	0	-17.98	0	1.567	1.625	-0.059
180	43.372	-0.327	20.786	0	-17.7	0	1.566	1.625	-0.059
180.1	43.272	-0.327	20.504	0	-17.69	0	1.566	1.625	-0.06
180.2	43.173	-0.327	20.673	0	-17.55	0	1.565	1.625	-0.06
180.3	43.073	-0.32	20.853	0	-17.56	0	1.565	1.625	-0.061
180.4	42.974	-0.312	20.966	0	-17.46	0	1.564	1.625	-0.061
180.5	42.868	-0.312	20.617	0	-17.47	0	1.564	1.625	-0.062
180.6	42.781	-0.32	20.588	0	-17.35	0	1.563	1.625	-0.062
180.7	42.67	-0.322	21.023	0	-17.41	0	1.563	1.625	-0.063
180.8	42.576	-0.322	20.733	0	-17.47	0	1.562	1.625	-0.063
180.9	42.483	-0.33	20.504	0	-18.05	0	1.562	1.625	-0.064
181	42.384	-0.32	20.952	0	-17.93	0	1.561	1.625	-0.064
181.1	42.278	-0.32	20.599	0	-16.32	0	1.561	1.625	-0.064
181.2	42.172	-0.31	20.599	0	-11.62	0	1.561	1.625	-0.065
181.3	42.079	-0.33	20.896	0	-1.05	0	1.561	1.625	-0.065
181.4	42.011	-0.33	20.896	0	1.69	0	1.561	1.625	-0.065
181.5	41.955	-0.312	20.843	0	2.34	0	1.561	1.626	-0.065
181.6	41.905	-0.322	20.504	0	2.37	0	1.561	1.626	-0.065
181.7	41.862	-0.322	20.8	0	2.36	0	1.561	1.626	-0.065
181.8	41.818	-0.345	21.037	0	2.34	0	1.561	1.626	-0.065
181.9	41.775	-0.322	21.122	0	2.37	0	1.561	1.626	-0.065
182	41.725	-0.322	20.147	0	2.39	0	1.561	1.626	-0.065
182.1	41.682	-0.317	19.935	0	3.03	0	1.561	1.626	-0.065
182.2	41.638	-0.337	21.217	0	4.62	0	1.561	1.626	-0.065
182.3	41.601	-0.315	21.302	0	7.22	0	1.561	1.626	-0.065
182.4	41.564	-0.312	21.217	0	12.22	0	1.562	1.627	-0.065
182.5	41.526	-0.32	20.588	0	18.51	0	1.562	1.627	-0.065
182.6	41.508	-0.32	20.634	0	21.16	0	1.563	1.628	-0.065
182.7	41.501	-0.325	20.599	0	23.23	0	1.564	1.628	-0.065
182.8	41.489	-0.33	20.867	0	28.3	0	1.564	1.629	-0.065
182.9	41.489	-0.33	21.122	0	30.23	0	1.565	1.63	-0.065
183	41.495	-0.347	20.49	0	35.18	0	1.566	1.631	-0.065
183.1	41.508	-0.347	20.938	0	40.48	0	1.567	1.632	-0.065
183.2	41.526	-0.357	21.016	0	44.9	0	1.569	1.633	-0.065

183.3	41.564	-0.335	20.465	0	51.65	0	1.57	1.635	-0.065
183.4	41.607	-0.34	20.952	0	60.6	0	1.572	1.636	-0.065
183.5	41.657	-0.34	20.896	0	61.83	0	1.573	1.638	-0.065
183.6	41.719	-0.34	20.938	0	61.88	0	1.575	1.64	-0.065
183.7	41.793	-0.33	20.49	0	61.84	0	1.577	1.642	-0.065
183.8	41.868	-0.33	20.362	0	62.57	0	1.579	1.643	-0.065
183.9	41.943	-0.352	20.299	0	64.05	0	1.58	1.645	-0.065
184	41.998	-0.357	21.376	0	64.18	0	1.582	1.647	-0.065
184.1	42.079	-0.357	20.716	0	64.28	0	1.584	1.649	-0.065
184.2	42.148	-0.35	20.147	0	64.12	0	1.586	1.65	-0.065
184.3	42.222	-0.345	20.461	0	65.46	0	1.587	1.652	-0.065
184.4	42.291	-0.345	20.461	0	66.91	0	1.589	1.654	-0.065
184.5	42.371	-0.345	20.408	0	67.47	0	1.591	1.656	-0.065
184.6	42.452	-0.345	20.687	0	67.42	0	1.593	1.658	-0.065
184.7	42.527	-0.345	20.56	0	66.36	0	1.595	1.66	-0.065
184.8	42.607	-0.342	20.422	0	66.33	0	1.597	1.662	-0.065
184.9	42.682	-0.32	20.673	0	66.3	0	1.599	1.663	-0.065
185	42.75	-0.32	19.727	0	66.33	0	1.6	1.665	-0.065
185.1	42.825	-0.347	19.903	0	66.28	0	1.602	1.667	-0.065
185.2	42.899	-0.347	21.023	0	66.31	0	1.604	1.669	-0.065
185.3	42.974	-0.32	20.867	0	66.32	0	1.606	1.671	-0.065
185.4	43.042	-0.315	19.896	0	65.29	0	1.608	1.673	-0.065
185.5	43.117	-0.317	19.812	0	65.17	0	1.61	1.674	-0.065
185.6	43.192	-0.317	20.504	0	65.08	0	1.611	1.676	-0.065
185.7	43.26	-0.335	20.783	0	65.25	0	1.613	1.678	-0.065
185.8	43.328	-0.35	20.472	0	65.13	0	1.615	1.68	-0.065
185.9	43.403	-0.35	20.938	0	65.13	0	1.617	1.682	-0.065
186	43.477	-0.317	20.472	0	65.18	0	1.619	1.683	-0.065
186.1	43.539	-0.32	19.812	0	65.05	0	1.62	1.685	-0.065
186.2	43.614	-0.32	19.903	0	65.16	0	1.622	1.687	-0.065
186.3	43.689	-0.325	20.952	0	63.23	0	1.624	1.689	-0.065
186.4	43.757	-0.317	20.952	0	55.39	0	1.626	1.69	-0.065
186.5	43.819	-0.317	19.861	0	43.98	0	1.627	1.692	-0.065
186.6	43.863	-0.315	20.161	0	33.57	0	1.628	1.693	-0.065
186.7	43.894	-0.325	20.299	0	27.35	0	1.628	1.693	-0.065
186.8	43.906	-0.325	20.772	0	23.07	0	1.629	1.694	-0.065
186.9	43.912	-0.32	20.408	0	22	0	1.63	1.695	-0.065
187	43.9	-0.327	20.161	0	22.03	0	1.63	1.695	-0.065
187.1	43.894	-0.327	20.687	0	21.8	0	1.631	1.696	-0.065
187.2	43.881	-0.325	20.465	0	19.19	0	1.631	1.696	-0.065
187.3	43.881	-0.33	20.26	0	14.48	0	1.632	1.697	-0.065
187.4	43.863	-0.33	20.175	0	10.55	0	1.632	1.697	-0.065
187.5	43.844	-0.327	20.627	0	8.5	0	1.632	1.697	-0.065
187.6	43.813	-0.332	20.419	0	6.76	0	1.633	1.697	-0.065
187.7	43.782	-0.332	20.465	0	5.37	0	1.633	1.698	-0.065
187.8	43.745	-0.32	20.38	0	4.51	0	1.633	1.698	-0.065
187.9	43.707	-0.322	20.26	0	4.37	0	1.633	1.698	-0.065

188	43.664	-0.322	20.207	0	4.37	0	1.633	1.698	-0.065
188.1	43.614	-0.345	20.175	0	4.36	0	1.633	1.698	-0.065
188.2	43.577	-0.345	20.465	0	4.36	0	1.633	1.698	-0.065
188.3	43.539	-0.34	20.136	0	4.38	0	1.633	1.698	-0.065
188.4	43.496	-0.345	20.408	0	4.36	0	1.634	1.698	-0.065
188.5	43.452	-0.347	20.239	0	4.36	0	1.634	1.699	-0.065
188.6	43.415	-0.347	20.588	0	4.36	0	1.634	1.699	-0.065
188.7	43.372	-0.342	20.249	0	4.37	0	1.634	1.699	-0.065
188.8	43.334	-0.342	20.143	0	4.89	0	1.634	1.699	-0.065
188.9	43.285	-0.342	20.68	0	5.95	0	1.634	1.699	-0.065
189	43.254	-0.327	19.896	0	7.77	0	1.634	1.699	-0.065
189.1	43.21	-0.345	20.126	0	9.68	0	1.635	1.7	-0.065
189.2	43.173	-0.345	21.136	0	10.55	0	1.635	1.7	-0.065
189.3	43.142	-0.32	20.613	0	11.61	0	1.635	1.7	-0.065
189.4	43.111	-0.32	20.528	0	13.37	0	1.636	1.701	-0.065
189.5	43.086	-0.32	20.334	0	16.03	0	1.636	1.701	-0.065
189.6	43.067	-0.327	20.175	0	20.47	0	1.637	1.702	-0.065
189.7	43.049	-0.327	20.599	0	22.11	0	1.637	1.702	-0.065
189.8	43.042	-0.327	19.812	0	22.07	0	1.638	1.703	-0.065
189.9	43.036	-0.325	20.26	0	22.75	0	1.639	1.703	-0.065
190	43.024	-0.327	20.161	0	22.94	0	1.639	1.704	-0.065
190.1	43.024	-0.327	20.175	0	22.9	0	1.64	1.705	-0.065
190.2	43.011	-0.335	20.391	0	22.95	0	1.641	1.705	-0.065
190.3	43.011	-0.317	20.083	0	23.97	0	1.641	1.706	-0.065
190.4	43.005	-0.317	19.999	0	29.7	0	1.642	1.707	-0.065
190.5	43.005	-0.335	20.433	0	31.61	0	1.643	1.708	-0.065
190.6	43.011	-0.337	20.249	0	31.62	0	1.644	1.709	-0.065
190.7	43.024	-0.337	20.091	0	32.44	0	1.645	1.71	-0.065
190.8	43.03	-0.347	19.988	0	33.31	0	1.646	1.71	-0.065
190.9	43.042	-0.337	20.613	0	33.87	0	1.647	1.711	-0.065
191	43.061	-0.337	19.642	0	36.67	0	1.648	1.712	-0.065
191.1	43.073	-0.327	20.083	0	41.33	0	1.649	1.714	-0.065
191.2	43.098	-0.32	20.101	0	42.5	0	1.65	1.715	-0.065
191.3	43.123	-0.327	20.433	0	43.72	0	1.651	1.716	-0.065
191.4	43.154	-0.33	20.348	0	45.17	0	1.652	1.717	-0.065
191.5	43.192	-0.345	19.6	0	47.47	0	1.654	1.719	-0.065
191.6	43.223	-0.345	20.433	0	48.34	0	1.655	1.72	-0.065
191.7	43.266	-0.337	20.645	0	49.71	0	1.656	1.721	-0.065
191.8	43.31	-0.335	19.857	0	50.85	0	1.658	1.723	-0.065
191.9	43.347	-0.335	19.812	0	50.92	0	1.659	1.724	-0.065
192	43.397	-0.33	20.348	0	52.47	0	1.661	1.726	-0.065
192.1	43.44	-0.33	19.988	0	52.74	0	1.662	1.727	-0.065
192.2	43.49	-0.327	19.925	0	52.8	0	1.664	1.728	-0.065
192.3	43.533	-0.35	20.221	0	52.82	0	1.665	1.73	-0.065
192.4	43.583	-0.337	20.175	0	52.71	0	1.667	1.731	-0.065
192.5	43.639	-0.337	20.175	0	52.73	0	1.668	1.733	-0.065
192.6	43.682	-0.36	19.684	0	52.55	0	1.669	1.734	-0.065

192.7	43.726	-0.325	20.963	0	51.64	0	1.671	1.736	-0.065
192.8	43.776	-0.325	19.515	0	49.75	0	1.672	1.737	-0.065
192.9	43.819	-0.317	19.377	0	48.92	0	1.674	1.738	-0.065
193	43.863	-0.317	20.43	0	48.97	0	1.675	1.74	-0.065
193.1	43.9	-0.317	20.091	0	49.04	0	1.676	1.741	-0.065
193.2	43.937	-0.332	20.013	0	49.02	0	1.678	1.743	-0.065
193.3	43.981	-0.33	20.444	0	48.35	0	1.679	1.744	-0.065
193.4	44.024	-0.33	20.613	0	47.05	0	1.68	1.745	-0.065
193.5	44.068	-0.345	19.826	0	45.26	0	1.682	1.746	-0.065
193.6	44.099	-0.357	20.391	0	43.68	0	1.683	1.748	-0.065
193.7	44.13	-0.357	20.571	0	43.82	0	1.684	1.749	-0.065
193.8	44.167	-0.342	19.741	0	45.77	0	1.685	1.75	-0.065
193.9	44.192	-0.342	19.218	0	46.13	0	1.687	1.751	-0.065
194	44.223	-0.342	19.999	0	46.13	0	1.688	1.753	-0.065
194.1	44.26	-0.317	19.812	0	47.29	0	1.689	1.754	-0.065
194.2	44.298	-0.317	19.695	0	47.26	0	1.691	1.755	-0.065
194.3	44.335	-0.342	20.228	0	47.31	0	1.692	1.757	-0.065
194.4	44.372	-0.345	19.653	0	47.37	0	1.693	1.758	-0.065
194.5	44.403	-0.342	19.737	0	46.38	0	1.694	1.759	-0.065
194.6	44.447	-0.342	20.083	0	45.47	0	1.696	1.761	-0.065
194.7	44.478	-0.34	19.826	0	45.5	0	1.697	1.762	-0.065
194.8	44.509	-0.345	19.91	0	45.53	0	1.698	1.763	-0.065
194.9	44.54	-0.345	20.246	0	45.61	0	1.699	1.764	-0.065
195	44.571	-0.322	20.264	0	45.34	0	1.701	1.766	-0.065
195.1	44.602	-0.322	19.826	0	45.23	0	1.702	1.767	-0.065
195.2	44.639	-0.317	19.405	0	44.32	0	1.703	1.768	-0.065
195.3	44.677	-0.33	20.543	0	43.2	0	1.704	1.769	-0.065
195.4	44.701	-0.317	19.819	0	41.47	0	1.706	1.77	-0.065
195.5	44.726	-0.317	19.734	0	39.24	0	1.707	1.772	-0.065
195.6	44.751	-0.33	20.38	0	37.38	0	1.708	1.773	-0.065
195.7	44.776	-0.347	20.348	0	36.21	0	1.709	1.774	-0.065
195.8	44.788	-0.347	20.175	0	34.49	0	1.71	1.775	-0.065
195.9	44.807	-0.342	20.264	0	31.64	0	1.711	1.775	-0.065
196	44.82	-0.347	19.699	0	29.68	0	1.711	1.776	-0.065
196.1	44.826	-0.347	19.999	0	28.02	0	1.712	1.777	-0.065
196.2	44.832	-0.345	20.161	0	26.91	0	1.713	1.778	-0.065
196.3	44.832	-0.335	19.536	0	24.63	0	1.714	1.778	-0.065
196.4	44.826	-0.335	19.536	0	21.11	0	1.714	1.779	-0.065
196.5	44.826	-0.35	20.348	0	18.05	0	1.715	1.78	-0.065
196.6	44.813	-0.345	20.207	0	16.16	0	1.715	1.78	-0.065
196.7	44.801	-0.345	19.727	0	15.36	0	1.716	1.78	-0.065
196.8	44.782	-0.315	19.91	0	13.44	0	1.716	1.781	-0.065
196.9	44.757	-0.322	19.49	0	12.9	0	1.716	1.781	-0.065
197	44.733	-0.322	19.896	0	12.92	0	1.717	1.781	-0.065
197.1	44.708	-0.32	20.528	0	12.75	0	1.717	1.782	-0.065
197.2	44.683	-0.32	19.812	0	12.15	0	1.717	1.782	-0.065
197.3	44.652	-0.337	19.914	0	11.51	0	1.718	1.783	-0.065

197.4	44.621	-0.347	19.999	0	9.73	0	1.718	1.783	-0.065
197.5	44.596	-0.342	19.914	0	8.54	0	1.718	1.783	-0.065
197.6	44.565	-0.342	19.91	0	7.55	0	1.718	1.783	-0.065
197.7	44.534	-0.335	19.737	0	6.58	0	1.719	1.783	-0.065
197.8	44.496	-0.325	19.999	0	5.57	0	1.719	1.784	-0.065
197.9	44.459	-0.325	19.741	0	4.58	0	1.719	1.784	-0.065
198	44.422	-0.342	19.307	0	3.61	0	1.719	1.784	-0.065
198.1	44.378	-0.342	20.306	0	2.79	0	1.719	1.784	-0.065
198.2	44.335	-0.34	20.161	0	2.23	0	1.719	1.784	-0.065
198.3	44.291	-0.332	19.557	0	2.21	0	1.719	1.784	-0.065
198.4	44.242	-0.337	19.97	0	2.23	0	1.719	1.784	-0.065
198.5	44.192	-0.337	20.055	0	2.2	0	1.719	1.784	-0.065
198.6	44.142	-0.335	19.857	0	2.24	0	1.719	1.784	-0.065
198.7	44.099	-0.342	19.695	0	2.22	0	1.719	1.784	-0.065
198.8	44.055	-0.342	20.528	0	2.23	0	1.719	1.784	-0.065
198.9	44.012	-0.36	19.706	0	2.23	0	1.72	1.784	-0.065
199	43.962	-0.377	19.773	0	2.23	0	1.72	1.784	-0.065
199.1	43.912	-0.377	20.43	0	2.22	0	1.72	1.784	-0.065
199.2	43.869	-0.38	19.872	0	2.23	0	1.72	1.785	-0.065
199.3	43.819	-0.352	19.522	0	2.21	0	1.72	1.785	-0.065
199.4	43.776	-0.352	19.412	0	2.23	0	1.72	1.785	-0.065
199.5	43.732	-0.357	19.391	0	2.23	0	1.72	1.785	-0.065
199.6	43.689	-0.345	20.419	0	2.23	0	1.72	1.785	-0.065
199.7	43.645	-0.345	19.896	0	2.25	0	1.72	1.785	-0.065
199.8	43.595	-0.342	19.176	0	3.13	0	1.72	1.785	-0.065
199.9	43.552	-0.357	19.737	0	4.54	0	1.72	1.785	-0.065
200	43.502	-0.357	20.391	0	5.91	0	1.72	1.785	-0.065
200.1	43.465	-0.35	19.737	0	6.51	0	1.721	1.785	-0.065
200.2	43.428	-0.345	19.307	0	7.35	0	1.721	1.786	-0.065
200.3	43.39	-0.335	19.448	0	9.23	0	1.721	1.786	-0.065
200.4	43.359	-0.33	19.988	0	11.1	0	1.721	1.786	-0.065
200.5	43.328	-0.327	19.96	0	12.25	0	1.722	1.787	-0.065
200.6	43.297	-0.327	19.462	0	12.87	0	1.722	1.787	-0.065
200.7	43.272	-0.355	19.999	0	13.25	0	1.722	1.787	-0.065
200.8	43.247	-0.35	20.366	0	14	0	1.723	1.788	-0.065
200.9	43.229	-0.35	19.476	0	15.03	0	1.723	1.788	-0.065
201	43.204	-0.332	19.264	0	16.01	0	1.724	1.789	-0.065
201.1	43.185	-0.332	19.465	0	16.7	0	1.724	1.789	-0.065
201.2	43.167	-0.327	19.582	0	16.67	0	1.725	1.789	-0.065
201.3	43.148	-0.317	19.737	0	17.1	0	1.725	1.79	-0.065
201.4	43.129	-0.327	19.377	0	17.61	0	1.726	1.79	-0.065
201.5	43.117	-0.327	19.462	0	17.73	0	1.726	1.791	-0.065
201.6	43.105	-0.322	20.161	0	17.76	0	1.727	1.791	-0.065
201.7	43.086	-0.327	19.508	0	18.58	0	1.727	1.792	-0.065
201.8	43.073	-0.327	19.208	0	19.38	0	1.728	1.792	-0.065
201.9	43.061	-0.35	20.175	0	19.35	0	1.728	1.793	-0.065
202	43.049	-0.342	19.812	0	19.84	0	1.729	1.794	-0.065

202.1	43.036	-0.342	19.462	0	20.24	0	1.729	1.794	-0.065
202.2	43.024	-0.34	19.476	0	20.45	0	1.73	1.795	-0.065
202.3	43.018	-0.345	19.508	0	21.03	0	1.73	1.795	-0.065
202.4	43.011	-0.345	19.423	0	21.48	0	1.731	1.796	-0.065
202.5	42.999	-0.332	19.183	0	21.75	0	1.732	1.796	-0.065
202.6	42.993	-0.327	19.522	0	22.05	0	1.732	1.797	-0.065
202.7	42.986	-0.327	19.91	0	22.02	0	1.733	1.798	-0.065
202.8	42.98	-0.337	19.653	0	22.03	0	1.733	1.798	-0.065
202.9	42.974	-0.33	19.988	0	22.05	0	1.734	1.799	-0.065
203	42.968	-0.33	19.91	0	21.99	0	1.735	1.799	-0.065
203.1	42.962	-0.337	19.307	0	21.98	0	1.735	1.8	-0.065
203.2	42.955	-0.347	20.087	0	20.85	0	1.736	1.801	-0.065
203.3	42.949	-0.337	19.653	0	20.83	0	1.736	1.801	-0.065
203.4	42.943	-0.332	19.653	0	20.81	0	1.737	1.802	-0.065
203.5	42.931	-0.34	19.49	0	20.79	0	1.738	1.802	-0.065
203.6	42.924	-0.34	19.769	0	20.82	0	1.738	1.803	-0.065
203.7	42.912	-0.34	20.334	0	20.76	0	1.739	1.804	-0.065
203.8	42.906	-0.332	19.96	0	21.2	0	1.739	1.804	-0.065
203.9	42.899	-0.332	19.684	0	21.37	0	1.74	1.805	-0.065
204	42.893	-0.332	19.434	0	21.42	0	1.741	1.805	-0.065
204.1	42.881	-0.332	19.776	0	21.38	0	1.741	1.806	-0.065
204.2	42.875	-0.33	19.797	0	21.41	0	1.742	1.807	-0.065
204.3	42.868	-0.347	19.783	0	21.42	0	1.742	1.807	-0.065
204.4	42.862	-0.332	20.083	0	21.52	0	1.743	1.808	-0.065
204.5	42.856	-0.332	20.055	0	22.48	0	1.744	1.808	-0.065
204.6	42.85	-0.305	18.872	0	23.88	0	1.744	1.809	-0.065
204.7	42.837	-0.312	19.547	0	24.22	0	1.745	1.81	-0.065
204.8	42.837	-0.312	19.91	0	24.27	0	1.746	1.81	-0.065
204.9	42.831	-0.355	19.988	0	24.8	0	1.746	1.811	-0.065
205	42.831	-0.34	20.246	0	24.96	0	1.747	1.812	-0.065
205.1	42.825	-0.34	19.624	0	26.37	0	1.748	1.812	-0.065
205.2	42.825	-0.327	19.133	0	26.68	0	1.748	1.813	-0.065
205.3	42.831	-0.335	19.812	0	27.39	0	1.749	1.814	-0.065
205.4	42.831	-0.335	19.812	0	27.79	0	1.75	1.815	-0.065
205.5	42.837	-0.33	19.797	0	27.82	0	1.751	1.816	-0.065
205.6	42.837	-0.337	19.434	0	27.78	0	1.751	1.816	-0.065
205.7	42.844	-0.337	19.699	0	27.86	0	1.752	1.817	-0.065
205.8	42.85	-0.317	19.684	0	27.83	0	1.753	1.818	-0.065
205.9	42.85	-0.317	19.434	0	28.76	0	1.754	1.819	-0.065
206	42.856	-0.317	19.642	0	29.87	0	1.755	1.819	-0.065
206.1	42.862	-0.35	19.875	0	37.05	0	1.756	1.821	-0.065
206.2	42.875	-0.35	20.083	0	41.04	0	1.757	1.822	-0.065
206.3	42.893	-0.315	20.161	0	44.71	0	1.758	1.823	-0.065
206.4	42.924	-0.297	18.858	0	49.64	0	1.759	1.824	-0.065
206.5	42.955	-0.31	18.83	0	50.03	0	1.761	1.826	-0.065
206.6	42.999	-0.31	19.96	0	49.96	0	1.762	1.827	-0.065
206.7	43.042	-0.33	20.083	0	50.05	0	1.764	1.828	-0.065

206.8	43.092	-0.325	19.812	0	50.06	0	1.765	1.83	-0.065
206.9	43.136	-0.325	19.624	0	50.64	0	1.766	1.831	-0.065
207	43.179	-0.335	19.264	0	52.1	0	1.768	1.833	-0.065
207.1	43.229	-0.335	19.783	0	52.11	0	1.769	1.834	-0.065
207.2	43.272	-0.337	19.307	0	52.6	0	1.771	1.836	-0.065
207.3	43.322	-0.332	19.928	0	54.51	0	1.772	1.837	-0.065
207.4	43.372	-0.325	19.292	0	56.45	0	1.774	1.839	-0.065
207.5	43.428	-0.325	19.264	0	58.61	0	1.775	1.84	-0.065
207.6	43.477	-0.335	19.956	0	58.53	0	1.777	1.842	-0.065
207.7	43.533	-0.312	20.179	0	58.35	0	1.779	1.844	-0.065
207.8	43.595	-0.312	19.01	0	58.42	0	1.78	1.845	-0.065
207.9	43.651	-0.33	19.278	0	57.08	0	1.782	1.847	-0.065
208	43.713	-0.325	20.218	0	53.86	0	1.783	1.848	-0.065
208.1	43.769	-0.325	19.434	0	48.48	0	1.785	1.85	-0.065
208.2	43.813	-0.327	19.451	0	41.83	0	1.786	1.851	-0.065
208.3	43.856	-0.35	20.073	0	39.29	0	1.787	1.852	-0.065
208.4	43.881	-0.35	19.96	0	39.39	0	1.788	1.853	-0.065
208.5	43.906	-0.35	19.709	0	38.73	0	1.789	1.854	-0.065
208.6	43.931	-0.332	19.543	0	36.02	0	1.79	1.855	-0.065
208.7	43.95	-0.332	18.915	0	26.99	0	1.791	1.856	-0.065
208.8	43.968	-0.347	19.522	0	12.18	0	1.791	1.856	-0.065
208.9	43.968	-0.35	20.101	0	6.86	0	1.791	1.856	-0.065
209	43.943	-0.35	20.006	0	4.74	0	1.792	1.856	-0.065
209.1	43.912	-0.325	19.352	0	3.35	0	1.792	1.857	-0.065
209.2	43.869	-0.32	19.095	0	2.41	0	1.792	1.857	-0.065
209.3	43.825	-0.337	20.161	0	2.2	0	1.792	1.857	-0.065
209.4	43.776	-0.35	19.624	0	2.2	0	1.792	1.857	-0.065
209.5	43.72	-0.342	19.709	0	2.22	0	1.792	1.857	-0.065
209.6	43.682	-0.342	20.002	0	2.21	0	1.792	1.857	-0.065
209.7	43.639	-0.337	19.593	0	2.21	0	1.792	1.857	-0.065
209.8	43.589	-0.32	19.684	0	2.24	0	1.792	1.857	-0.065
209.9	43.546	-0.32	19.176	0	2.21	0	1.792	1.857	-0.065
210	43.502	-0.317	19.091	0	2.23	0	1.792	1.857	-0.065
210.1	43.452	-0.317	19.861	0	-3.19	0	1.792	1.857	-0.065
210.2	43.39	-0.315	19.642	0	-12.8	0	1.792	1.857	-0.065
210.3	43.303	-0.332	19.462	0	-15.34	0	1.791	1.857	-0.066
210.4	43.198	-0.337	19.988	0	-15.51	0	1.791	1.857	-0.066
210.5	43.092	-0.337	19.988	0	-15.44	0	1.791	1.857	-0.067
210.6	42.993	-0.345	19.268	0	-15.36	0	1.79	1.857	-0.067
210.7	42.912	-0.335	19.617	0	-15.31	0	1.79	1.857	-0.067
210.8	42.819	-0.335	18.989	0	-15.25	0	1.789	1.857	-0.068
210.9	42.725	-0.32	19.434	0	-15.35	0	1.789	1.857	-0.068
211	42.632	-0.325	19.091	0	-16.7	0	1.788	1.857	-0.069
211.1	42.539	-0.325	19.48	0	-19.33	0	1.788	1.857	-0.069
211.2	42.433	-0.347	19.727	0	-19.8	0	1.787	1.857	-0.07
211.3	42.315	-0.317	19.847	0	-19.74	0	1.787	1.857	-0.07
211.4	42.216	-0.317	19.872	0	-19.63	0	1.786	1.857	-0.071

211.5	42.117	-0.327	19.434	0	-18.24	0	1.786	1.857	-0.071
211.6	42.011	-0.332	19.797	0	-15.2	0	1.785	1.857	-0.072
211.7	41.918	-0.332	19.614	0	-13.68	0	1.785	1.857	-0.072
211.8	41.824	-0.355	19.843	0	-13.44	0	1.784	1.857	-0.073
211.9	41.738	-0.423	19.352	0	-13.39	0	1.784	1.857	-0.073
212	41.651	-0.423	19.628	0	-13.42	0	1.784	1.857	-0.073
212.1	41.551	-0.495	17.82	0	-13.58	0	1.783	1.857	-0.074
212.2	41.464	-0.445	11.276	0	-13.57	0	1.783	1.857	-0.074
212.3	41.383	-0.46	12.314	0	-13.53	0	1.783	1.857	-0.074
212.4	41.296	-0.463	13.331	0	-13.53	0	1.782	1.857	-0.075
212.5	41.209	-0.455	13.222	0	-13.46	0	1.782	1.857	-0.075
212.6	41.122	-0.455	12.893	0	-13.41	0	1.781	1.857	-0.076
212.7	41.035	-0.433	13.091	0	-13.42	0	1.781	1.857	-0.076
212.8	40.948	-0.438	12.787	0	-13.33	0	1.781	1.857	-0.076
212.9	40.849	-0.438	13.271	0	-13.36	0	1.78	1.857	-0.077
213	40.774	-0.458	14.041	0	-13.29	0	1.78	1.857	-0.077
213.1	40.687	-0.458	13.342	0	-13.31	0	1.78	1.857	-0.077
213.2	40.6	-0.455	12.572	0	-12.79	0	1.779	1.857	-0.078
213.3	40.513	-0.443	12.547	0	-8.53	0	1.779	1.857	-0.078
213.4	40.433	-0.463	13.744	0	0	0	1.779	1.857	-0.078
213.5	40.358	-0.463	13.826	0	1.98	0	1.779	1.857	-0.078
213.6	40.308	-0.46	14.073	0	2.31	0	1.779	1.857	-0.078
213.7	40.265	-0.453	12.823	0	2.3	0	1.779	1.857	-0.078
213.8	40.228	-0.453	12.325	0	2.29	0	1.779	1.857	-0.078
213.9	40.184	-0.48	13.282	0	2.31	0	1.779	1.857	-0.078
214	40.134	-0.475	13.247	0	2.29	0	1.779	1.857	-0.078
214.1	40.097	-0.475	12.169	0	2.34	0	1.779	1.858	-0.078
214.2	40.06	-0.48	11.502	0	3.12	0	1.78	1.858	-0.078
214.3	40.01	-0.505	11.347	0	5.12	0	1.78	1.858	-0.078
214.4	39.973	-0.505	11.371	0	8.88	0	1.78	1.858	-0.078
214.5	39.936	-0.51	11.724	0	16.52	0	1.78	1.858	-0.078
214.6	39.911	-0.518	10.432	0	26.15	0	1.781	1.859	-0.078
214.7	39.904	-0.518	9.906	0	28.11	0	1.782	1.86	-0.078
214.8	39.911	-0.52	10.079	0	33.52	0	1.783	1.861	-0.078
214.9	39.923	-0.525	9.09	0	40.81	0	1.784	1.862	-0.078
215	39.942	-0.525	8.497	0	45.17	0	1.785	1.863	-0.078
215.1	39.979	-0.565	8.737	0	49.38	0	1.787	1.865	-0.078
215.2	40.029	-0.565	8.101	0	51.65	0	1.788	1.866	-0.078
215.3	40.078	-0.543	6.908	0	52.41	0	1.79	1.868	-0.078
215.4	40.134	-0.545	7.324	0	55	0	1.791	1.869	-0.078
215.5	40.19	-0.565	7.24	0	56.88	0	1.793	1.871	-0.078
215.6	40.259	-0.565	7.229	0	58.02	0	1.794	1.872	-0.078
215.7	40.321	-0.59	7.497	0	62.64	0	1.796	1.874	-0.078
215.8	40.389	-0.598	5.53	0	66.4	0	1.798	1.876	-0.078
215.9	40.457	-0.598	5.361	0	51.13	0	1.799	1.877	-0.078
216	40.532	-0.578	6.155	0	38.25	0	1.8	1.878	-0.078
216.1	40.6	-0.578	3.101	0	33.74	0	1.801	1.879	-0.078

216.2	40.663	-0.555	4.679	0	30.9	0	1.802	1.88	-0.078
216.3	40.725	-0.247	7.324	0	32.45	0	1.803	1.881	-0.078
216.4	40.793	-0.227	20.295	0	24.56	0	1.804	1.882	-0.078
216.5	40.861	-0.227	20.211	0	26.96	0	1.804	1.882	-0.078
216.6	40.905	-0.232	25.882	0	35.28	0	1.805	1.883	-0.078
216.7	40.948	-0.255	24.607	0	42.95	0	1.807	1.885	-0.078
216.8	40.992	-0.255	24.77	0	50.08	0	1.808	1.886	-0.078
216.9	41.048	-0.347	24.685	0	54.08	0	1.809	1.888	-0.078
217	41.104	-0.398	22.658	0	56.54	0	1.811	1.889	-0.078
217.1	41.153	-0.398	19.872	0	33.23	0	1.812	1.89	-0.078
217.2	41.197	-0.45	16.993	0	23.65	0	1.813	1.891	-0.078
217.3	41.247	-0.423	14.228	0	29.88	0	1.813	1.892	-0.078
217.4	41.303	-0.423	14.144	0	34.02	0	1.814	1.892	-0.078
217.5	41.34	-0.53	14.486	0	36.47	0	1.815	1.893	-0.078
217.6	41.383	-0.565	14.144	0	38.56	0	1.816	1.895	-0.078
217.7	41.421	-0.565	10.33	0	40.61	0	1.818	1.896	-0.078
217.8	41.47	-0.545	7.826	0	41.68	0	1.819	1.897	-0.078
217.9	41.514	-0.558	7.826	0	43.43	0	1.82	1.898	-0.078
218	41.564	-0.558	9.429	0	49.25	0	1.821	1.899	-0.078
218.1	41.613	-0.523	7.801	0	51.07	0	1.823	1.901	-0.078
218.2	41.675	-0.523	7.497	0	50.36	0	1.824	1.902	-0.078
218.3	41.738	-0.523	8.091	0	51.07	0	1.826	1.904	-0.078
218.4	41.806	-0.538	8.076	0	51.78	0	1.827	1.905	-0.078
218.5	41.868	-0.54	8.076	0	51.32	0	1.828	1.907	-0.078
218.6	41.936	-0.54	8.076	0	49.83	0	1.83	1.908	-0.078
218.7	41.998	-0.553	7.215	0	47.18	0	1.831	1.909	-0.078
218.8	42.067	-0.53	7.349	0	42.85	0	1.832	1.91	-0.078
218.9	42.135	-0.53	7.582	0	39.57	0	1.833	1.912	-0.078
219	42.204	-0.453	7.84	0	36.55	0	1.834	1.913	-0.078
219.1	42.278	-0.453	9.556	0	33.84	0	1.835	1.913	-0.078
219.2	42.346	-0.44	11.841	0	31.22	0	1.836	1.914	-0.078
219.3	42.421	-0.395	13.511	0	28.73	0	1.837	1.915	-0.078
219.4	42.489	-0.355	15.828	0	26.58	0	1.838	1.916	-0.078
219.5	42.558	-0.355	15.856	0	23.65	0	1.838	1.917	-0.078
219.6	42.638	-0.335	17.022	0	19.87	0	1.839	1.917	-0.078
219.7	42.701	-0.327	18.568	0	16.79	0	1.839	1.918	-0.078
219.8	42.769	-0.327	19.974	0	15.11	0	1.84	1.918	-0.078
219.9	42.837	-0.27	20.295	0	11.67	0	1.84	1.918	-0.078
220	42.912	-0.257	21.164	0	5.58	0	1.84	1.918	-0.078
220.1	42.968	-0.257	23	0	-1.46	0	1.84	1.918	-0.078
220.2	43.03	-0.237	24.24	0	-2.61	0	1.84	1.918	-0.078
220.3	43.073	-0.192	24.597	0	-4.19	0	1.84	1.918	-0.078
220.4	43.117	-0.192	24.681	0	-6.06	0	1.84	1.918	-0.078
220.5	43.154	-0.195	27.09	0	-9.04	0	1.84	1.918	-0.079
220.6	43.192	-0.195	28.344	0	-11.08	0	1.839	1.918	-0.079
220.7	43.216	-0.195	27.722	0	-11.08	0	1.839	1.918	-0.079
220.8	43.241	-0.18	28.132	0	-11.12	0	1.839	1.918	-0.08

220.9	43.272	-0.17	28.605	0	-11.12	0	1.838	1.918	-0.08
221	43.303	-0.17	28.665	0	-11.12	0	1.838	1.918	-0.08
221.1	43.328	-0.177	28.637	0	-11.14	0	1.838	1.918	-0.081
221.2	43.359	-0.177	29.59	0	-11.04	0	1.838	1.918	-0.081
221.3	43.384	-0.172	30.346	0	-10.93	0	1.837	1.918	-0.081
221.4	43.409	-0.155	28.492	0	-10.66	0	1.837	1.918	-0.081
221.5	43.434	-0.16	28.492	0	-9.9	0	1.837	1.918	-0.082
221.6	43.465	-0.16	29.346	0	-6.42	0	1.837	1.918	-0.082
221.7	43.49	-0.177	29.837	0	-4.83	0	1.836	1.918	-0.082
221.8	43.521	-0.177	29.565	0	-4.1	0	1.836	1.918	-0.082
221.9	43.552	-0.177	29.753	0	-4.26	0	1.836	1.918	-0.082
222	43.583	-0.152	29.477	0	-15.47	0	1.836	1.918	-0.083
222.1	43.62	-0.152	29.753	0	-14.87	0	1.835	1.918	-0.083
222.2	43.658	-0.155	30.784	0	-13.62	0	1.835	1.918	-0.084
222.3	43.676	-0.152	31.232	0	-10.92	0	1.835	1.918	-0.084
222.4	43.707	-0.17	31.105	0	-8.97	0	1.834	1.918	-0.084
222.5	43.732	-0.17	31.105	0	-7.41	0	1.834	1.918	-0.084
222.6	43.763	-0.2	30.346	0	-5.81	0	1.834	1.918	-0.084
222.7	43.788	-0.202	29.576	0	-1.74	0	1.834	1.918	-0.084
222.8	43.825	-0.202	28.386	0	-2.54	0	1.834	1.918	-0.085
222.9	43.856	-0.202	28.132	0	-4.13	0	1.834	1.918	-0.085
223	43.9	-0.212	27.489	0	-4.12	0	1.834	1.918	-0.085
223.1	43.943	-0.212	26.97	0	-4.21	0	1.834	1.918	-0.085
223.2	43.987	-0.192	27.323	0	-4.5	0	1.833	1.918	-0.085
223.3	44.024	-0.165	27.768	0	-4.77	0	1.833	1.918	-0.085
223.4	44.068	-0.165	27.849	0	-4.94	0	1.833	1.918	-0.085
223.5	44.105	-0.16	29.569	0	-4.94	0	1.833	1.918	-0.085
223.6	44.142	-0.157	29.565	0	-4.91	0	1.833	1.918	-0.086
223.7	44.186	-0.157	30.201	0	-5.23	0	1.833	1.918	-0.086
223.8	44.223	-0.16	30.187	0	-5.54	0	1.833	1.918	-0.086
223.9	44.26	-0.16	30.3	0	-5.81	0	1.832	1.918	-0.086
224	44.304	-0.16	30.201	0	-5.36	0	1.832	1.918	-0.086
224.1	44.341	-0.162	30.261	0	-4.8	0	1.832	1.918	-0.086
224.2	44.378	-0.147	29.799	0	-3.56	0	1.832	1.918	-0.086
224.3	44.422	-0.135	29.467	0	-5.86	0	1.832	1.918	-0.087
224.4	44.472	-0.14	29.382	0	-6.18	0	1.832	1.918	-0.087
224.5	44.515	-0.145	30.526	0	-6.19	0	1.832	1.918	-0.087
224.6	44.559	-0.145	30.544	0	-6.7	0	1.831	1.918	-0.087
224.7	44.602	-0.13	29.587	0	-6.66	0	1.831	1.918	-0.087
224.8	44.646	-0.137	30.413	0	-7.21	0	1.831	1.918	-0.087
224.9	44.689	-0.137	31.571	0	-8.12	0	1.831	1.918	-0.088
225	44.733	-0.092	31.07	0	-8.34	0	1.83	1.918	-0.088
225.1	44.776	-0.092	31.01	0	-8.33	0	1.83	1.918	-0.088
225.2	44.82	-0.097	32.108	0	-7.19	0	1.83	1.918	-0.088
225.3	44.857	-0.122	32.8	0	-6.98	0	1.83	1.918	-0.089
225.4	44.894	-0.117	31.638	0	-6.91	0	1.83	1.918	-0.089
225.5	44.938	-0.117	31.557	0	-6.85	0	1.829	1.918	-0.089

225.6	44.975	-0.135	30.653	0	-7.13	0	1.829	1.918	-0.089
225.7	45.012	-0.142	30.618	0	-7.18	0	1.829	1.918	-0.089
225.8	45.049	-0.142	30.441	0	-7.63	0	1.829	1.918	-0.09
225.9	45.087	-0.16	30.236	0	-7.73	0	1.829	1.918	-0.09
226	45.124	-0.155	30.321	0	-7.41	0	1.828	1.918	-0.09
226.1	45.161	-0.155	29.947	0	-7.2	0	1.828	1.918	-0.09
226.2	45.186	-0.15	29.502	0	-7.11	0	1.828	1.918	-0.09
226.3	45.223	-0.177	29.862	0	-7.08	0	1.828	1.918	-0.091
226.4	45.254	-0.177	29.947	0	-6.95	0	1.828	1.918	-0.091
226.5	45.292	-0.152	29.749	0	-6.8	0	1.827	1.918	-0.091
226.6	45.329	-0.142	28.898	0	-6.7	0	1.827	1.918	-0.091
226.7	45.366	-0.142	28.64	0	-6.62	0	1.827	1.918	-0.091
226.8	45.404	-0.157	29.947	0	-6.57	0	1.827	1.918	-0.092
226.9	45.435	-0.145	29.837	0	-6.67	0	1.827	1.918	-0.092
227	45.472	-0.145	29.078	0	-6.55	0	1.827	1.918	-0.092
227.1	45.509	-0.167	29.262	0	-6.18	0	1.826	1.918	-0.092
227.2	45.54	-0.167	29.972	0	-6.15	0	1.826	1.918	-0.092
227.3	45.578	-0.14	29.262	0	-6.16	0	1.826	1.918	-0.092
227.4	45.615	-0.155	29.76	0	-6.14	0	1.826	1.918	-0.093
227.5	45.646	-0.17	29.675	0	-6.14	0	1.826	1.918	-0.093
227.6	45.683	-0.17	29.611	0	-5.97	0	1.826	1.918	-0.093
227.7	45.72	-0.147	29.77	0	-5.74	0	1.825	1.918	-0.093
227.8	45.758	-0.137	29.036	0	-4.8	0	1.825	1.918	-0.093
227.9	45.795	-0.137	29.541	0	-3.55	0	1.825	1.918	-0.093
228	45.832	-0.135	30.886	0	-2.56	0	1.825	1.918	-0.093
228.1	45.87	-0.135	30.625	0	-1.73	0	1.825	1.918	-0.093
228.2	45.913	-0.15	31.031	0	-1.27	0	1.825	1.918	-0.093
228.3	45.95	-0.152	30.607	0	-0.62	0	1.825	1.918	-0.093
228.4	45.994	-0.167	30.039	0	0	0	1.825	1.918	-0.093
228.5	46.044	-0.167	30.095	0	-0.55	0	1.825	1.918	-0.093
228.6	46.093	-0.14	30.335	0	-1.39	0	1.825	1.918	-0.094
228.7	46.149	-0.11	30.219	0	-3.53	0	1.825	1.918	-0.094
228.8	46.205	-0.11	30.593	0	-4.89	0	1.825	1.918	-0.094
228.9	46.255	-0.072	31.232	0	-4.75	0	1.825	1.918	-0.094
229	46.311	-0.062	32.666	0	-5.09	0	1.824	1.918	-0.094
229.1	46.361	-0.062	33.69	0	-5.27	0	1.824	1.918	-0.094
229.2	46.416	-0.052	34.1	0	-6.11	0	1.824	1.918	-0.094
229.3	46.472	-0.062	35.375	0	-6.79	0	1.824	1.918	-0.095
229.4	46.522	-0.062	35.403	0	-6.75	0	1.824	1.918	-0.095
229.5	46.578	-0.035	35.873	0	-6.65	0	1.824	1.918	-0.095
229.6	46.628	-0.04	35.926	0	-6.67	0	1.823	1.918	-0.095
229.7	46.677	-0.04	35.961	0	-6.53	0	1.823	1.918	-0.095
229.8	46.727	-0.065	36.07	0	-7.93	0	1.823	1.918	-0.096
229.9	46.777	-0.057	36.346	0	-8.46	0	1.823	1.918	-0.096
230	46.82	-0.057	35.777	0	-7.61	0	1.822	1.918	-0.096
230.1	46.864	-0.05	35.276	0	-7.73	0	1.822	1.918	-0.096
230.2	46.901	-0.062	35.375	0	-8.25	0	1.822	1.918	-0.096

230.3	46.938	-0.13	35.569	0	-8.08	0	1.822	1.918	-0.097
230.4	46.969	-0.14	33.005	0	-7.87	0	1.822	1.918	-0.097
230.5	47.001	-0.13	33.09	0	-7.57	0	1.821	1.918	-0.097
230.6	47.038	-0.13	31.921	0	-7.41	0	1.821	1.918	-0.097
230.7	47.069	-0.127	31.716	0	-7.19	0	1.821	1.918	-0.097
230.8	47.1	-0.137	31.628	0	-7.25	0	1.821	1.918	-0.098
230.9	47.137	-0.137	31.653	0	-7.25	0	1.821	1.918	-0.098
231	47.168	-0.132	31.042	0	-8.72	0	1.82	1.918	-0.098
231.1	47.199	-0.132	31.027	0	-13.48	0	1.82	1.918	-0.098
231.2	47.23	-0.145	31.903	0	-15.46	0	1.82	1.918	-0.099
231.3	47.249	-0.142	31.529	0	-15.47	0	1.819	1.918	-0.099
231.4	47.261	-0.147	31.088	0	-15.51	0	1.819	1.918	-0.1
231.5	47.274	-0.147	30.978	0	-15.54	0	1.818	1.918	-0.1
231.6	47.293	-0.152	31.193	0	-15.69	0	1.818	1.918	-0.101
231.7	47.305	-0.135	30.989	0	-15.72	0	1.817	1.918	-0.101
231.8	47.324	-0.135	30.431	0	-15.62	0	1.817	1.918	-0.101
231.9	47.342	-0.137	31.151	0	-15.84	0	1.817	1.918	-0.102
232	47.361	-0.135	31.645	0	-16.03	0	1.816	1.918	-0.102
232.1	47.373	-0.135	31.557	0	-16	0	1.816	1.918	-0.103
232.2	47.386	-0.147	31.593	0	-16.06	0	1.815	1.918	-0.103
232.3	47.404	-0.127	31.783	0	-15.98	0	1.815	1.918	-0.104
232.4	47.417	-0.127	31.049	0	-16.83	0	1.814	1.918	-0.104
232.5	47.435	-0.147	31.554	0	-19.37	0	1.814	1.918	-0.105
232.6	47.442	-0.147	32.066	0	-20.91	0	1.813	1.918	-0.105
232.7	47.448	-0.147	31.557	0	-21.92	0	1.813	1.918	-0.106
232.8	47.454	-0.155	31.352	0	-23.52	0	1.812	1.918	-0.107
232.9	47.448	-0.127	31.437	0	-24.26	0	1.811	1.918	-0.107
233	47.448	-0.127	30.639	0	-24.49	0	1.811	1.918	-0.108
233.1	47.442	-0.132	30.699	0	-24.54	0	1.81	1.918	-0.109
233.2	47.435	-0.145	31.73	0	-24.49	0	1.809	1.918	-0.109
233.3	47.429	-0.14	31.013	0	-25.77	0	1.808	1.918	-0.11
233.4	47.423	-0.137	31.013	0	-28.91	0	1.808	1.918	-0.111
233.5	47.417	-0.125	31.137	0	-29.89	0	1.807	1.918	-0.112
233.6	47.398	-0.125	31.137	0	-29.92	0	1.806	1.918	-0.112
233.7	47.38	-0.137	31.056	0	-29.89	0	1.805	1.918	-0.113
233.8	47.367	-0.142	31.338	0	-29.95	0	1.804	1.918	-0.114
233.9	47.348	-0.142	31.137	0	-30.07	0	1.803	1.918	-0.115
234	47.33	-0.155	31.176	0	-29.94	0	1.803	1.918	-0.116
234.1	47.311	-0.155	31.54	0	-29.9	0	1.802	1.918	-0.117
234.2	47.293	-0.152	31.176	0	-29.85	0	1.801	1.918	-0.117
234.3	47.274	-0.12	31.261	0	-29.81	0	1.8	1.918	-0.118
234.4	47.255	-0.127	31.063	0	-29.81	0	1.799	1.918	-0.119
234.5	47.243	-0.127	30.978	0	-29.72	0	1.799	1.918	-0.12
234.6	47.218	-0.147	31.557	0	-29.78	0	1.798	1.918	-0.121
234.7	47.206	-0.145	31.73	0	-29.78	0	1.797	1.918	-0.122
234.8	47.181	-0.145	31.176	0	-29.68	0	1.796	1.918	-0.122
234.9	47.168	-0.14	30.974	0	-29.73	0	1.795	1.918	-0.123

235	47.15	-0.15	30.974	0	-29.79	0	1.794	1.918	-0.124
235.1	47.131	-0.15	31.338	0	-29.55	0	1.794	1.918	-0.125
235.2	47.112	-0.157	31.366	0	-29.6	0	1.793	1.918	-0.126
235.3	47.094	-0.16	30.833	0	-29.68	0	1.792	1.918	-0.127
235.4	47.075	-0.16	30.858	0	-29.66	0	1.791	1.918	-0.127
235.5	47.063	-0.14	30.65	0	-29.46	0	1.79	1.918	-0.128
235.6	47.05	-0.127	30.957	0	-29.48	0	1.789	1.918	-0.129
235.7	47.032	-0.127	30.544	0	-29.22	0	1.789	1.918	-0.13
235.8	47.013	-0.147	31.879	0	-29.1	0	1.788	1.918	-0.131
235.9	47.001	-0.147	32.066	0	-29.09	0	1.787	1.918	-0.131
236	46.988	-0.147	31.338	0	-29.04	0	1.786	1.918	-0.132
236.1	46.969	-0.147	31.151	0	-28.92	0	1.785	1.918	-0.133
236.2	46.951	-0.135	30.904	0	-28.29	0	1.785	1.918	-0.134
236.3	46.945	-0.127	30.78	0	-26.39	0	1.784	1.918	-0.135
236.4	46.932	-0.13	30.982	0	-23.63	0	1.783	1.918	-0.135
236.5	46.92	-0.145	30.897	0	-21.81	0	1.783	1.918	-0.136
236.6	46.914	-0.145	30.936	0	-21.08	0	1.782	1.918	-0.136
236.7	46.907	-0.145	31.504	0	-20.62	0	1.781	1.918	-0.137
236.8	46.914	-0.132	30.625	0	-20.63	0	1.781	1.918	-0.138
236.9	46.914	-0.132	30.431	0	-20.37	0	1.78	1.918	-0.138
237	46.914	-0.145	30.78	0	-20.09	0	1.78	1.918	-0.139
237.1	46.914	-0.145	30.851	0	-19.97	0	1.779	1.918	-0.139
237.2	46.92	-0.15	30.473	0	-19.94	0	1.779	1.918	-0.14
237.3	46.92	-0.142	30.657	0	-19.82	0	1.778	1.918	-0.14
237.4	46.92	-0.14	30.756	0	-19.71	0	1.778	1.918	-0.141
237.5	46.926	-0.14	30.756	0	-19.62	0	1.777	1.918	-0.141
237.6	46.932	-0.16	30.922	0	-19.6	0	1.776	1.918	-0.142
237.7	46.932	-0.147	31.25	0	-19.49	0	1.776	1.918	-0.143
237.8	46.938	-0.147	30.392	0	-19.44	0	1.775	1.918	-0.143
237.9	46.945	-0.14	30.254	0	-19.4	0	1.775	1.918	-0.144
238	46.951	-0.152	30.766	0	-19.37	0	1.774	1.918	-0.144
238.1	46.951	-0.152	30.985	0	-19.34	0	1.774	1.918	-0.145
238.2	46.957	-0.162	30.526	0	-19.5	0	1.773	1.918	-0.145
238.3	46.963	-0.155	30.611	0	-19.86	0	1.773	1.918	-0.146
238.4	46.969	-0.155	30.611	0	-19.91	0	1.772	1.918	-0.146
238.5	46.969	-0.175	30.681	0	-19.83	0	1.772	1.918	-0.147
238.6	46.969	-0.18	30.794	0	-19.87	0	1.771	1.918	-0.147
238.7	46.976	-0.18	30.455	0	-19.85	0	1.77	1.918	-0.148
238.8	46.976	-0.145	30.597	0	-19.72	0	1.77	1.918	-0.149
238.9	46.982	-0.145	29.431	0	-19.74	0	1.769	1.918	-0.149
239	46.982	-0.145	29.862	0	-19.61	0	1.769	1.918	-0.15
239.1	46.982	-0.16	31.137	0	-19.69	0	1.768	1.918	-0.15
239.2	46.988	-0.16	30.544	0	-19.58	0	1.768	1.918	-0.151
239.3	46.988	-0.152	30.173	0	-19.53	0	1.767	1.918	-0.151
239.4	46.994	-0.162	30.484	0	-19.47	0	1.767	1.918	-0.152
239.5	46.994	-0.172	30.653	0	-19.41	0	1.766	1.918	-0.152
239.6	46.994	-0.172	30.614	0	-19.52	0	1.766	1.918	-0.153

239.7	46.994	-0.145	30.307	0	-19.37	0	1.765	1.918	-0.153
239.8	47.001	-0.155	30.003	0	-19.4	0	1.765	1.918	-0.154
239.9	47.001	-0.155	30.487	0	-19.24	0	1.764	1.918	-0.154
240	47.007	-0.147	30.462	0	-19.31	0	1.763	1.918	-0.155
240.1	47.007	-0.147	30.226	0	-19.25	0	1.763	1.918	-0.156
240.2	47.013	-0.14	29.64	0	-19.09	0	1.762	1.918	-0.156
240.3	47.013	-0.15	30.568	0	-19	0	1.762	1.918	-0.157
240.4	47.019	-0.155	30.042	0	-19.04	0	1.761	1.918	-0.157
240.5	47.019	-0.155	30.127	0	-19.07	0	1.761	1.918	-0.158
240.6	47.025	-0.165	30.568	0	-19.12	0	1.76	1.918	-0.158
240.7	47.025	-0.152	30.498	0	-19.69	0	1.76	1.918	-0.159
240.8	47.032	-0.152	29.678	0	-20.2	0	1.759	1.918	-0.159
240.9	47.032	-0.16	29.862	0	-20.69	0	1.759	1.918	-0.16
241	47.032	-0.157	30.607	0	-20.6	0	1.758	1.918	-0.16
241.1	47.032	-0.157	30.311	0	-20.56	0	1.757	1.918	-0.161
241.2	47.032	-0.155	29.989	0	-20.63	0	1.757	1.918	-0.162
241.3	47.032	-0.162	29.901	0	-20.49	0	1.756	1.918	-0.162
241.4	47.032	-0.162	30.085	0	-20.39	0	1.756	1.918	-0.163
241.5	47.032	-0.147	30.056	0	-20.39	0	1.755	1.918	-0.163
241.6	47.025	-0.145	29.516	0	-20.27	0	1.755	1.918	-0.164
241.7	47.025	-0.145	29.809	0	-20.22	0	1.754	1.918	-0.164
241.8	47.025	-0.152	30.162	0	-20.23	0	1.753	1.918	-0.165
241.9	47.019	-0.165	30.003	0	-20.21	0	1.753	1.918	-0.166
242	47.019	-0.165	29.696	0	-20.1	0	1.752	1.918	-0.166
242.1	47.019	-0.157	30.028	0	-20.13	0	1.752	1.918	-0.167
242.2	47.013	-0.157	29.516	0	-20.31	0	1.751	1.918	-0.167
242.3	47.013	-0.152	29.142	0	-20.16	0	1.751	1.918	-0.168
242.4	47.013	-0.175	29.848	0	-20.14	0	1.75	1.918	-0.168
242.5	47.007	-0.172	30.017	0	-20.09	0	1.75	1.918	-0.169
242.6	47.007	-0.172	30.003	0	-20.02	0	1.749	1.918	-0.169
242.7	47.007	-0.162	29.258	0	-19.91	0	1.748	1.918	-0.17
242.8	47.001	-0.162	29.738	0	-19.82	0	1.748	1.918	-0.171
242.9	47.001	-0.162	29.774	0	-19.63	0	1.747	1.918	-0.171
243	47.001	-0.17	29.682	0	-18.81	0	1.747	1.918	-0.172
243.1	47.001	-0.17	29.862	0	-18.31	0	1.746	1.918	-0.172
243.2	47.001	-0.17	29.424	0	-17.72	0	1.746	1.918	-0.173
243.3	47.007	-0.172	29.41	0	-17.62	0	1.745	1.918	-0.173
243.4	47.007	-0.182	29.555	0	-17.03	0	1.745	1.918	-0.174
243.5	47.013	-0.182	29.64	0	-16.58	0	1.744	1.918	-0.174
243.6	47.013	-0.175	29.738	0	-15.99	0	1.744	1.918	-0.174
243.7	47.019	-0.18	29.205	0	-14.91	0	1.744	1.918	-0.175
243.8	47.019	-0.18	29.396	0	-13.96	0	1.743	1.918	-0.175
243.9	47.025	-0.185	29.636	0	-13.2	0	1.743	1.918	-0.176
244	47.038	-0.195	29.219	0	-13.02	0	1.742	1.918	-0.176
244.1	47.044	-0.195	28.679	0	-12.71	0	1.742	1.918	-0.176
244.2	47.056	-0.212	29.195	0	-12.58	0	1.742	1.918	-0.177
244.3	47.063	-0.192	28.654	0	-12.06	0	1.741	1.918	-0.177

244.4	47.075	-0.192	28.654	0	-11.27	0	1.741	1.918	-0.177
244.5	47.081	-0.192	29.075	0	-10.68	0	1.741	1.918	-0.178
244.6	47.1	-0.195	28.478	0	-9.4	0	1.741	1.918	-0.178
244.7	47.112	-0.195	28.587	0	-8.64	0	1.74	1.918	-0.178
244.8	47.131	-0.187	28.665	0	-8.45	0	1.74	1.918	-0.178
244.9	47.156	-0.182	28.803	0	-7.78	0	1.74	1.918	-0.179
245	47.168	-0.182	28.637	0	-7.35	0	1.74	1.918	-0.179
245.1	47.193	-0.18	28.803	0	-6.92	0	1.739	1.918	-0.179
245.2	47.212	-0.185	28.57	0	-6.51	0	1.739	1.918	-0.179
245.3	47.237	-0.21	28.887	0	-6.54	0	1.739	1.918	-0.179
245.4	47.261	-0.197	28.118	0	-6.55	0	1.739	1.918	-0.18
245.5	47.286	-0.197	28.174	0	-6.54	0	1.739	1.918	-0.18
245.6	47.311	-0.197	28.683	0	-6.55	0	1.739	1.918	-0.18
245.7	47.336	-0.202	28.587	0	-6.55	0	1.738	1.918	-0.18
245.8	47.361	-0.2	28.721	0	-6.54	0	1.738	1.918	-0.18
245.9	47.386	-0.2	28.711	0	-5.93	0	1.738	1.918	-0.18
246	47.404	-0.177	28.75	0	-5.73	0	1.738	1.918	-0.181
246.1	47.435	-0.177	28.817	0	-4.76	0	1.738	1.918	-0.181
246.2	47.46	-0.17	28.548	0	-4.49	0	1.738	1.918	-0.181
246.3	47.491	-0.195	29.075	0	-3.96	0	1.737	1.918	-0.181
246.4	47.516	-0.187	28.672	0	-3.76	0	1.737	1.918	-0.181
246.5	47.547	-0.187	28.587	0	-3.93	0	1.737	1.918	-0.181
246.6	47.578	-0.192	28.587	0	-3.95	0	1.737	1.918	-0.181
246.7	47.609	-0.182	28.887	0	-4.12	0	1.737	1.918	-0.181
246.8	47.634	-0.182	28.464	0	-4.68	0	1.737	1.918	-0.182
246.9	47.665	-0.185	29.075	0	-5.3	0	1.737	1.918	-0.182
247	47.696	-0.162	29.152	0	-6.12	0	1.737	1.918	-0.182
247.1	47.721	-0.162	28.121	0	-6.4	0	1.736	1.918	-0.182
247.2	47.752	-0.167	28.962	0	-6.4	0	1.736	1.918	-0.182
247.3	47.771	-0.19	29.527	0	-7.28	0	1.736	1.918	-0.182
247.4	47.796	-0.19	29.527	0	-9.44	0	1.736	1.918	-0.183
247.5	47.821	-0.2	28.99	0	-11.62	0	1.735	1.918	-0.183
247.6	47.839	-0.17	29.389	0	-13.06	0	1.735	1.918	-0.183
247.7	47.852	-0.17	28.464	0	-14.58	0	1.735	1.918	-0.184
247.8	47.864	-0.19	28.771	0	-16	0	1.734	1.918	-0.184
247.9	47.877	-0.192	29.541	0	-19.47	0	1.734	1.918	-0.185
248	47.877	-0.192	29.389	0	-20.67	0	1.733	1.918	-0.185
248.1	47.877	-0.175	28.181	0	-21.22	0	1.733	1.918	-0.186
248.2	47.87	-0.172	28.361	0	-21.38	0	1.732	1.918	-0.187
248.3	47.87	-0.152	29.636	0	-21.28	0	1.731	1.918	-0.187
248.4	47.87	-0.132	29.103	0	-21.29	0	1.731	1.918	-0.188
248.5	47.87	-0.117	29.216	0	-21.3	0	1.73	1.918	-0.188
248.6	47.877	-0.117	30.364	0	-21.18	0	1.73	1.918	-0.189
248.7	47.877	-0.142	31.543	0	-21.05	0	1.729	1.918	-0.189
248.8	47.877	-0.14	32.557	0	-21.38	0	1.728	1.918	-0.19
248.9	47.877	-0.14	31.864	0	-21.53	0	1.728	1.918	-0.191
249	47.877	-0.15	31.405	0	-21.44	0	1.727	1.918	-0.191

249.1	47.877	-0.15	31.271	0	-21.49	0	1.727	1.918	-0.192
249.2	47.877	-0.177	31.886	0	-21.48	0	1.726	1.918	-0.192
249.3	47.87	-0.165	31.395	0	-21.49	0	1.725	1.918	-0.193
249.4	47.87	-0.157	30.699	0	-21.48	0	1.725	1.918	-0.194
249.5	47.87	-0.157	30.674	0	-20.93	0	1.724	1.918	-0.194
249.6	47.87	-0.142	30.78	0	-20.81	0	1.724	1.918	-0.195
249.7	47.87	-0.152	30.869	0	-20.15	0	1.723	1.918	-0.195
249.8	47.864	-0.152	30.89	0	-20	0	1.723	1.918	-0.196
249.9	47.864	-0.132	31.042	0	-19.79	0	1.722	1.918	-0.196
250	47.864	-0.147	30.311	0	-19.75	0	1.721	1.918	-0.197
250.1	47.864	-0.147	30.565	0	-19.58	0	1.721	1.918	-0.198
250.2	47.864	-0.15	31.218	0	-19.46	0	1.72	1.918	-0.198
250.3	47.864	-0.135	30.311	0	-19.31	0	1.72	1.918	-0.199
250.4	47.858	-0.135	30.282	0	-19.29	0	1.719	1.918	-0.199
250.5	47.864	-0.157	31.031	0	-19.18	0	1.719	1.918	-0.2
250.6	47.864	-0.155	30.671	0	-19.14	0	1.718	1.918	-0.2
250.7	47.864	-0.155	29.756	0	-19.15	0	1.718	1.918	-0.201
250.8	47.864	-0.162	29.774	0	-19.49	0	1.717	1.918	-0.201
250.9	47.864	-0.155	29.904	0	-19.6	0	1.717	1.918	-0.202
251	47.858	-0.155	29.883	0	-19.59	0	1.716	1.918	-0.202
251.1	47.858	-0.155	29.851	0	-19.65	0	1.716	1.918	-0.203
251.2	47.858	-0.17	30.159	0	-19.69	0	1.715	1.918	-0.203
251.3	47.852	-0.16	30.296	0	-19.69	0	1.714	1.918	-0.204
251.4	47.858	-0.16	29.474	0	-19.64	0	1.714	1.918	-0.205
251.5	47.852	-0.18	29.474	0	-19.41	0	1.713	1.918	-0.205
251.6	47.852	-0.18	30.477	0	-19.41	0	1.713	1.918	-0.206
251.7	47.852	-0.177	30.462	0	-19	0	1.712	1.918	-0.206
251.8	47.846	-0.177	29.922	0	-18.79	0	1.712	1.918	-0.207
251.9	47.846	-0.177	29.922	0	-18.33	0	1.711	1.918	-0.207
252	47.846	-0.177	29.657	0	-17.81	0	1.711	1.918	-0.208
252.1	47.852	-0.177	30.032	0	-17.61	0	1.71	1.918	-0.208
252.2	47.852	-0.162	30.007	0	-17.03	0	1.71	1.918	-0.209
252.3	47.852	-0.142	29.315	0	-16.38	0	1.709	1.918	-0.209
252.4	47.852	-0.155	29.53	0	-15.72	0	1.709	1.918	-0.21
252.5	47.852	-0.155	29.445	0	-14.1	0	1.708	1.918	-0.21
252.6	47.858	-0.19	29.488	0	-12.64	0	1.708	1.918	-0.21
252.7	47.87	-0.187	29.096	0	-11.82	0	1.708	1.918	-0.211
252.8	47.877	-0.187	29.053	0	-11.32	0	1.707	1.918	-0.211
252.9	47.895	-0.17	29.558	0	-10.64	0	1.707	1.918	-0.211
253	47.908	-0.175	28.923	0	-10.5	0	1.707	1.918	-0.212
253.1	47.92	-0.175	29.181	0	-11.06	0	1.707	1.918	-0.212
253.2	47.939	-0.177	29.283	0	-10.88	0	1.706	1.918	-0.212
253.3	47.945	-0.192	28.725	0	-10.8	0	1.706	1.918	-0.212
253.4	47.964	-0.192	28.993	0	-10.71	0	1.706	1.918	-0.213
253.5	47.976	-0.197	29.17	0	-10.65	0	1.705	1.918	-0.213
253.6	47.988	-0.19	28.195	0	-10.79	0	1.705	1.918	-0.213
253.7	48.001	-0.19	28.093	0	-11.22	0	1.705	1.918	-0.214

253.8	48.013	-0.182	28.171	0	-11.91	0	1.704	1.918	-0.214
253.9	48.026	-0.19	28.269	0	-12.71	0	1.704	1.918	-0.214
254	48.032	-0.19	28.559	0	-14.09	0	1.704	1.918	-0.215
254.1	48.044	-0.187	28.199	0	-15.14	0	1.703	1.918	-0.215
254.2	48.044	-0.195	28.195	0	-16.08	0	1.703	1.918	-0.216
254.3	48.051	-0.192	28.545	0	-17.17	0	1.702	1.918	-0.216
254.4	48.057	-0.2	28.185	0	-18.21	0	1.702	1.918	-0.217
254.5	48.051	-0.205	28.188	0	-19.12	0	1.701	1.918	-0.217
254.6	48.051	-0.205	28.185	0	-19.24	0	1.701	1.918	-0.218
254.7	48.044	-0.222	28.453	0	-19.29	0	1.7	1.918	-0.218
254.8	48.044	-0.22	28.223	0	-19.23	0	1.7	1.918	-0.219
254.9	48.038	-0.22	28.132	0	-19.01	0	1.699	1.918	-0.219
255	48.038	-0.2	28.856	0	-18.47	0	1.699	1.918	-0.22
255.1	48.032	-0.2	28.555	0	-17.93	0	1.698	1.918	-0.22
255.2	48.032	-0.202	28.884	0	-17.63	0	1.698	1.918	-0.221
255.3	48.026	-0.2	28.725	0	-16.8	0	1.697	1.918	-0.221
255.4	48.026	-0.2	29.301	0	-15.38	0	1.697	1.918	-0.222
255.5	48.026	-0.2	29.301	0	-13.95	0	1.696	1.918	-0.222
255.6	48.032	-0.195	29.007	0	-12.44	0	1.696	1.918	-0.222
255.7	48.044	-0.22	28.979	0	-11.45	0	1.696	1.918	-0.223
255.8	48.051	-0.22	29.286	0	-10.4	0	1.695	1.918	-0.223
255.9	48.069	-0.19	29.325	0	-8.51	0	1.695	1.918	-0.223
256	48.082	-0.187	28.601	0	-6.15	0	1.695	1.918	-0.223
256.1	48.094	-0.187	28.75	0	-3.28	0	1.695	1.918	-0.223
256.2	48.119	-0.202	28.52	0	-1.58	0	1.695	1.918	-0.224
256.3	48.144	-0.205	28.368	0	-1.25	0	1.695	1.918	-0.224
256.4	48.175	-0.205	28.368	0	-1.08	0	1.695	1.918	-0.224
256.5	48.2	-0.205	28.615	0	-0.99	0	1.695	1.918	-0.224
256.6	48.225	-0.2	28.171	0	0	0	1.695	1.918	-0.224
256.7	48.256	-0.2	27.556	0	0	0	1.695	1.918	-0.224
256.8	48.287	-0.192	28.16	0	0.74	0	1.695	1.918	-0.224
256.9	48.318	-0.19	27.362	0	1.93	0	1.695	1.919	-0.224
257	48.349	-0.19	26.959	0	2.18	0	1.695	1.919	-0.224
257.1	48.38	-0.182	27.637	0	1.82	0	1.695	1.919	-0.224
257.2	48.417	-0.167	27.461	0	1.81	0	1.695	1.919	-0.224
257.3	48.448	-0.195	27.595	0	2.82	0	1.695	1.919	-0.224
257.4	48.479	-0.202	28.16	0	4.12	0	1.695	1.919	-0.224
257.5	48.517	-0.195	28.16	0	5.11	0	1.695	1.919	-0.224
257.6	48.554	-0.195	27.097	0	6.87	0	1.696	1.919	-0.224
257.7	48.591	-0.197	27.182	0	6.02	0	1.696	1.919	-0.224
257.8	48.635	-0.212	27.637	0	4.97	0	1.696	1.92	-0.224
257.9	48.678	-0.212	28.04	0	2.84	0	1.696	1.92	-0.224
258	48.722	-0.155	27.708	0	-1.58	0	1.696	1.92	-0.224
258.1	48.765	-0.155	27.613	0	-5.96	0	1.696	1.92	-0.224
258.2	48.809	-0.135	29.703	0	-10.13	0	1.695	1.92	-0.224
258.3	48.846	-0.095	30.83	0	-14.09	0	1.695	1.92	-0.225
258.4	48.877	-0.065	33.369	0	-15.46	0	1.695	1.92	-0.225

258.5	48.902	-0.065	33.369	0	-16.85	0	1.694	1.92	-0.225
258.6	48.914	-0.122	35.135	0	-15.91	0	1.694	1.92	-0.226
258.7	48.921	-0.165	35.77	0	-14.23	0	1.693	1.92	-0.226
258.8	48.927	-0.165	34.368	0	-13.02	0	1.693	1.92	-0.227
258.9	48.933	-0.17	30.607	0	-12.02	0	1.693	1.92	-0.227
259	48.933	-0.182	29.382	0	-11.18	0	1.692	1.92	-0.227
259.1	48.939	-0.182	28.94	0	-10.72	0	1.692	1.92	-0.228
259.2	48.939	-0.2	28.358	0	-10.33	0	1.692	1.92	-0.228
259.3	48.945	-0.23	27.814	0	-9.98	0	1.691	1.92	-0.228
259.4	48.952	-0.23	27.87	0	-9.51	0	1.691	1.92	-0.228
259.5	48.952	-0.225	26.429	0	-9.18	0	1.691	1.92	-0.229
259.6	48.958	-0.237	26.179	0	-8.91	0	1.691	1.92	-0.229
259.7	48.964	-0.237	26.797	0	-9.08	0	1.69	1.92	-0.229
259.8	48.97	-0.255	26.094	0	-9.97	0	1.69	1.92	-0.229
259.9	48.97	-0.252	26.278	0	-10.15	0	1.69	1.92	-0.23
260	48.97	-0.252	25.663	0	-9.83	0	1.69	1.92	-0.23
260.1	48.976	-0.245	25.504	0	-9.53	0	1.689	1.92	-0.23
260.2	48.976	-0.242	25.638	0	-9.36	0	1.689	1.92	-0.23
260.3	48.976	-0.27	25.677	0	-8.99	0	1.689	1.92	-0.231
260.4	48.976	-0.257	25.091	0	-8.96	0	1.689	1.92	-0.231
260.5	48.983	-0.26	25.091	0	-8.84	0	1.688	1.92	-0.231
260.6	48.983	-0.26	24.59	0	-8.75	0	1.688	1.92	-0.231
260.7	48.983	-0.252	25.268	0	-8.75	0	1.688	1.92	-0.232
260.8	48.983	-0.24	24.699	0	-8.74	0	1.688	1.92	-0.232
260.9	48.989	-0.24	24.575	0	-8.74	0	1.687	1.92	-0.232
261	48.989	-0.247	24.392	0	-8.74	0	1.687	1.92	-0.232
261.1	48.995	-0.247	25.091	0	-8.75	0	1.687	1.92	-0.233
261.2	48.995	-0.255	25.239	0	-8.76	0	1.687	1.92	-0.233
261.3	48.995	-0.245	24.614	0	-8.78	0	1.686	1.92	-0.233
261.4	49.001	-0.255	25.451	0	-8.8	0	1.686	1.92	-0.233
261.5	49.008	-0.255	25.451	0	-9.01	0	1.686	1.92	-0.234
261.6	49.014	-0.25	25.105	0	-9.44	0	1.686	1.92	-0.234
261.7	49.014	-0.255	24.932	0	-9.74	0	1.685	1.92	-0.234
261.8	49.02	-0.255	25.49	0	-9.53	0	1.685	1.92	-0.234
261.9	49.026	-0.23	25.504	0	-9.44	0	1.685	1.92	-0.235
262	49.026	-0.225	25.296	0	-9.35	0	1.685	1.92	-0.235
262.1	49.026	-0.225	25.246	0	-9.28	0	1.684	1.92	-0.235
262.2	49.032	-0.225	25.49	0	-9.27	0	1.684	1.92	-0.236
262.3	49.032	-0.252	25.282	0	-9.29	0	1.684	1.92	-0.236
262.4	49.032	-0.252	25.282	0	-9.26	0	1.684	1.92	-0.236
262.5	49.039	-0.25	25.465	0	-9.26	0	1.683	1.92	-0.236
262.6	49.039	-0.232	24.975	0	-9.28	0	1.683	1.92	-0.237
262.7	49.039	-0.232	24.614	0	-9.28	0	1.683	1.92	-0.237
262.8	49.039	-0.232	24.575	0	-9.28	0	1.683	1.92	-0.237
262.9	49.045	-0.235	24.932	0	-9.26	0	1.682	1.92	-0.237
263	49.045	-0.235	25.105	0	-9.28	0	1.682	1.92	-0.238
263.1	49.045	-0.23	25.148	0	-9.27	0	1.682	1.92	-0.238

263.2	49.045	-0.232	24.491	0	-9.27	0	1.682	1.92	-0.238
263.3	49.045	-0.225	25.148	0	-9.26	0	1.681	1.92	-0.238
263.4	49.045	-0.23	24.975	0	-9.27	0	1.681	1.92	-0.239
263.5	49.051	-0.24	24.975	0	-9.27	0	1.681	1.92	-0.239
263.6	49.051	-0.24	25.035	0	-9.26	0	1.68	1.92	-0.239
263.7	49.051	-0.245	24.749	0	-9.61	0	1.68	1.92	-0.239
263.8	49.051	-0.242	24.975	0	-11.83	0	1.68	1.92	-0.24
263.9	49.051	-0.242	24.72	0	-15.5	0	1.679	1.92	-0.24
264	49.045	-0.25	24.749	0	-17.65	0	1.679	1.92	-0.241
264.1	49.032	-0.25	24.706	0	-18.34	0	1.678	1.92	-0.241
264.2	49.014	-0.255	24.65	0	-19.47	0	1.678	1.92	-0.242
264.3	48.995	-0.275	24.409	0	-21.32	0	1.677	1.92	-0.242
264.4	48.97	-0.272	23.551	0	-23.25	0	1.677	1.92	-0.243
264.5	48.933	-0.272	23.551	0	-22.64	0	1.676	1.92	-0.244
264.6	48.896	-0.287	22.842	0	-22.41	0	1.675	1.92	-0.244
264.7	48.858	-0.297	22.937	0	-22.63	0	1.675	1.92	-0.245
264.8	48.821	-0.297	22.404	0	-22.93	0	1.674	1.92	-0.245
264.9	48.784	-0.312	21.623	0	-23.74	0	1.674	1.92	-0.246
265	48.753	-0.315	21.263	0	-24.14	0	1.673	1.92	-0.247
265.1	48.709	-0.315	21.012	0	-23.22	0	1.672	1.92	-0.247
265.2	48.666	-0.315	20.825	0	-22.77	0	1.672	1.92	-0.248
265.3	48.616	-0.345	21.178	0	-22.47	0	1.671	1.92	-0.249
265.4	48.566	-0.345	20.998	0	-14.37	0	1.671	1.92	-0.249
265.5	48.51	-0.34	19.773	0	-2.56	0	1.67	1.92	-0.249
265.6	48.467	-0.35	19.264	0	0	0	1.67	1.92	-0.249
265.7	48.43	-0.35	18.554	0	0	0	1.67	1.92	-0.249
265.8	48.38	-0.52	18.304	0	0	0	1.67	1.92	-0.249
265.9	48.33	-0.608	17.813	0	0	0	1.671	1.92	-0.249
266	48.281	-0.608	11.375	0	0	0	1.671	1.92	-0.249
266.1	48.231	-0.715	4.806	0	0	0	1.671	1.92	-0.249
266.2	48.181	-0.73	0.173	0	0	0	1.671	1.92	-0.249
266.3	48.125	-0.69	-3.588	0	0	0	1.671	1.92	-0.249
266.4	48.082	-0.695	-0.593	0	0	0	1.671	1.92	-0.249
266.5	48.032	-0.708	-0.59	0	0	0	1.671	1.92	-0.249
266.6	47.976	-0.708	-1.095	0	1.22	0	1.671	1.92	-0.249
266.7	47.926	-0.705	-0.749	0	2.65	0	1.671	1.92	-0.249
266.8	47.877	-0.705	-1.271	0	4.18	0	1.671	1.92	-0.249
266.9	47.833	-0.705	-2.069	0	4.69	0	1.671	1.92	-0.249
267	47.796	-0.713	-2.006	0	4.83	0	1.671	1.92	-0.249
267.1	47.752	-0.713	-2.366	0	4.68	0	1.671	1.92	-0.249
267.2	47.709	-0.698	-3.087	0	4.62	0	1.671	1.92	-0.249
267.3	47.672	-0.78	-1.388	0	4.62	0	1.671	1.921	-0.249
267.4	47.628	-0.735	-5.142	0	4.61	0	1.672	1.921	-0.249
267.5	47.585	-0.735	-5.396	0	4.61	0	1.672	1.921	-0.249
267.6	47.547	-0.713	-2.945	0	5.17	0	1.672	1.921	-0.249
267.7	47.504	-0.7	-1.833	0	6.42	0	1.672	1.921	-0.249
267.8	47.467	-0.7	-1.458	0	7	0	1.672	1.921	-0.249

267.9	47.429	-0.708	-1.642	0	7.11	0	1.672	1.922	-0.249
268	47.392	-0.71	-1.014	0	7.11	0	1.673	1.922	-0.249
268.1	47.355	-0.71	-0.752	0	7.1	0	1.673	1.922	-0.249
268.2	47.317	-0.695	-1.275	0	7.1	0	1.673	1.922	-0.249
268.3	47.286	-0.698	-1.236	0	7.16	0	1.673	1.922	-0.249
268.4	47.243	-0.698	-0.78	0	7.79	0	1.673	1.923	-0.249
268.5	47.212	-0.703	-0.823	0	8.38	0	1.674	1.923	-0.249
268.6	47.175	-0.7	-0.766	0	8.81	0	1.674	1.923	-0.249
268.7	47.143	-0.7	-0.851	0	9.04	0	1.674	1.923	-0.249
268.8	47.106	-0.685	-0.59	0	9.02	0	1.674	1.924	-0.249
268.9	47.075	-0.693	-0.72	0	8.49	0	1.675	1.924	-0.249
269	47.038	-0.693	-0.911	0	7.26	0	1.675	1.924	-0.249
269.1	47.007	-0.715	-0.152	0	5.69	0	1.675	1.924	-0.249
269.2	46.969	-0.705	-0.431	0	3.74	0	1.675	1.924	-0.249
269.3	46.932	-0.705	-1.328	0	2.02	0	1.675	1.924	-0.249
269.4	46.889	-0.708	-0.459	0	0.85	0	1.675	1.924	-0.249
269.5	46.845	-0.708	-0.459	0	0	0	1.675	1.924	-0.249
269.6	46.789	-0.708	-0.784	0	0	0	1.675	1.924	-0.249
269.7	46.746	-0.703	-0.742	0	0	0	1.675	1.924	-0.249
269.8	46.696	-0.693	-0.699	0	0	0	1.675	1.924	-0.249
269.9	46.646	-0.693	-0.904	0	0	0	1.675	1.924	-0.249
270	46.597	-0.713	-0.975	0	0	0	1.675	1.924	-0.249
270.1	46.547	-0.713	-0.187	0	0.78	0	1.675	1.924	-0.249
270.2	46.497	-0.74	0.004	0	2.23	0	1.675	1.924	-0.249
270.3	46.447	-0.693	-0.551	0	3.78	0	1.675	1.925	-0.249
270.4	46.404	-0.703	-1.155	0	5.4	0	1.676	1.925	-0.249
270.5	46.361	-0.703	-1.155	0	7.9	0	1.676	1.925	-0.249
270.6	46.323	-0.71	0.057	0	8.7	0	1.676	1.925	-0.249
270.7	46.292	-0.713	-0.699	0	9.36	0	1.676	1.925	-0.249
270.8	46.255	-0.713	-0.675	0	10.09	0	1.677	1.926	-0.249
270.9	46.23	-0.7	-0.713	0	10.07	0	1.677	1.926	-0.249
271	46.199	-0.695	-0.89	0	10.31	0	1.677	1.926	-0.249
271.1	46.168	-0.695	-0.798	0	10.32	0	1.677	1.927	-0.249
271.2	46.143	-0.69	-0.558	0	10.26	0	1.678	1.927	-0.249
271.3	46.112	-0.71	-0.886	0	10.31	0	1.678	1.927	-0.249
271.4	46.081	-0.71	-0.346	0	10.29	0	1.678	1.927	-0.249
271.5	46.056	-0.67	-0.6	0	10.25	0	1.679	1.928	-0.249
271.6	46.025	-0.68	-1.526	0	10.3	0	1.679	1.928	-0.249
271.7	46	-0.68	-0.23	0	10.26	0	1.679	1.928	-0.249
271.8	45.969	-0.7	-0.554	0	10.24	0	1.679	1.929	-0.249
271.9	45.938	-0.72	-0.773	0	10.29	0	1.68	1.929	-0.249
272	45.913	-0.72	0.117	0	11.96	0	1.68	1.929	-0.249
272.1	45.882	-0.703	-1.127	0	13.52	0	1.68	1.93	-0.249
272.2	45.857	-0.678	-1.095	0	13.81	0	1.681	1.93	-0.249
272.3	45.839	-0.705	-0.939	0	15.05	0	1.681	1.93	-0.249
272.4	45.814	-0.703	-0.159	0	15.61	0	1.682	1.931	-0.249
272.5	45.795	-0.685	-0.159	0	15.61	0	1.682	1.931	-0.249

272.6	45.776	-0.685	-1.017	0	15.6	0	1.683	1.932	-0.249
272.7	45.758	-0.703	-1.017	0	15.74	0	1.683	1.932	-0.249
272.8	45.745	-0.71	-0.286	0	17.82	0	1.683	1.933	-0.249
272.9	45.72	-0.71	-0.233	0	18.65	0	1.684	1.933	-0.249
273	45.708	-0.708	-0.819	0	18.66	0	1.684	1.934	-0.249
273.1	45.696	-0.708	-0.364	0	18.61	0	1.685	1.934	-0.249
273.2	45.683	-0.695	-0.784	0	18.64	0	1.686	1.935	-0.249
273.3	45.671	-0.69	-0.646	0	17.91	0	1.686	1.935	-0.249
273.4	45.658	-0.68	-0.893	0	17.02	0	1.686	1.936	-0.249
273.5	45.646	-0.68	-0.865	0	16.65	0	1.687	1.936	-0.249
273.6	45.627	-0.705	-0.614	0	16.69	0	1.687	1.937	-0.249
273.7	45.615	-0.69	-0.078	0	16.36	0	1.688	1.937	-0.249
273.8	45.596	-0.69	-0.484	0	14.86	0	1.688	1.937	-0.249
273.9	45.584	-0.7	-1.342	0	12.2	0	1.689	1.938	-0.249
274	45.559	-0.728	-0.558	0	10.96	0	1.689	1.938	-0.249
274.1	45.534	-0.728	0.297	0	11.01	0	1.689	1.938	-0.249
274.2	45.503	-0.705	-0.675	0	10.95	0	1.69	1.939	-0.249
274.3	45.484	-0.708	-0.939	0	10.96	0	1.69	1.939	-0.249
274.4	45.46	-0.708	-0.011	0	10.97	0	1.69	1.939	-0.249
274.5	45.428	-0.688	-0.978	0	10.92	0	1.69	1.94	-0.249
274.6	45.404	-0.705	-1.197	0	10.81	0	1.691	1.94	-0.249
274.7	45.379	-0.705	-0.293	0	9.74	0	1.691	1.94	-0.249
274.8	45.348	-0.695	-0.244	0	8.97	0	1.691	1.94	-0.249
274.9	45.323	-0.683	-0.989	0	8.5	0	1.692	1.941	-0.249
275	45.292	-0.683	-1.204	0	7.76	0	1.692	1.941	-0.249
275.1	45.261	-0.69	-0.689	0	7.68	0	1.692	1.941	-0.249
275.2	45.23	-0.708	-0.095	0	7.66	0	1.692	1.941	-0.249
275.3	45.192	-0.72	-0.78	0	7.67	0	1.692	1.942	-0.249
275.4	45.167	-0.718	-0.586	0	7.66	0	1.693	1.942	-0.249
275.5	45.136	-0.713	-0.501	0	7.66	0	1.693	1.942	-0.249
275.6	45.099	-0.713	-0.763	0	7.67	0	1.693	1.942	-0.249
275.7	45.068	-0.73	-0.463	0	7.66	0	1.693	1.942	-0.249
275.8	45.037	-0.71	-0.35	0	7.66	0	1.693	1.943	-0.249
275.9	45	-0.71	-0.325	0	7.65	0	1.694	1.943	-0.249
276	44.969	-0.683	-1.271	0	7.65	0	1.694	1.943	-0.249
276.1	44.938	-0.683	-0.929	0	7.65	0	1.694	1.943	-0.249
276.2	44.906	-0.698	-0.131	0	7.63	0	1.694	1.943	-0.249
276.3	44.869	-0.718	-0.374	0	7.63	0	1.694	1.944	-0.249
276.4	44.838	-0.725	0.198	0	7.62	0	1.695	1.944	-0.249
276.5	44.807	-0.725	0.109	0	7.61	0	1.695	1.944	-0.249
276.6	44.776	-0.69	-1.197	0	7.62	0	1.695	1.944	-0.249
276.7	44.745	-0.69	-1.183	0	7.61	0	1.695	1.944	-0.249
276.8	44.708	-0.69	-0.572	0	7.6	0	1.696	1.945	-0.249
276.9	44.683	-0.688	-0.646	0	7.68	0	1.696	1.945	-0.249
277	44.646	-0.705	-0.883	0	7.77	0	1.696	1.945	-0.249
277.1	44.614	-0.705	-0.491	0	7.77	0	1.696	1.945	-0.249
277.2	44.583	-0.703	-0.275	0	7.78	0	1.696	1.946	-0.249

277.3	44.552	-0.7	-1.151	0	7.77	0	1.697	1.946	-0.249
277.4	44.521	-0.7	-0.646	0	7.77	0	1.697	1.946	-0.249
277.5	44.49	-0.68	-0.343	0	7.76	0	1.697	1.946	-0.249
277.6	44.459	-0.708	-1.059	0	7.82	0	1.697	1.946	-0.249
277.7	44.428	-0.708	-0.576	0	7.92	0	1.697	1.947	-0.249
277.8	44.397	-0.7	0.039	0	7.94	0	1.698	1.947	-0.249
277.9	44.366	-0.695	-1.137	0	7.94	0	1.698	1.947	-0.249
278	44.335	-0.695	-1.134	0	7.93	0	1.698	1.947	-0.249
278.1	44.304	-0.695	-0.297	0	7.9	0	1.698	1.948	-0.249
278.2	44.273	-0.698	-0.869	0	8.75	0	1.699	1.948	-0.249
278.3	44.242	-0.695	-0.477	0	9	0	1.699	1.948	-0.249
278.4	44.217	-0.695	-0.738	0	10.24	0	1.699	1.948	-0.249
278.5	44.186	-0.7	-0.823	0	10.78	0	1.699	1.949	-0.249
278.6	44.161	-0.7	-0.544	0	11.28	0	1.7	1.949	-0.249
278.7	44.136	-0.71	-0.297	0	11.29	0	1.7	1.949	-0.249
278.8	44.111	-0.71	-0.463	0	11.71	0	1.7	1.95	-0.249
278.9	44.086	-0.71	-0.95	0	11.8	0	1.701	1.95	-0.249
279	44.068	-0.72	-0.459	0	12.11	0	1.701	1.95	-0.249
279.1	44.043	-0.72	-0.417	0	12.07	0	1.701	1.951	-0.249
279.2	44.018	-0.725	-0.456	0	12.35	0	1.702	1.951	-0.249
279.3	43.993	-0.713	-0.579	0	12.36	0	1.702	1.951	-0.249
279.4	43.968	-0.708	-0.72	0	12.31	0	1.702	1.952	-0.249
279.5	43.956	-0.708	-0.636	0	12.4	0	1.703	1.952	-0.249
279.6	43.931	-0.698	-0.918	0	12.35	0	1.703	1.952	-0.249
279.7	43.906	-0.703	-0.547	0	12.02	0	1.703	1.953	-0.249
279.8	43.881	-0.703	-0.579	0	10.37	0	1.704	1.953	-0.249
279.9	43.863	-0.715	-0.191	0	8.21	0	1.704	1.953	-0.249
280	43.838	-0.7	-0.463	0	6.77	0	1.704	1.953	-0.249
280.1	43.807	-0.7	-0.593	0	5.17	0	1.704	1.953	-0.249
280.2	43.776	-0.68	-1.603	0	3.14	0	1.704	1.954	-0.249
280.3	43.738	-0.723	-0.692	0	1.71	0	1.704	1.954	-0.249
280.4	43.701	-0.723	0.194	0	0.8	0	1.704	1.954	-0.249
280.5	43.658	-0.708	-0.417	0	0	0	1.704	1.954	-0.249
280.6	43.608	-0.675	-0.622	0	0	0	1.704	1.954	-0.249
280.7	43.564	-0.675	-1.275	0	0	0	1.704	1.954	-0.249
280.8	43.515	-0.698	-1.194	0	0	0	1.705	1.954	-0.249
280.9	43.471	-0.72	-0.092	0	0	0	1.705	1.954	-0.249
281	43.428	-0.72	-0.177	0	0	0	1.705	1.954	-0.249
281.1	43.378	-0.723	-0.396	0	0	0	1.705	1.954	-0.249
281.2	43.334	-0.718	-0.738	0	0	0	1.705	1.954	-0.249
281.3	43.291	-0.7	-1.035	0	0.56	0	1.705	1.954	-0.249
281.4	43.241	-0.7	-0.463	0	0.58	0	1.705	1.954	-0.249
281.5	43.198	-0.708	-0.463	0	0.58	0	1.705	1.954	-0.249
281.6	43.148	-0.708	-0.77	0	0.57	0	1.705	1.954	-0.249
281.7	43.105	-0.705	-0.544	0	0	0	1.705	1.954	-0.249
281.8	43.049	-0.7	-0.417	0	-5.45	0	1.704	1.954	-0.249
281.9	42.993	-0.7	-0.784	0	-10.35	0	1.704	1.954	-0.25

282	42.918	-0.7	-0.501	0	-15.21	0	1.704	1.954	-0.25
282.1	42.831	-0.7	-0.653	0	-18.2	0	1.703	1.954	-0.251
282.2	42.732	-0.68	-1.109	0	-20.93	0	1.703	1.954	-0.251
282.3	42.62	-0.713	-0.826	0	-22.8	0	1.702	1.954	-0.252
282.4	42.514	-0.695	-0.653	0	-24.65	0	1.701	1.954	-0.252
282.5	42.396	-0.695	-0.738	0	-27.18	0	1.701	1.954	-0.253
282.6	42.266	-0.71	-1.155	0	-33.03	0	1.7	1.954	-0.254
282.7	42.154	-0.73	-0.463	0	-40.82	0	1.699	1.954	-0.255
282.8	41.992	-0.73	0.237	0	-45.09	0	1.697	1.954	-0.256
282.9	41.843	-0.683	-0.579	0	-47.52	0	1.696	1.954	-0.258
283	41.663	-0.683	-1.48	0	-48.43	0	1.695	1.954	-0.259
283.1	41.489	-0.683	-0.579	0	-48.23	0	1.693	1.954	-0.26
283.2	41.309	-0.69	-0.251	0	-48.33	0	1.692	1.954	-0.262
283.3	41.135	-0.693	-0.65	0	-49.37	0	1.691	1.954	-0.263
283.4	40.955	-0.693	-1.095	0	-49.99	0	1.689	1.954	-0.265
283.5	40.768	-0.713	-0.131	0	-48.18	0	1.688	1.954	-0.266
283.6	40.576	-0.703	-0.579	0	-43.18	0	1.687	1.954	-0.267
283.7	40.389	-0.703	-0.738	0	-40.18	0	1.686	1.954	-0.268
283.8	40.178	-0.678	-1.109	0	-42.13	0	1.684	1.954	-0.269
283.9	40.004	-0.685	-1.109	0	-42.66	0	1.683	1.954	-0.271
284	39.824	-0.685	-0.431	0	-41.63	0	1.682	1.954	-0.272
284.1	39.656	-0.7	-0.131	0	-39.37	0	1.681	1.954	-0.273
284.2	39.488	-0.708	-0.487	0	-39.96	0	1.68	1.954	-0.274
284.3	39.333	-0.705	-0.579	0	-41.4	0	1.679	1.954	-0.275
284.4	39.177	-0.71	-0.989	0	-33.09	0	1.678	1.954	-0.276
284.5	39.022	-0.705	-0.876	0	-22.46	0	1.677	1.954	-0.277
284.6	38.885	-0.705	-0.403	0	-17.83	0	1.677	1.954	-0.277
284.7	38.786	-0.693	-1.261	0	-15.64	0	1.676	1.954	-0.278
284.8	38.68	-0.693	-0.579	0	-15.19	0	1.676	1.954	-0.278
284.9	38.606	-0.693	-0.463	0	-15.17	0	1.675	1.954	-0.278
285	38.513	-0.698	-0.579	0	-15.14	0	1.675	1.954	-0.279
285.1	38.426	-0.698	-0.855	0	-15.1	0	1.675	1.954	-0.279
285.2	38.339	-0.708	-0.622	0	-15.06	0	1.674	1.954	-0.28
285.3	38.252	-0.713	-0.463	0	-15	0	1.674	1.954	-0.28
285.4	38.165	-0.713	-0.477	0	-17.38	0	1.673	1.954	-0.281
285.5	38.078	-0.713	-0.477	0	-24.48	0	1.673	1.954	-0.281
285.6	37.972	-0.683	-1.36	0	-30.44	0	1.672	1.954	-0.282
285.7	37.848	-0.708	-0.855	0	-31.83	0	1.671	1.954	-0.283
285.8	37.692	-0.708	-0.501	0	-32.4	0	1.67	1.954	-0.284
285.9	37.568	-0.708	0.208	0	-33.89	0	1.669	1.954	-0.285
286	37.425	-0.683	-0.95	0	-35.75	0	1.668	1.954	-0.286
286.1	37.282	-0.683	-1.603	0	-37.15	0	1.667	1.954	-0.287
286.2	37.127	-0.685	-1.275	0	-38.98	0	1.666	1.954	-0.288
286.3	36.965	-0.693	-0.417	0	-40.09	0	1.665	1.954	-0.289
286.4	36.804	-0.693	-0.297	0	-40.52	0	1.664	1.954	-0.29
286.5	36.636	-0.685	-0.622	0	-40.29	0	1.662	1.954	-0.291
286.6	36.474	-0.693	-0.978	0	-40.06	0	1.661	1.954	-0.292

286.7	36.307	-0.693	-0.328	0	-39.91	0	1.66	1.954	-0.294
286.8	36.127	-0.705	-0.692	0	-39.59	0	1.659	1.954	-0.295
286.9	35.977	-0.698	-0.533	0	-39.45	0	1.658	1.954	-0.296
287	35.803	-0.698	-0.487	0	-39.1	0	1.657	1.954	-0.297
287.1	35.642	-0.703	-1.017	0	-38.64	0	1.656	1.954	-0.298
287.2	35.474	-0.7	-0.664	0	-37.5	0	1.655	1.954	-0.299
287.3	35.313	-0.738	-1.035	0	-34.99	0	1.654	1.954	-0.3
287.4	35.157	-0.77	0.321	0	-28.49	0	1.653	1.954	-0.301
287.5	35.002	-0.785	0.321	0	-17.38	0	1.653	1.954	-0.301
287.6	34.884	-0.785	-0.304	0	-12.84	0	1.652	1.954	-0.302
287.7	34.791	-0.733	-0.335	0	-12.21	0	1.652	1.954	-0.302
287.8	34.697	-0.715	-1.543	0	-10.35	0	1.652	1.954	-0.302
287.9	34.623	-0.715	-0.72	0	-9.52	0	1.651	1.954	-0.302
288	34.548	-0.683	-1.398	0	-9.49	0	1.651	1.954	-0.303
288.1	34.48	-0.683	-0.932	0	-8.78	0	1.651	1.954	-0.303
288.2	34.405	-0.68	-0.283	0	-8.16	0	1.651	1.954	-0.303
288.3	34.331	-0.705	-0.851	0	-8.14	0	1.65	1.954	-0.303
288.4	34.262	-0.705	-0.65	0	-8.13	0	1.65	1.954	-0.304
288.5	34.194	-0.705	-0.65	0	-8.1	0	1.65	1.954	-0.304
288.6	34.113	-0.71	-1.095	0	-8.1	0	1.65	1.954	-0.304
288.7	34.051	-0.7	-0.883	0	-8.06	0	1.65	1.954	-0.304
288.8	33.977	-0.7	-0.607	0	-7.52	0	1.649	1.954	-0.304
288.9	33.914	-0.69	-1.18	0	-6.97	0	1.649	1.954	-0.305
289	33.846	-0.693	-0.851	0	-6.71	0	1.649	1.954	-0.305
289.1	33.784	-0.693	-0.622	0	-6.6	0	1.649	1.954	-0.305
289.2	33.716	-0.695	-0.653	0	-6.6	0	1.649	1.954	-0.305
289.3	33.653	-0.705	-0.607	0	-6.59	0	1.648	1.954	-0.305
289.4	33.585	-0.705	-0.463	0	-6.59	0	1.648	1.954	-0.306
289.5	33.523	-0.715	-0.643	0	-6.83	0	1.648	1.954	-0.306
289.6	33.455	-0.7	-0.283	0	-7.38	0	1.648	1.954	-0.306
289.7	33.386	-0.7	-0.932	0	-7.79	0	1.648	1.954	-0.306
289.8	33.312	-0.698	-1.081	0	-7.81	0	1.647	1.954	-0.306
289.9	33.243	-0.713	-0.42	0	-7.78	0	1.647	1.954	-0.307
290	33.175	-0.713	-0.134	0	-7.67	0	1.647	1.954	-0.307
290.1	33.107	-0.715	-0.692	0	-7.61	0	1.647	1.954	-0.307
290.2	33.038	-0.7	-0.607	0	-8.13	0	1.646	1.954	-0.307
290.3	32.97	-0.71	-1.137	0	-8.59	0	1.646	1.954	-0.308
290.4	32.895	-0.703	-1.356	0	-8.6	0	1.646	1.954	-0.308
290.5	32.821	-0.703	-1.356	0	-8.6	0	1.646	1.954	-0.308
290.6	32.752	-0.703	-0.579	0	-8.59	0	1.646	1.954	-0.308
290.7	32.678	-0.713	-0.265	0	-8.53	0	1.645	1.954	-0.308
290.8	32.585	-0.72	-0.667	0	-8.47	0	1.645	1.954	-0.309
290.9	32.523	-0.72	-0.547	0	-8.44	0	1.645	1.954	-0.309
291	32.448	-0.735	-0.547	0	-8.44	0	1.645	1.954	-0.309
291.1	32.38	-0.735	-0.441	0	-8.43	0	1.644	1.954	-0.309
291.2	32.305	-0.715	-0.985	0	-8.37	0	1.644	1.954	-0.31
291.3	32.231	-0.718	-0.932	0	-8.37	0	1.644	1.954	-0.31

291.4	32.156	-0.71	-0.283	0	-8.33	0	1.644	1.954	-0.31
291.5	32.088	-0.71	-0.452	0	-8.42	0	1.643	1.954	-0.31
291.6	32.013	-0.7	-1.504	0	-8.62	0	1.643	1.954	-0.311
291.7	31.938	-0.705	-0.809	0	-9.62	0	1.643	1.954	-0.311
291.8	31.851	-0.705	-0.448	0	-10.51	0	1.643	1.954	-0.311
291.9	31.783	-0.713	-0.689	0	-10.9	0	1.642	1.954	-0.311
292	31.696	-0.733	-0.975	0	-11.25	0	1.642	1.954	-0.312
292.1	31.615	-0.733	0.208	0	-12.75	0	1.642	1.954	-0.312
292.2	31.528	-0.71	-0.738	0	-15.87	0	1.641	1.954	-0.313
292.3	31.429	-0.708	-1.356	0	-18.15	0	1.641	1.954	-0.313
292.4	31.323	-0.708	-0.251	0	-18.68	0	1.64	1.954	-0.314
292.5	31.211	-0.683	-0.565	0	-19	0	1.64	1.954	-0.314
292.6	31.1	-0.695	-1.137	0	-20.01	0	1.639	1.954	-0.315
292.7	30.988	-0.695	-0.77	0	-20.31	0	1.639	1.954	-0.315
292.8	30.87	-0.705	-0.148	0	-18.29	0	1.638	1.954	-0.316
292.9	30.752	-0.695	-0.448	0	-16.46	0	1.638	1.954	-0.316
293	30.627	-0.695	-0.77	0	-15.83	0	1.637	1.954	-0.317
293.1	30.478	-0.683	-1.345	0	-21.15	0	1.637	1.954	-0.317
293.2	30.335	-0.705	-1.035	0	-23.64	0	1.636	1.954	-0.318
293.3	30.205	-0.715	-0.064	0	-24.23	0	1.635	1.954	-0.319
293.4	30.074	-0.708	-0.851	0	-23.59	0	1.635	1.954	-0.319
293.5	29.944	-0.71	-0.742	0	-23.14	0	1.634	1.954	-0.32
293.6	29.82	-0.71	-0.95	0	-22.47	0	1.633	1.954	-0.32
293.7	29.695	-0.705	-0.448	0	-17.27	0	1.633	1.954	-0.321
293.8	29.565	-0.71	-0.932	0	-13.76	0	1.632	1.954	-0.321
293.9	29.478	-0.71	-0.89	0	-12.38	0	1.632	1.954	-0.322
294	29.385	-0.7	-0.607	0	-12.29	0	1.632	1.954	-0.322
294.1	29.298	-0.7	-0.819	0	-12.35	0	1.631	1.954	-0.322
294.2	29.211	-0.69	-0.77	0	-11.74	0	1.631	1.954	-0.323
294.3	29.124	-0.71	-0.932	0	-9.92	0	1.631	1.954	-0.323
294.4	29.037	-0.698	-0.565	0	-8.16	0	1.631	1.954	-0.323
294.5	28.968	-0.698	-0.565	0	-7.56	0	1.63	1.954	-0.323
294.6	28.894	-0.725	-0.855	0	-7.32	0	1.63	1.954	-0.324
294.7	28.825	-0.73	-0.307	0	-7	0	1.63	1.954	-0.324
294.8	28.751	-0.73	-0.448	0	-6.87	0	1.63	1.954	-0.324
294.9	28.689	-0.713	-0.565	0	-4.97	0	1.63	1.954	-0.324
295	28.62	-0.723	-0.876	0	-1.08	0	1.63	1.954	-0.324
295.1	28.571	-0.723	-0.484	0	0	0	1.63	1.954	-0.324
295.2	28.521	-0.723	-0.639	0	0	0	1.63	1.954	-0.324
295.3	28.484	-0.718	-1.095	0	0	0	1.63	1.954	-0.324
295.4	28.453	-0.718	-0.36	0	0	0	1.63	1.954	-0.324
295.5	28.415	-0.693	-0.89	0	0	0	1.63	1.954	-0.324
295.6	28.378	-0.705	-1.07	0	0	0	1.63	1.954	-0.324
295.7	28.347	-0.705	-0.403	0	0	0	1.63	1.954	-0.324
295.8	28.303	-0.695	-0.283	0	0	0	1.63	1.954	-0.324
295.9	28.272	-0.695	-0.858	0	0	0	1.63	1.954	-0.324
296	28.241	-0.695	-0.565	0	1.2	0	1.63	1.954	-0.324

296.1	28.204	-0.69	-0.961	0	2.79	0	1.63	1.954	-0.324
296.2	28.173	-0.7	-0.855	0	4.29	0	1.63	1.954	-0.324
296.3	28.142	-0.7	-0.403	0	6.17	0	1.63	1.954	-0.324
296.4	28.123	-0.7	-1.067	0	10.21	0	1.63	1.955	-0.324
296.5	28.105	-0.715	-1.095	0	12.99	0	1.631	1.955	-0.324
296.6	28.098	-0.715	-0.565	0	17.85	0	1.631	1.955	-0.324
296.7	28.105	-0.703	-0.533	0	23.74	0	1.632	1.956	-0.324
296.8	28.123	-0.695	-0.932	0	27.47	0	1.633	1.957	-0.324
296.9	28.154	-0.695	-0.89	0	28.84	0	1.633	1.958	-0.324
297	28.204	-0.703	-0.932	0	33.97	0	1.634	1.959	-0.324
297.1	28.254	-0.703	-0.251	0	35.5	0	1.635	1.96	-0.324
297.2	28.316	-0.69	-0.607	0	35.91	0	1.636	1.961	-0.324
297.3	28.384	-0.703	-0.932	0	40.24	0	1.637	1.962	-0.324
297.4	28.453	-0.71	-0.304	0	47.11	0	1.639	1.963	-0.324
297.5	28.533	-0.71	-0.473	0	52.45	0	1.64	1.964	-0.324
297.6	28.633	-0.73	-0.784	0	60.27	0	1.642	1.966	-0.324
297.7	28.745	-0.713	-0.078	0	76.88	0	1.644	1.968	-0.324
297.8	28.875	-0.713	-0.565	0	98.13	0	1.647	1.971	-0.324
297.9	29.03	-0.693	-1.215	0	98.38	0	1.65	1.974	-0.324
298	29.204	-0.705	-0.89	0	118.81	0	1.653	1.977	-0.324
298.1	29.397	-0.705	-0.448	0	166.81	0	1.657	1.982	-0.324
298.2	29.583	-0.705	-0.533	0	175.82	0	1.662	1.986	-0.324
298.3	29.776	-0.67	-0.904	0	153.2	0	1.667	1.991	-0.324
298.4	30.006	-0.67	-0.484	0	82.65	0	1.669	1.993	-0.324
298.5	30.248	-0.02	0.766	0	54.43	0	1.67	1.995	-0.324
298.6	30.497	0.198	6.491	0	45.44	0	1.672	1.996	-0.324
298.7	30.739	0.198	27.058	0	42.38	0	1.673	1.997	-0.324
298.8	30.994	-0.24	47.675	0	38.16	0	1.674	1.998	-0.324
298.9	31.193	-0.12	44.645	0	35.34	0	1.675	1.999	-0.324
299	31.404	-0.12	29.304	0	33.05	0	1.676	2	-0.324
299.1	31.615	-0.02	30.632	0	31.26	0	1.677	2.001	-0.324
299.2	31.82	-0.032	38.956	0	28.93	0	1.677	2.002	-0.324
299.3	32.025	-0.025	39.496	0	26.4	0	1.678	2.002	-0.324
299.4	32.231	-0.02	38.864	0	23.4	0	1.679	2.003	-0.324
299.5	32.429	0.003	38.86	0	17.16	0	1.679	2.003	-0.324
299.6	32.641	0.003	38.864	0	11.1	0	1.68	2.004	-0.324
299.7	32.821	0	39.683	0	6.39	0	1.68	2.004	-0.324
299.8	32.995	0.028	40.354	0	2.81	0	1.68	2.004	-0.324
299.9	33.169	0.028	39.895	0	0	0	1.68	2.004	-0.324
300	33.337	0.098	40.891	0	-0.8	0	1.68	2.004	-0.324
300.1	33.504	0.098	43.207	0	7.55	0	1.68	2.004	-0.324
300.2	33.666	0.103	45.595	0	18.97	0	1.681	2.005	-0.324
300.3	33.834	0.138	47.209	0	7.03	0	1.681	2.005	-0.324
300.4	34.008	0.138	48.893	0	2.33	0	1.681	2.005	-0.324
300.5	34.188	0.138	48.95	0	12.24	0	1.681	2.006	-0.324
300.6	34.368	0.131	49.847	0	12.92	0	1.682	2.006	-0.324
300.7	34.517	0.023	49.433	0	13.9	0	1.682	2.006	-0.324

300.8	34.679	0.023	49.818	0	15.78	0	1.682	2.007	-0.324
300.9	34.853	0.048	45.461	0	15.57	0	1.683	2.007	-0.324
301	35.02	0.083	40.04	0	15.75	0	1.683	2.008	-0.324
301.1	35.201	0.083	41.604	0	16.34	0	1.684	2.008	-0.324
301.2	35.375	0.073	44.419	0	12.31	0	1.684	2.008	-0.324
301.3	35.561	0.105	44.881	0	10.02	0	1.684	2.009	-0.324
301.4	35.729	0.105	44.666	0	9.1	0	1.685	2.009	-0.324
301.5	35.903	0.12	44.352	0	8.32	0	1.685	2.009	-0.324
301.6	36.089	0.12	46.135	0	7.39	0	1.685	2.009	-0.324
301.7	36.238	0.12	46.449	0	6.93	0	1.685	2.01	-0.324
301.8	36.406	0.156	47.078	0	6.16	0	1.685	2.01	-0.324
301.9	36.58	0.166	47.918	0	5.38	0	1.686	2.01	-0.324
302	36.748	0.166	49.049	0	4.63	0	1.686	2.01	-0.324
302.1	36.916	0.193	49.154	0	3.74	0	1.686	2.01	-0.324
302.2	37.083	0.213	50.108	0	3.06	0	1.686	2.01	-0.324
302.3	37.251	0.221	51.514	0	2.95	0	1.686	2.01	-0.324
302.4	37.419	0.236	53.106	0	3.01	0	1.686	2.01	-0.324
302.5	37.593	0.231	53.187	0	3.05	0	1.686	2.011	-0.324
302.6	37.773	0.231	54.134	0	3.01	0	1.686	2.011	-0.324
302.7	37.928	0.213	54.826	0	3.01	0	1.686	2.011	-0.324
302.8	38.096	0.246	54.551	0	3.08	0	1.686	2.011	-0.324
302.9	38.264	0.246	55.977	0	3.08	0	1.686	2.011	-0.324
303	38.438	0.256	56.38	0	3.04	0	1.687	2.011	-0.324
303.1	38.612	0.256	56.606	0	3.25	0	1.687	2.011	-0.324
303.2	38.792	0.266	58.124	0	3.2	0	1.687	2.011	-0.324
303.3	38.966	0.306	59.353	0	2.89	0	1.687	2.011	-0.324
303.4	39.153	0.318	59.572	0	-1.11	0	1.687	2.011	-0.324
303.5	39.339	0.318	59.459	0	-4.94	0	1.687	2.011	-0.325
303.6	39.513	0.298	61.772	0	-9.87	0	1.686	2.011	-0.325
303.7	39.699	0.321	63.517	0	-11.19	0	1.686	2.011	-0.325
303.8	39.836	0.321	62.274	0	-8.84	0	1.686	2.011	-0.325
303.9	39.985	0.261	63.637	0	-6.42	0	1.686	2.011	-0.326
304	40.128	0.221	64.199	0	-7.01	0	1.685	2.011	-0.326
304.1	40.265	0.221	62.892	0	-7.23	0	1.685	2.011	-0.326
304.2	40.395	0.178	60.3	0	-7.94	0	1.685	2.011	-0.326
304.3	40.52	0.171	56.334	0	-9.8	0	1.685	2.011	-0.327
304.4	40.631	0.171	52.961	0	-11.78	0	1.684	2.011	-0.327
304.5	40.743	0.125	51.775	0	-14.46	0	1.684	2.011	-0.327
304.6	40.849	0.113	51.061	0	-14.86	0	1.684	2.011	-0.328
304.7	40.911	0.113	48.748	0	-16.49	0	1.683	2.011	-0.328
304.8	40.973	0.015	47.428	0	-14.25	0	1.683	2.011	-0.329
304.9	41.023	-0.045	45.718	0	-11.25	0	1.682	2.011	-0.329
305	41.073	-0.045	41.989	0	-7.94	0	1.682	2.011	-0.329
305.1	41.122	-0.042	37.374	0	-6.03	0	1.682	2.011	-0.329
305.2	41.166	-0.045	35.262	0	-2.25	0	1.682	2.011	-0.329
305.3	41.216	-0.072	35.036	0	-3.38	0	1.682	2.011	-0.329
305.4	41.265	-0.067	33.206	0	-18.79	0	1.681	2.011	-0.33

305.5	41.321	-0.052	33.178	0	-14.47	0	1.681	2.011	-0.33
305.6	41.365	-0.052	33.076	0	-10.72	0	1.681	2.011	-0.331
305.7	41.402	-0.042	33.443	0	-8.66	0	1.68	2.011	-0.331
305.8	41.445	-0.095	34.979	0	-6.61	0	1.68	2.011	-0.331
305.9	41.495	-0.095	35.636	0	-5.81	0	1.68	2.011	-0.331
306	41.539	-0.115	32.701	0	-3.66	0	1.68	2.011	-0.331
306.1	41.595	-0.115	31.264	0	-3.09	0	1.68	2.011	-0.331
306.2	41.644	-0.11	30.911	0	-2.99	0	1.68	2.011	-0.331
306.3	41.706	-0.182	31.123	0	-2.13	0	1.68	2.011	-0.332
306.4	41.762	-0.155	30.561	0	1.12	0	1.68	2.011	-0.332
306.5	41.818	-0.155	30.561	0	4.03	0	1.68	2.011	-0.332
306.6	41.887	-0.112	29.636	0	4.12	0	1.68	2.011	-0.332
306.7	41.955	-0.115	30.72	0	3.49	0	1.68	2.012	-0.332
306.8	42.023	-0.115	30.953	0	2.88	0	1.68	2.012	-0.332
306.9	42.092	-0.107	31.465	0	2.21	0	1.68	2.012	-0.332
307	42.166	-0.09	31.822	0	1.29	0	1.68	2.012	-0.332
307.1	42.235	-0.09	31.695	0	-0.56	0	1.68	2.012	-0.332
307.2	42.303	-0.087	32.189	0	-1.24	0	1.68	2.012	-0.332
307.3	42.365	-0.072	32.949	0	-1.51	0	1.68	2.012	-0.332
307.4	42.433	-0.072	33.175	0	-1.53	0	1.68	2.012	-0.332
307.5	42.496	-0.042	33.319	0	-1.77	0	1.68	2.012	-0.332
307.6	42.57	-0.057	33.538	0	-1.77	0	1.68	2.012	-0.332
307.7	42.626	-0.057	34.142	0	-1.95	0	1.68	2.012	-0.332
307.8	42.694	-0.077	34.909	0	-2.62	0	1.68	2.012	-0.332
307.9	42.757	-0.067	34.577	0	-2.72	0	1.68	2.012	-0.332
308	42.819	-0.067	33.99	0	-2.62	0	1.68	2.012	-0.332
308.1	42.887	-0.07	34.439	0	-2.68	0	1.68	2.012	-0.332
308.2	42.949	-0.062	34.909	0	-2.68	0	1.68	2.012	-0.332
308.3	43.011	-0.042	34.697	0	-3.38	0	1.679	2.012	-0.332
308.4	43.08	-0.055	34.439	0	-3.36	0	1.679	2.012	-0.332
308.5	43.136	-0.065	34.439	0	-3.39	0	1.679	2.012	-0.332
308.6	43.192	-0.065	34.591	0	-3.53	0	1.679	2.012	-0.333
308.7	43.254	-0.062	34.548	0	-4.22	0	1.679	2.012	-0.333
308.8	43.316	-0.07	34.004	0	-4.01	0	1.679	2.012	-0.333
308.9	43.372	-0.07	34.344	0	-4.07	0	1.679	2.012	-0.333
309	43.428	-0.07	34.015	0	-4.04	0	1.679	2.012	-0.333
309.1	43.484	-0.07	34.372	0	-3.94	0	1.679	2.012	-0.333
309.2	43.539	-0.075	34.153	0	-4.18	0	1.679	2.012	-0.333
309.3	43.595	-0.092	33.552	0	-4.3	0	1.678	2.012	-0.333
309.4	43.658	-0.09	34.096	0	-4.33	0	1.678	2.012	-0.333
309.5	43.713	-0.09	34.096	0	-4.39	0	1.678	2.012	-0.334
309.6	43.769	-0.067	33.386	0	-4.56	0	1.678	2.012	-0.334
309.7	43.825	-0.075	33.831	0	-4.91	0	1.678	2.012	-0.334
309.8	43.881	-0.075	34.386	0	-6.09	0	1.678	2.012	-0.334
309.9	43.931	-0.072	34.301	0	-6.95	0	1.678	2.012	-0.334
310	43.987	-0.065	34.386	0	-6.75	0	1.677	2.012	-0.334
310.1	44.037	-0.065	34.301	0	-6.57	0	1.677	2.012	-0.335

310.2	44.086	-0.06	34.181	0	-5.76	0	1.677	2.012	-0.335
310.3	44.13	-0.087	33.916	0	-5.27	0	1.677	2.012	-0.335
310.4	44.173	-0.087	34.1	0	-5.19	0	1.677	2.012	-0.335
310.5	44.211	-0.132	33.609	0	-5.87	0	1.677	2.012	-0.335
310.6	44.254	-0.135	32.235	0	-5.78	0	1.676	2.012	-0.335
310.7	44.291	-0.135	31.148	0	-6.1	0	1.676	2.012	-0.336
310.8	44.335	-0.15	29.548	0	-6.07	0	1.676	2.012	-0.336
310.9	44.372	-0.155	30.667	0	-6.31	0	1.676	2.012	-0.336
311	44.403	-0.155	30.226	0	-5.95	0	1.676	2.012	-0.336
311.1	44.434	-0.152	29.77	0	-5.88	0	1.676	2.012	-0.336
311.2	44.472	-0.15	29.41	0	-6.87	0	1.675	2.012	-0.336
311.3	44.496	-0.145	28.82	0	-8.34	0	1.675	2.012	-0.337
311.4	44.527	-0.152	28.672	0	-8.72	0	1.675	2.012	-0.337
311.5	44.552	-0.145	28.672	0	-9	0	1.675	2.012	-0.337
311.6	44.577	-0.145	28.584	0	-9.12	0	1.674	2.012	-0.337
311.7	44.596	-0.165	28.075	0	-8.73	0	1.674	2.012	-0.338
311.8	44.614	-0.175	28.382	0	-8.09	0	1.674	2.012	-0.338
311.9	44.639	-0.175	28.061	0	-7.61	0	1.674	2.012	-0.338
312	44.658	-0.182	27.786	0	-7.14	0	1.674	2.012	-0.338
312.1	44.677	-0.182	27.164	0	-6.43	0	1.673	2.012	-0.338
312.2	44.695	-0.175	26.708	0	-5.81	0	1.673	2.012	-0.339
312.3	44.714	-0.21	26.458	0	-5.28	0	1.673	2.012	-0.339
312.4	44.739	-0.21	25.995	0	-5.47	0	1.673	2.012	-0.339
312.5	44.757	-0.21	25.914	0	-5.47	0	1.673	2.012	-0.339
312.6	44.776	-0.21	25.621	0	-5.49	0	1.673	2.012	-0.339
312.7	44.801	-0.195	25.455	0	-5.48	0	1.672	2.012	-0.339
312.8	44.82	-0.195	25.222	0	-5.46	0	1.672	2.012	-0.339
312.9	44.844	-0.182	25.794	0	-5.47	0	1.672	2.012	-0.34
313	44.869	-0.192	25.875	0	-5.48	0	1.672	2.012	-0.34
313.1	44.888	-0.192	26.196	0	-5.48	0	1.672	2.012	-0.34
313.2	44.913	-0.217	26.663	0	-5.49	0	1.672	2.012	-0.34
313.3	44.938	-0.195	26.913	0	-5.48	0	1.672	2.012	-0.34
313.4	44.956	-0.195	25.924	0	-5.5	0	1.671	2.012	-0.34
313.5	44.981	-0.197	25.896	0	-5.5	0	1.671	2.012	-0.341
313.6	45.006	-0.21	26.829	0	-5.5	0	1.671	2.012	-0.341
313.7	45.025	-0.21	27.228	0	-5.5	0	1.671	2.012	-0.341
313.8	45.049	-0.195	26.006	0	-5.52	0	1.671	2.012	-0.341
313.9	45.074	-0.195	26.115	0	-5.82	0	1.671	2.012	-0.341
314	45.093	-0.195	26.186	0	-6.36	0	1.67	2.012	-0.341
314.1	45.118	-0.185	26.225	0	-6.42	0	1.67	2.012	-0.342
314.2	45.136	-0.192	26.324	0	-6.33	0	1.67	2.012	-0.342
314.3	45.155	-0.195	26.295	0	-6.24	0	1.67	2.012	-0.342
314.4	45.174	-0.215	26.843	0	-6.08	0	1.67	2.012	-0.342
314.5	45.192	-0.207	26.758	0	-5.93	0	1.67	2.012	-0.342
314.6	45.217	-0.207	26.249	0	-5.84	0	1.669	2.012	-0.342
314.7	45.236	-0.195	25.465	0	-5.78	0	1.669	2.012	-0.343
314.8	45.254	-0.215	26.03	0	-5.66	0	1.669	2.012	-0.343

314.9	45.273	-0.215	25.995	0	-5.61	0	1.669	2.012	-0.343
315	45.298	-0.217	26.225	0	-5.59	0	1.669	2.012	-0.343
315.1	45.317	-0.217	26.292	0	-5.57	0	1.669	2.012	-0.343
315.2	45.335	-0.21	25.49	0	-5.57	0	1.668	2.012	-0.343
315.3	45.354	-0.197	25.451	0	-5.55	0	1.668	2.012	-0.343
315.4	45.379	-0.187	25.808	0	-5.58	0	1.668	2.012	-0.344
315.5	45.397	-0.187	25.808	0	-5.56	0	1.668	2.012	-0.344
315.6	45.422	-0.182	26.076	0	-5.57	0	1.668	2.012	-0.344
315.7	45.441	-0.167	26.165	0	-5.58	0	1.668	2.012	-0.344
315.8	45.46	-0.167	25.783	0	-5.58	0	1.668	2.012	-0.344
315.9	45.478	-0.175	25.995	0	-5.59	0	1.667	2.012	-0.344
316	45.503	-0.182	26.348	0	-5.57	0	1.667	2.012	-0.345
316.1	45.528	-0.182	26.348	0	-5.61	0	1.667	2.012	-0.345
316.2	45.553	-0.2	26.85	0	-5.59	0	1.667	2.012	-0.345
316.3	45.571	-0.21	26.786	0	-5.63	0	1.667	2.012	-0.345
316.4	45.59	-0.21	26.504	0	-5.67	0	1.667	2.012	-0.345
316.5	45.615	-0.222	26.539	0	-5.61	0	1.666	2.012	-0.345
316.6	45.634	-0.215	26.292	0	-5.54	0	1.666	2.012	-0.345
316.7	45.658	-0.215	26.239	0	-5.45	0	1.666	2.012	-0.346
316.8	45.677	-0.212	25.66	0	-5.45	0	1.666	2.012	-0.346
316.9	45.702	-0.2	26.461	0	-5.44	0	1.666	2.012	-0.346
317	45.72	-0.2	26.419	0	-5.45	0	1.666	2.012	-0.346
317.1	45.745	-0.187	25.631	0	-5.48	0	1.666	2.012	-0.346
317.2	45.764	-0.195	26.281	0	-5.45	0	1.665	2.012	-0.346
317.3	45.783	-0.19	26.461	0	-5.44	0	1.665	2.012	-0.347
317.4	45.801	-0.185	26.03	0	-5.47	0	1.665	2.012	-0.347
317.5	45.82	-0.19	26.006	0	-5.51	0	1.665	2.012	-0.347
317.6	45.839	-0.19	25.861	0	-5.76	0	1.665	2.012	-0.347
317.7	45.857	-0.217	26.377	0	-5.75	0	1.665	2.012	-0.347
317.8	45.882	-0.212	26.278	0	-5.99	0	1.664	2.012	-0.347
317.9	45.901	-0.212	25.518	0	-6.03	0	1.664	2.012	-0.348
318	45.919	-0.205	25.875	0	-6.04	0	1.664	2.012	-0.348
318.1	45.938	-0.205	26.098	0	-6.01	0	1.664	2.012	-0.348
318.2	45.963	-0.205	26.352	0	-6	0	1.664	2.012	-0.348
318.3	45.981	-0.19	26.377	0	-6	0	1.664	2.012	-0.348
318.4	46	-0.192	26.701	0	-6.02	0	1.663	2.012	-0.348
318.5	46.025	-0.192	26.814	0	-5.2	0	1.663	2.012	-0.348
318.6	46.044	-0.202	26.5	0	-3.32	0	1.663	2.012	-0.349
318.7	46.062	-0.2	26.73	0	-3.41	0	1.663	2.012	-0.349
318.8	46.087	-0.2	26.377	0	-3.15	0	1.663	2.012	-0.349
318.9	46.118	-0.182	26.193	0	-2.7	0	1.663	2.012	-0.349
319	46.143	-0.185	26.8	0	-3.81	0	1.663	2.012	-0.349
319.1	46.174	-0.185	27.256	0	-3.2	0	1.663	2.012	-0.349
319.2	46.199	-0.19	27.485	0	-3.27	0	1.663	2.012	-0.349
319.3	46.23	-0.17	27.793	0	-2.41	0	1.663	2.012	-0.349
319.4	46.261	-0.17	27.831	0	-1.96	0	1.663	2.012	-0.349
319.5	46.292	-0.167	28.156	0	-1.53	0	1.662	2.012	-0.349

319.6	46.323	-0.18	29.043	0	-1.55	0	1.662	2.012	-0.349
319.7	46.361	-0.18	28.471	0	0	0	1.662	2.012	-0.349
319.8	46.385	-0.19	26.98	0	1.27	0	1.662	2.012	-0.349
319.9	46.423	-0.192	26.882	0	2.22	0	1.663	2.012	-0.349
320	46.454	-0.192	26.882	0	0	0	1.663	2.012	-0.349
320.1	46.497	-0.175	26.896	0	-1.06	0	1.663	2.012	-0.349
320.2	46.541	-0.14	27.213	0	-1.9	0	1.662	2.012	-0.349
320.3	46.59	-0.065	28.923	0	-2.66	0	1.662	2.012	-0.349
320.4	46.646	-0.042	29.007	0	-3.63	0	1.662	2.012	-0.35
320.5	46.696	-0.035	31.953	0	-5.04	0	1.662	2.012	-0.35
320.6	46.74	-0.035	33.701	0	-5.04	0	1.662	2.012	-0.35
320.7	46.789	-0.027	34.192	0	-5.13	0	1.662	2.012	-0.35
320.8	46.839	-0.017	35.025	0	-5.2	0	1.662	2.012	-0.35
320.9	46.882	-0.017	35.452	0	-5.32	0	1.662	2.012	-0.35
321	46.938	-0.035	35.77	0	-5.4	0	1.661	2.012	-0.35
321.1	46.982	-0.035	36.462	0	-5.84	0	1.661	2.012	-0.351
321.2	47.032	-0.04	36.568	0	-6.55	0	1.661	2.012	-0.351
321.3	47.075	-0.047	36.014	0	-8.35	0	1.661	2.012	-0.351
321.4	47.119	-0.025	35.993	0	-10	0	1.661	2.012	-0.351
321.5	47.156	-0.025	35.908	0	-9.97	0	1.66	2.012	-0.352
321.6	47.187	-0.052	35.308	0	-10.85	0	1.66	2.012	-0.352
321.7	47.218	-0.092	36.653	0	-10.09	0	1.66	2.012	-0.352
321.8	47.237	-0.092	36.014	0	-8.76	0	1.659	2.012	-0.352
321.9	47.261	-0.122	33.33	0	-7.53	0	1.659	2.012	-0.353
322	47.286	-0.13	31.585	0	-6.6	0	1.659	2.012	-0.353
322.1	47.311	-0.13	30.696	0	-6.49	0	1.659	2.012	-0.353
322.2	47.33	-0.132	30.346	0	-5.73	0	1.659	2.012	-0.353
322.3	47.361	-0.132	29.961	0	-4.67	0	1.659	2.012	-0.353
322.4	47.386	-0.132	29.809	0	-3.83	0	1.658	2.012	-0.353
322.5	47.423	-0.112	29.421	0	-3.09	0	1.658	2.012	-0.353
322.6	47.454	-0.105	29.682	0	-2.13	0	1.658	2.012	-0.354
322.7	47.491	-0.105	30.766	0	-1.97	0	1.658	2.012	-0.354
322.8	47.541	-0.09	31.314	0	-1.42	0	1.658	2.012	-0.354
322.9	47.585	-0.072	31.201	0	0	0	1.658	2.012	-0.354
323	47.641	-0.072	31.529	0	0	0	1.658	2.012	-0.354
323.1	47.696	-0.045	32.507	0	0	0	1.658	2.012	-0.354
323.2	47.759	-0.01	33.704	0	0.59	0	1.658	2.012	-0.354
323.3	47.821	-0.012	35.007	0	0.89	0	1.658	2.012	-0.354
323.4	47.883	-0.015	36.861	0	0	0	1.658	2.012	-0.354
323.5	47.945	-0.012	36.946	0	2.13	0	1.658	2.012	-0.354
323.6	48.013	-0.012	37.582	0	1.79	0	1.658	2.012	-0.354
323.7	48.082	0.005	38.055	0	2.18	0	1.658	2.012	-0.354
323.8	48.144	0.03	37.956	0	1.29	0	1.659	2.012	-0.354
323.9	48.218	0.03	37.857	0	-0.71	0	1.658	2.012	-0.354
324	48.287	0.018	38.673	0	-0.74	0	1.658	2.012	-0.354
324.1	48.355	0.018	39.139	0	0	0	1.658	2.012	-0.354
324.2	48.417	0.033	39.256	0	2.35	0	1.659	2.012	-0.354

324.3	48.486	0.043	39.768	0	2.3	0	1.659	2.012	-0.354
324.4	48.56	0.065	39.768	0	2.72	0	1.659	2.012	-0.354
324.5	48.635	0.065	39.683	0	2.04	0	1.659	2.012	-0.354
324.6	48.716	0.048	40.223	0	1.32	0	1.659	2.012	-0.354
324.7	48.784	0.05	41.029	0	-0.76	0	1.659	2.012	-0.354
324.8	48.865	0.05	40.591	0	-0.75	0	1.659	2.012	-0.354
324.9	48.933	0.078	40.961	0	-0.73	0	1.659	2.012	-0.354
325	49.008	0.085	41.371	0	-0.74	0	1.659	2.012	-0.354
325.1	49.076	0.085	41.986	0	-0.74	0	1.659	2.012	-0.354
325.2	49.15	0.07	42.166	0	-0.74	0	1.659	2.012	-0.354
325.3	49.225	0.085	42.579	0	-0.77	0	1.659	2.012	-0.354
325.4	49.3	0.085	41.986	0	-0.75	0	1.659	2.012	-0.354
325.5	49.374	0.075	42.137	0	-0.76	0	1.659	2.012	-0.354
325.6	49.443	0.08	43.313	0	-0.78	0	1.659	2.012	-0.354
325.7	49.517	0.08	42.72	0	-0.76	0	1.659	2.012	-0.354
325.8	49.592	0.078	42.886	0	-0.78	0	1.658	2.012	-0.354
325.9	49.666	0.073	42.9	0	-0.77	0	1.658	2.012	-0.354
326	49.735	0.073	43.091	0	-0.77	0	1.658	2.012	-0.354
326.1	49.809	0.088	42.777	0	-0.82	0	1.658	2.012	-0.354
326.2	49.877	0.093	42.074	0	-0.81	0	1.658	2.012	-0.354
326.3	49.946	0.083	42.508	0	-0.8	0	1.658	2.012	-0.354
326.4	50.014	0.07	42.692	0	-0.95	0	1.658	2.012	-0.354
326.5	50.089	0.07	42.579	0	-0.95	0	1.658	2.012	-0.354
326.6	50.157	0.07	42.671	0	-1.01	0	1.658	2.012	-0.354
326.7	50.225	0.073	42.685	0	-1.09	0	1.658	2.012	-0.354
326.8	50.294	0.085	42.356	0	-1.01	0	1.658	2.012	-0.354
326.9	50.362	0.085	42.441	0	-1.65	0	1.658	2.012	-0.354
327	50.43	0.1	42.639	0	-2.03	0	1.658	2.012	-0.354
327.1	50.499	0.1	42.526	0	-1.97	0	1.658	2.012	-0.354
327.2	50.567	0.098	42.473	0	-1.91	0	1.658	2.012	-0.354
327.3	50.629	0.08	43.264	0	-1.79	0	1.658	2.012	-0.354
327.4	50.698	0.068	43.179	0	-1.64	0	1.658	2.012	-0.355
327.5	50.76	0.068	43.179	0	-1.76	0	1.658	2.012	-0.355
327.6	50.828	0.085	42.78	0	-1.6	0	1.658	2.012	-0.355
327.7	50.89	0.093	42.402	0	-1.47	0	1.658	2.012	-0.355
327.8	50.952	0.093	42.572	0	-1.52	0	1.658	2.012	-0.355
327.9	51.021	0.083	42.378	0	-1.44	0	1.658	2.012	-0.355
328	51.083	0.088	42.378	0	-1.4	0	1.658	2.012	-0.355
328.1	51.145	0.088	42.176	0	-1.39	0	1.658	2.012	-0.355
328.2	51.207	0.08	42.378	0	-1.26	0	1.658	2.012	-0.355
328.3	51.269	0.083	42.688	0	-1.26	0	1.658	2.012	-0.355
328.4	51.338	0.083	42.579	0	-1.31	0	1.658	2.012	-0.355
328.5	51.4	0.048	42.544	0	-1.31	0	1.658	2.012	-0.355
328.6	51.462	0.058	42.918	0	-0.82	0	1.657	2.012	-0.355
328.7	51.524	0.058	42.363	0	-0.57	0	1.657	2.012	-0.355
328.8	51.586	0.06	42.205	0	-0.84	0	1.657	2.012	-0.355
328.9	51.655	0.085	42.699	0	-0.86	0	1.657	2.012	-0.355

329	51.717	0.085	41.784	0	-0.95	0	1.657	2.012	-0.355
329.1	51.785	0.098	42.529	0	-1.2	0	1.657	2.012	-0.355
329.2	51.853	0.085	43.476	0	-1.25	0	1.657	2.012	-0.355
329.3	51.916	0.078	43.2	0	-1.44	0	1.657	2.012	-0.355
329.4	51.984	0.083	43.561	0	-1.58	0	1.657	2.012	-0.355
329.5	52.046	0.078	43.479	0	-1.6	0	1.657	2.012	-0.355
329.6	52.108	0.078	43.804	0	-1.73	0	1.657	2.012	-0.355
329.7	52.177	0.088	43.409	0	-1.8	0	1.657	2.012	-0.355
329.8	52.239	0.09	43.144	0	-1.77	0	1.657	2.012	-0.355
329.9	52.307	0.09	43.451	0	-1.93	0	1.657	2.012	-0.355
330	52.369	0.083	43.059	0	-1.87	0	1.657	2.012	-0.356
330.1	52.431	0.083	43.328	0	-1.39	0	1.657	2.012	-0.356
330.2	52.493	0.083	44.009	0	-1.22	0	1.657	2.012	-0.356
330.3	52.556	0.07	44.009	0	-0.95	0	1.657	2.012	-0.356
330.4	52.624	0.08	43.232	0	-0.87	0	1.657	2.012	-0.356
330.5	52.686	0.08	43.232	0	-0.79	0	1.657	2.012	-0.356
330.6	52.754	0.078	43.328	0	0	0	1.657	2.012	-0.356
330.7	52.817	0.085	44.207	0	0	0	1.657	2.012	-0.356
330.8	52.879	0.085	44.08	0	0	0	1.657	2.012	-0.356
330.9	52.947	0.103	43.928	0	0	0	1.657	2.012	-0.356
331	53.009	0.108	44.362	0	0	0	1.657	2.012	-0.356
331.1	53.078	0.108	44.278	0	0	0	1.657	2.012	-0.356
331.2	53.14	0.11	44.733	0	0	0	1.657	2.012	-0.356
331.3	53.208	0.093	44.91	0	0	0	1.657	2.012	-0.356
331.4	53.276	0.093	44.91	0	0	0	1.657	2.012	-0.356
331.5	53.339	0.118	45.482	0	-0.55	0	1.657	2.012	-0.356
331.6	53.413	0.108	45.249	0	-0.66	0	1.657	2.012	-0.356
331.7	53.481	0.108	45.676	0	-0.92	0	1.657	2.012	-0.356
331.8	53.55	0.113	46.054	0	-0.61	0	1.657	2.012	-0.356
331.9	53.612	0.125	45.549	0	0	0	1.657	2.012	-0.356
332	53.686	0.125	45.492	0	0	0	1.657	2.012	-0.356
332.1	53.755	0.136	46.884	0	0	0	1.657	2.012	-0.356
332.2	53.823	0.138	46.52	0	0	0	1.657	2.012	-0.356
332.3	53.885	0.161	46.651	0	0	0	1.657	2.012	-0.356
332.4	53.96	0.151	46.799	0	0	0	1.657	2.012	-0.356
332.5	54.028	0.133	46.799	0	0	0	1.657	2.012	-0.356
332.6	54.097	0.133	47.802	0	-0.61	0	1.656	2.012	-0.356
332.7	54.171	0.146	47.371	0	-0.61	0	1.656	2.012	-0.356
332.8	54.246	0.171	47.77	0	-0.54	0	1.656	2.012	-0.356
332.9	54.314	0.171	48.363	0	-0.89	0	1.656	2.012	-0.356
333	54.389	0.161	48.501	0	-0.97	0	1.656	2.012	-0.356
333.1	54.463	0.161	49.72	0	-1.21	0	1.656	2.012	-0.356
333.2	54.544	0.158	49.984	0	-1.51	0	1.656	2.012	-0.356
333.3	54.612	0.168	49.564	0	-1.65	0	1.656	2.012	-0.356
333.4	54.687	0.211	50.359	0	-1.88	0	1.656	2.012	-0.356
333.5	54.755	0.211	50.359	0	-2	0	1.656	2.012	-0.356
333.6	54.83	0.216	50.867	0	-2.09	0	1.656	2.012	-0.356

333.7	54.917	0.206	50.828	0	-2.18	0	1.656	2.012	-0.356
333.8	54.985	0.206	50.627	0	-2.25	0	1.656	2.012	-0.356
333.9	55.053	0.176	50.443	0	-2.37	0	1.656	2.012	-0.357
334	55.128	0.148	51.217	0	-2.35	0	1.656	2.012	-0.357
334.1	55.196	0.148	51.937	0	-2.49	0	1.656	2.012	-0.357
334.2	55.271	0.181	50.348	0	-2.52	0	1.656	2.012	-0.357
334.3	55.339	0.131	50.518	0	-2.61	0	1.656	2.012	-0.357
334.4	55.42	0.131	51.8	0	-2.63	0	1.656	2.012	-0.357
334.5	55.488	0.143	50.458	0	-2.56	0	1.656	2.012	-0.357
334.6	55.563	0.133	50.161	0	-2.52	0	1.655	2.012	-0.357
334.7	55.631	0.133	51.235	0	-2.46	0	1.655	2.012	-0.357
334.8	55.706	0.166	50.963	0	-2.43	0	1.655	2.012	-0.357
334.9	55.774	0.148	50.461	0	-2.26	0	1.655	2.012	-0.357
335	55.843	0.148	50.546	0	-2.32	0	1.655	2.012	-0.357
335.1	55.911	0.136	51.157	0	-2.31	0	1.655	2.012	-0.357
335.2	55.979	0.133	51.422	0	-2.28	0	1.655	2.012	-0.357
335.3	56.048	0.201	49.963	0	-2.52	0	1.655	2.012	-0.357
335.4	56.116	0.173	49.974	0	-2.49	0	1.655	2.012	-0.358
335.5	56.178	0.118	50.055	0	-2.51	0	1.655	2.012	-0.358
335.6	56.247	0.118	51.697	0	-2.62	0	1.655	2.012	-0.358
335.7	56.321	0.125	50.751	0	-2.67	0	1.655	2.012	-0.358
335.8	56.383	0.136	50.338	0	-2.73	0	1.655	2.012	-0.358
335.9	56.445	0.136	50.313	0	-2.83	0	1.655	2.012	-0.358
336	56.514	0.123	51.026	0	-3.68	0	1.654	2.012	-0.358
336.1	56.576	0.123	50.938	0	-4.05	0	1.654	2.012	-0.358
336.2	56.638	0.136	50.821	0	-5.67	0	1.654	2.012	-0.358
336.3	56.706	0.171	50.895	0	-7.67	0	1.654	2.012	-0.358
336.4	56.762	0.183	50.966	0	-6.59	0	1.654	2.012	-0.359
336.5	56.818	0.183	50.938	0	-7.78	0	1.654	2.012	-0.359
336.6	56.868	0.171	51.259	0	-11.26	0	1.653	2.012	-0.359
336.7	56.918	0.068	50.542	0	-14.68	0	1.653	2.012	-0.36
336.8	56.949	0.068	51.273	0	-16.51	0	1.652	2.012	-0.36
336.9	56.974	0.023	49.448	0	-18.42	0	1.652	2.012	-0.361
337	56.998	0.045	45.044	0	-19.86	0	1.651	2.012	-0.361
337.1	57.005	0.045	43.105	0	-20.03	0	1.651	2.012	-0.362
337.2	57.017	0.045	42.893	0	-19.18	0	1.65	2.012	-0.362
337.3	57.023	0.033	42.145	0	-17.98	0	1.65	2.012	-0.363
337.4	57.023	0.033	41.975	0	-15.4	0	1.649	2.012	-0.363
337.5	57.023	-0.022	40.333	0	-11.22	0	1.649	2.012	-0.363
337.6	57.017	-0.085	39.612	0	-7.85	0	1.649	2.012	-0.364
337.7	57.011	-0.085	38.136	0	-5.51	0	1.649	2.012	-0.364
337.8	57.005	-0.192	34.958	0	-3.87	0	1.649	2.012	-0.364
337.9	56.998	-0.212	31.479	0	-2.24	0	1.648	2.012	-0.364
338	56.992	-0.212	27.824	0	-0.87	0	1.648	2.012	-0.364
338.1	56.986	-0.22	25.886	0	0	0	1.648	2.012	-0.364
338.2	56.98	-0.232	24.847	0	0	0	1.648	2.012	-0.364
338.3	56.974	-0.247	23.926	0	1.31	0	1.648	2.012	-0.364

338.4	56.974	-0.26	23.449	0	3.2	0	1.649	2.013	-0.364
338.5	56.974	-0.26	23.449	0	3.18	0	1.649	2.013	-0.364
338.6	56.974	-0.26	23.784	0	3.22	0	1.649	2.013	-0.364
338.7	56.98	-0.215	23.354	0	3.18	0	1.649	2.013	-0.364
338.8	56.992	-0.182	23.869	0	3.23	0	1.649	2.013	-0.364
338.9	57.005	-0.182	24.996	0	3.23	0	1.649	2.013	-0.364
339	57.017	-0.15	26.235	0	2.86	0	1.649	2.013	-0.364
339.1	57.036	-0.15	28.393	0	2.98	0	1.649	2.013	-0.364
339.2	57.054	-0.127	28.697	0	3.31	0	1.649	2.013	-0.364
339.3	57.073	-0.125	30.24	0	3.31	0	1.649	2.013	-0.364
339.4	57.092	-0.117	31.366	0	3.3	0	1.649	2.013	-0.364
339.5	57.116	-0.117	31.366	0	3.3	0	1.65	2.014	-0.364
339.6	57.135	-0.12	32.027	0	3.29	0	1.65	2.014	-0.364
339.7	57.16	-0.105	31.935	0	3.31	0	1.65	2.014	-0.364
339.8	57.179	-0.105	31.857	0	3.28	0	1.65	2.014	-0.364
339.9	57.203	-0.105	32.479	0	3.33	0	1.65	2.014	-0.364
340	57.228	-0.097	33.535	0	3.29	0	1.65	2.014	-0.364
340.1	57.253	-0.097	33.778	0	3.32	0	1.65	2.014	-0.364
340.2	57.284	-0.092	33.605	0	3.29	0	1.65	2.014	-0.364
340.3	57.309	-0.082	33.715	0	3.32	0	1.65	2.014	-0.364
340.4	57.334	-0.082	33.715	0	3.29	0	1.65	2.014	-0.364
340.5	57.365	-0.075	33.916	0	3.34	0	1.65	2.014	-0.364
340.6	57.39	-0.07	33.821	0	3.29	0	1.651	2.015	-0.364
340.7	57.415	-0.07	33.549	0	3.32	0	1.651	2.015	-0.364
340.8	57.44	-0.07	34.1	0	3.27	0	1.651	2.015	-0.364
340.9	57.464	-0.06	34.1	0	3.32	0	1.651	2.015	-0.364
341	57.489	-0.06	33.694	0	3.29	0	1.651	2.015	-0.364
341.1	57.514	-0.057	33.874	0	3.31	0	1.651	2.015	-0.364
341.2	57.545	-0.062	33.743	0	3.3	0	1.651	2.015	-0.364
341.3	57.57	-0.072	34.11	0	3.31	0	1.651	2.015	-0.364
341.4	57.595	-0.072	34.322	0	3.3	0	1.651	2.015	-0.364
341.5	57.626	-0.06	34.298	0	3.31	0	1.651	2.015	-0.364
341.6	57.651	-0.06	34.637	0	3.32	0	1.651	2.015	-0.364
341.7	57.682	-0.037	33.955	0	3.31	0	1.652	2.016	-0.364
341.8	57.707	-0.052	34.675	0	3.34	0	1.652	2.016	-0.364
341.9	57.738	-0.052	34.661	0	3.12	0	1.652	2.016	-0.364
342	57.769	-0.037	35.417	0	2.33	0	1.652	2.016	-0.364
342.1	57.8	-0.037	35.233	0	2.46	0	1.652	2.016	-0.364
342.2	57.825	-0.03	35.251	0	2.15	0	1.652	2.016	-0.364
342.3	57.856	-0.025	35.887	0	2.22	0	1.652	2.016	-0.364
342.4	57.887	-0.022	35.191	0	2.28	0	1.652	2.016	-0.364
342.5	57.912	-0.022	35.11	0	2.62	0	1.652	2.016	-0.364
342.6	57.943	-0.06	35.901	0	2.13	0	1.652	2.016	-0.364
342.7	57.968	-0.045	35.972	0	2.19	0	1.652	2.016	-0.364
342.8	57.993	-0.045	35.166	0	2.28	0	1.652	2.016	-0.364
342.9	58.017	-0.042	35.205	0	2.41	0	1.652	2.016	-0.364
343	58.042	-0.07	35.534	0	2.57	0	1.652	2.016	-0.364

343.1	58.067	-0.07	35.163	0	2.73	0	1.652	2.017	-0.364
343.2	58.092	-0.087	34.962	0	2.94	0	1.653	2.017	-0.364
343.3	58.111	-0.065	33.955	0	3.15	0	1.653	2.017	-0.364
343.4	58.135	-0.065	33.326	0	3.14	0	1.653	2.017	-0.364
343.5	58.16	-0.075	33.86	0	3.27	0	1.653	2.017	-0.364
343.6	58.185	-0.077	34.043	0	3.15	0	1.653	2.017	-0.364
343.7	58.21	-0.077	33.312	0	1.32	0	1.653	2.017	-0.364
343.8	58.229	-0.067	33.899	0	0.6	0	1.653	2.017	-0.364
343.9	58.247	-0.082	33.235	0	0	0	1.653	2.017	-0.364
344	58.266	-0.082	33.916	0	0.85	0	1.653	2.017	-0.364
344.1	58.285	-0.092	33.86	0	1.76	0	1.653	2.017	-0.364
344.2	58.297	-0.09	33.312	0	2.25	0	1.653	2.017	-0.364
344.3	58.316	-0.115	33.055	0	2.75	0	1.653	2.017	-0.364
344.4	58.328	-0.115	32.479	0	3.05	0	1.653	2.017	-0.364
344.5	58.347	-0.112	32.369	0	3.27	0	1.653	2.017	-0.364
344.6	58.365	-0.112	31.663	0	3.33	0	1.653	2.018	-0.364
344.7	58.378	-0.117	31.335	0	3.23	0	1.654	2.018	-0.364
344.8	58.396	-0.132	31.706	0	3.26	0	1.654	2.018	-0.364
344.9	58.409	-0.132	31.43	0	3.27	0	1.654	2.018	-0.364
345	58.428	-0.137	31.716	0	3.24	0	1.654	2.018	-0.364
345.1	58.44	-0.137	31.017	0	3.27	0	1.654	2.018	-0.364
345.2	58.459	-0.13	30.805	0	3.25	0	1.654	2.018	-0.364
345.3	58.471	-0.14	30.801	0	3.24	0	1.654	2.018	-0.364
345.4	58.49	-0.13	30.748	0	3.28	0	1.654	2.018	-0.364
345.5	58.502	-0.13	30.748	0	3.24	0	1.654	2.018	-0.364
345.6	58.515	-0.135	30.568	0	3.26	0	1.654	2.018	-0.364
345.7	58.533	-0.132	30.861	0	3.27	0	1.654	2.019	-0.364
345.8	58.546	-0.132	31.035	0	3.23	0	1.655	2.019	-0.364
345.9	58.564	-0.15	30.554	0	3.28	0	1.655	2.019	-0.364
346	58.577	-0.142	31.321	0	3.27	0	1.655	2.019	-0.364
346.1	58.589	-0.142	31.702	0	3.25	0	1.655	2.019	-0.364
346.2	58.608	-0.125	30.816	0	3.28	0	1.655	2.019	-0.364
346.3	58.626	-0.145	31.158	0	3.25	0	1.655	2.019	-0.364
346.4	58.639	-0.145	31.801	0	3.25	0	1.655	2.019	-0.364
346.5	58.657	-0.122	30.646	0	3.27	0	1.655	2.019	-0.364
346.6	58.67	-0.125	30.872	0	3.16	0	1.655	2.019	-0.364
346.7	58.689	-0.125	31.289	0	3.01	0	1.655	2.019	-0.364
346.8	58.701	-0.13	31.54	0	3.04	0	1.655	2.019	-0.364
346.9	58.713	-0.12	31.444	0	3.19	0	1.656	2.02	-0.364
347	58.732	-0.12	31.112	0	3.25	0	1.656	2.02	-0.364
347.1	58.751	-0.117	30.985	0	3.29	0	1.656	2.02	-0.364
347.2	58.763	-0.127	31.532	0	3.26	0	1.656	2.02	-0.364
347.3	58.782	-0.12	31.758	0	3.28	0	1.656	2.02	-0.364
347.4	58.8	-0.112	31.342	0	3.31	0	1.656	2.02	-0.364
347.5	58.813	-0.11	31.342	0	3.27	0	1.656	2.02	-0.364
347.6	58.831	-0.11	31.868	0	3.31	0	1.656	2.02	-0.364
347.7	58.844	-0.11	31.645	0	3.32	0	1.656	2.02	-0.364

347.8	58.862	-0.122	31.758	0	3.29	0	1.656	2.02	-0.364
347.9	58.875	-0.122	31.758	0	3.32	0	1.656	2.02	-0.364
348	58.894	-0.142	31.706	0	3.31	0	1.657	2.021	-0.364
348.1	58.912	-0.142	31.921	0	3.3	0	1.657	2.021	-0.364
348.2	58.925	-0.132	31.225	0	3.04	0	1.657	2.021	-0.364
348.3	58.937	-0.125	31.211	0	2.85	0	1.657	2.021	-0.364
348.4	58.956	-0.12	31.14	0	2.49	0	1.657	2.021	-0.364
348.5	58.968	-0.12	31.225	0	2.35	0	1.657	2.021	-0.364
348.6	58.987	-0.12	31.388	0	3.01	0	1.657	2.021	-0.364
348.7	58.999	-0.137	31.607	0	3.28	0	1.657	2.021	-0.364
348.8	59.012	-0.137	31.303	0	3.34	0	1.657	2.021	-0.364
348.9	59.024	-0.145	31.211	0	3.12	0	1.657	2.021	-0.364
349	59.03	-0.152	31.02	0	0	0	1.657	2.021	-0.364
349.1	59.043	-0.152	30.886	0	-3.67	0	1.657	2.021	-0.364
349.2	59.055	-0.15	30.441	0	-2.64	0	1.657	2.021	-0.364
349.3	59.049	-0.155	30.296	0	-0.97	0	1.657	2.021	-0.364
349.4	59.049	-0.155	30.212	0	0	0	1.657	2.021	-0.364
349.5	59.043	-0.212	29.947	0	1.13	0	1.657	2.021	-0.364
349.6	59.036	-0.217	29.851	0	1.92	0	1.657	2.021	-0.364
349.7	59.036	-0.217	27.616	0	2.28	0	1.657	2.022	-0.364
349.8	59.03	-0.255	25.585	0	1.5	0	1.657	2.022	-0.364
349.9	59.024	-0.27	25.31	0	0	0	1.657	2.022	-0.364
350	59.018	-0.27	24.964	0	0.95	0	1.657	2.022	-0.364
350.1	59.005	-0.277	24.346	0	1.1	0	1.657	2.022	-0.364
350.2	58.999	-0.275	24.339	0	1.37	0	1.657	2.022	-0.364
350.3	58.987	-0.242	23.343	0	1.46	0	1.657	2.022	-0.364
350.4	58.974	-0.27	24.01	0	0.61	0	1.657	2.022	-0.364
350.5	58.968	-0.29	24.035	0	0	0	1.657	2.022	-0.364
350.6	58.949	-0.29	23.191	0	1.29	0	1.658	2.022	-0.364
350.7	58.937	-0.257	22.495	0	2.04	0	1.658	2.022	-0.364
350.8	58.918	-0.267	21.969	0	2.28	0	1.658	2.022	-0.364
350.9	58.906	-0.267	22.471	0	2.33	0	1.658	2.022	-0.364
351	58.887	-0.287	22.439	0	3.01	0	1.658	2.022	-0.364
351.1	58.869	-0.287	21.44	0	3.34	0	1.658	2.022	-0.364
351.2	58.85	-0.3	21.263	0	3.28	0	1.658	2.022	-0.364
351.3	58.838	-0.31	20.899	0	3.32	0	1.658	2.022	-0.364
351.4	58.819	-0.322	21.115	0	3.23	0	1.658	2.022	-0.364
351.5	58.807	-0.322	21.199	0	3.19	0	1.658	2.023	-0.364
351.6	58.794	-0.307	20.631	0	3.17	0	1.658	2.023	-0.364
351.7	58.776	-0.295	20.539	0	2.98	0	1.658	2.023	-0.364
351.8	58.763	-0.295	20.267	0	2.74	0	1.658	2.023	-0.364
351.9	58.744	-0.302	21.199	0	2.95	0	1.659	2.023	-0.364
352	58.726	-0.3	21.401	0	3.12	0	1.659	2.023	-0.364
352.1	58.713	-0.3	20.786	0	3.2	0	1.659	2.023	-0.364
352.2	58.695	-0.295	20.86	0	3.16	0	1.659	2.023	-0.364
352.3	58.682	-0.317	20.726	0	3.16	0	1.659	2.023	-0.364
352.4	58.67	-0.317	21.295	0	3.27	0	1.659	2.023	-0.364

352.5	58.651	-0.29	20.475	0	3.41	0	1.659	2.023	-0.364
352.6	58.633	-0.3	19.674	0	3.39	0	1.659	2.023	-0.364
352.7	58.62	-0.3	21.104	0	3.43	0	1.659	2.024	-0.364
352.8	58.602	-0.295	21.196	0	3.41	0	1.659	2.024	-0.364
352.9	58.583	-0.305	20.32	0	3.39	0	1.659	2.024	-0.364
353	58.564	-0.305	20.504	0	3.28	0	1.66	2.024	-0.364
353.1	58.552	-0.315	21.549	0	3.25	0	1.66	2.024	-0.364
353.2	58.533	-0.29	20.168	0	3.28	0	1.66	2.024	-0.364
353.3	58.515	-0.35	20.083	0	3.15	0	1.66	2.024	-0.364
353.4	58.508	-0.332	21.521	0	3.21	0	1.66	2.024	-0.364
353.5	58.49	-0.295	21.355	0	3.2	0	1.66	2.024	-0.364
353.6	58.471	-0.295	19.381	0	3.19	0	1.66	2.024	-0.364
353.7	58.459	-0.282	21.016	0	3.26	0	1.66	2.024	-0.364
353.8	58.44	-0.297	21.259	0	3.26	0	1.66	2.025	-0.364
353.9	58.428	-0.297	20.91	0	3.24	0	1.66	2.025	-0.364
354	58.415	-0.302	21.556	0	3.27	0	1.66	2.025	-0.364
354.1	58.396	-0.302	20.723	0	3.25	0	1.661	2.025	-0.364
354.2	58.384	-0.305	20.574	0	3.26	0	1.661	2.025	-0.364
354.3	58.372	-0.302	21.249	0	3.26	0	1.661	2.025	-0.364
354.4	58.353	-0.295	20.709	0	3.24	0	1.661	2.025	-0.364
354.5	58.347	-0.295	20.818	0	3.26	0	1.661	2.025	-0.364
354.6	58.334	-0.29	21.884	0	3.24	0	1.661	2.025	-0.364
354.7	58.322	-0.277	21.493	0	3.25	0	1.661	2.025	-0.364
354.8	58.309	-0.277	20.924	0	3.25	0	1.661	2.025	-0.364
354.9	58.297	-0.307	22.156	0	3.24	0	1.661	2.026	-0.364
355	58.285	-0.297	22.114	0	3.26	0	1.661	2.026	-0.364
355.1	58.272	-0.297	21.927	0	3.24	0	1.661	2.026	-0.364
355.2	58.254	-0.285	20.924	0	3.26	0	1.662	2.026	-0.364
355.3	58.241	-0.305	21.63	0	3.25	0	1.662	2.026	-0.364
355.4	58.235	-0.305	21.803	0	3.02	0	1.662	2.026	-0.364
355.5	58.216	-0.292	22.386	0	2.66	0	1.662	2.026	-0.364
355.6	58.21	-0.297	21.235	0	2.71	0	1.662	2.026	-0.364
355.7	58.198	-0.297	21.228	0	2.93	0	1.662	2.026	-0.364
355.8	58.185	-0.315	22.001	0	3.05	0	1.662	2.026	-0.364
355.9	58.173	-0.302	21.884	0	3.17	0	1.662	2.026	-0.364
356	58.154	-0.302	21.327	0	3.19	0	1.662	2.026	-0.364
356.1	58.142	-0.31	21.623	0	3.13	0	1.662	2.027	-0.364
356.2	58.135	-0.302	21.189	0	3.16	0	1.662	2.027	-0.364
356.3	58.117	-0.33	20.776	0	3.12	0	1.662	2.027	-0.364
356.4	58.104	-0.335	21.327	0	3.2	0	1.663	2.027	-0.364
356.5	58.098	-0.33	21.327	0	3.25	0	1.663	2.027	-0.364
356.6	58.086	-0.33	21.125	0	3.25	0	1.663	2.027	-0.364
356.7	58.073	-0.312	21.136	0	3.26	0	1.663	2.027	-0.364
356.8	58.067	-0.3	21.475	0	3.23	0	1.663	2.027	-0.364
356.9	58.048	-0.3	21.708	0	3.24	0	1.663	2.027	-0.364
357	58.042	-0.275	20.599	0	3.18	0	1.663	2.027	-0.364
357.1	58.03	-0.275	21.387	0	3.21	0	1.663	2.027	-0.364

357.2	58.017	-0.282	21.397	0	3.16	0	1.663	2.028	-0.364
357.3	58.005	-0.305	21.217	0	3.23	0	1.663	2.028	-0.364
357.4	57.999	-0.317	22.015	0	3.19	0	1.663	2.028	-0.364
357.5	57.986	-0.317	22.1	0	3.14	0	1.664	2.028	-0.364
357.6	57.974	-0.312	21.15	0	2.92	0	1.664	2.028	-0.364
357.7	57.962	-0.307	21.249	0	2.94	0	1.664	2.028	-0.364
357.8	57.949	-0.307	21.221	0	2.98	0	1.664	2.028	-0.364
357.9	57.943	-0.305	21.221	0	3.04	0	1.664	2.028	-0.364
358	57.924	-0.287	21.447	0	2.93	0	1.664	2.028	-0.364
358.1	57.918	-0.287	21.125	0	1.98	0	1.664	2.028	-0.364
358.2	57.906	-0.285	21.341	0	1.39	0	1.664	2.028	-0.364
358.3	57.887	-0.322	22.043	0	0.62	0	1.664	2.028	-0.364
358.4	57.875	-0.322	22.015	0	-0.84	0	1.664	2.028	-0.364
358.5	57.862	-0.287	21.048	0	-1.86	0	1.664	2.028	-0.364
358.6	57.843	-0.297	21.164	0	-2.17	0	1.664	2.028	-0.364
358.7	57.825	-0.297	21.764	0	-2.13	0	1.664	2.028	-0.364
358.8	57.806	-0.3	21.542	0	-2.64	0	1.664	2.028	-0.365
358.9	57.781	-0.297	21.337	0	-3.09	0	1.664	2.028	-0.365
359	57.763	-0.297	21.387	0	-3.61	0	1.664	2.028	-0.365
359.1	57.738	-0.307	21.164	0	-4.24	0	1.663	2.028	-0.365
359.2	57.713	-0.312	21.164	0	-4.33	0	1.663	2.028	-0.365
359.3	57.694	-0.3	20.991	0	-4.35	0	1.663	2.028	-0.365
359.4	57.669	-0.297	20.991	0	-4.24	0	1.663	2.028	-0.365
359.5	57.645	-0.3	21.072	0	-4.19	0	1.663	2.028	-0.365
359.6	57.626	-0.3	21.355	0	-3.99	0	1.663	2.028	-0.365
359.7	57.601	-0.3	20.92	0	-3.98	0	1.663	2.028	-0.366
359.8	57.57	-0.325	21.164	0	-3.95	0	1.663	2.028	-0.366
359.9	57.545	-0.325	20.906	0	-3.94	0	1.663	2.028	-0.366
360	57.514	-0.337	21.387	0	-3.74	0	1.662	2.028	-0.366
360.1	57.489	-0.337	20.327	0	-3.7	0	1.662	2.028	-0.366
360.2	57.471	-0.32	19.978	0	-3.64	0	1.662	2.028	-0.366
360.3	57.44	-0.312	20.299	0	-3.28	0	1.662	2.028	-0.366
360.4	57.415	-0.325	20.991	0	-3.16	0	1.662	2.028	-0.366
360.5	57.39	-0.325	20.991	0	-3.14	0	1.662	2.028	-0.366
360.6	57.359	-0.317	20.394	0	-3.1	0	1.662	2.028	-0.366
360.7	57.334	-0.325	20.03	0	-2.55	0	1.662	2.028	-0.366
360.8	57.315	-0.325	20.426	0	-2.31	0	1.662	2.028	-0.367
360.9	57.284	-0.33	20.479	0	-2.31	0	1.662	2.028	-0.367
361	57.259	-0.332	20.596	0	-2.22	0	1.662	2.028	-0.367
361.1	57.235	-0.332	20.327	0	-2.09	0	1.662	2.028	-0.367
361.2	57.216	-0.32	20.638	0	-1.75	0	1.662	2.028	-0.367
361.3	57.185	-0.317	20.285	0	-1.71	0	1.662	2.028	-0.367
361.4	57.166	-0.317	20.2	0	-1.54	0	1.661	2.028	-0.367
361.5	57.141	-0.307	20.37	0	-1.18	0	1.661	2.028	-0.367
361.6	57.116	-0.32	20.285	0	-0.54	0	1.661	2.028	-0.367
361.7	57.098	-0.32	20.567	0	0	0	1.661	2.028	-0.367
361.8	57.079	-0.32	20.719	0	0.76	0	1.661	2.028	-0.367

361.9	57.061	-0.315	20.274	0	0	0	1.661	2.028	-0.367
362	57.042	-0.315	20.55	0	0	0	1.661	2.028	-0.367
362.1	57.023	-0.307	20.158	0	0	0	1.661	2.028	-0.367
362.2	57.011	-0.31	20.719	0	0	0	1.661	2.028	-0.367
362.3	56.998	-0.31	20.694	0	1.24	0	1.662	2.028	-0.367
362.4	56.98	-0.317	20.468	0	1.54	0	1.662	2.028	-0.367
362.5	56.967	-0.297	20.468	0	2.29	0	1.662	2.029	-0.367
362.6	56.955	-0.297	20.663	0	2.95	0	1.662	2.029	-0.367
362.7	56.936	-0.3	20.14	0	3.37	0	1.662	2.029	-0.367
362.8	56.924	-0.302	20.652	0	3.22	0	1.662	2.029	-0.367
362.9	56.918	-0.302	20.521	0	3.86	0	1.662	2.029	-0.367
363	56.905	-0.31	20.521	0	4.18	0	1.662	2.029	-0.367
363.1	56.893	-0.31	20.309	0	5.09	0	1.662	2.029	-0.367
363.2	56.88	-0.31	20.677	0	5.53	0	1.662	2.029	-0.367
363.3	56.874	-0.297	20.691	0	5.54	0	1.663	2.029	-0.367
363.4	56.868	-0.29	21.072	0	5.52	0	1.663	2.03	-0.367
363.5	56.862	-0.29	21.016	0	5.54	0	1.663	2.03	-0.367
363.6	56.849	-0.302	21.256	0	5.53	0	1.663	2.03	-0.367
363.7	56.843	-0.292	21.337	0	5.67	0	1.663	2.03	-0.367
363.8	56.837	-0.292	20.652	0	7.38	0	1.663	2.03	-0.367
363.9	56.831	-0.307	20.896	0	9	0	1.664	2.031	-0.367
364	56.824	-0.322	20.92	0	9.03	0	1.664	2.031	-0.367
364.1	56.824	-0.322	21.235	0	8.94	0	1.664	2.031	-0.367
364.2	56.824	-0.325	20.874	0	9.05	0	1.664	2.031	-0.367
364.3	56.818	-0.297	20.158	0	9.63	0	1.665	2.032	-0.367
364.4	56.824	-0.297	19.865	0	9.61	0	1.665	2.032	-0.367
364.5	56.818	-0.312	20.408	0	9.57	0	1.665	2.032	-0.367
364.6	56.812	-0.312	20.546	0	9.54	0	1.665	2.032	-0.367
364.7	56.812	-0.312	20.154	0	9.53	0	1.666	2.033	-0.367
364.8	56.806	-0.315	20.355	0	9.46	0	1.666	2.033	-0.367
364.9	56.806	-0.31	20.112	0	9.47	0	1.666	2.033	-0.367
365	56.8	-0.31	20.073	0	9.48	0	1.667	2.033	-0.367
365.1	56.8	-0.3	20.129	0	10.57	0	1.667	2.034	-0.367
365.2	56.8	-0.312	20.115	0	11.22	0	1.667	2.034	-0.367
365.3	56.8	-0.315	20.285	0	11.17	0	1.667	2.034	-0.367
365.4	56.8	-0.32	20.832	0	11.17	0	1.668	2.035	-0.367
365.5	56.8	-0.322	20.829	0	11.09	0	1.668	2.035	-0.367
365.6	56.8	-0.322	20.79	0	11.09	0	1.668	2.035	-0.367
365.7	56.8	-0.3	20.521	0	11.09	0	1.669	2.036	-0.367
365.8	56.806	-0.297	20.324	0	11.04	0	1.669	2.036	-0.367
365.9	56.806	-0.297	20.394	0	11	0	1.669	2.036	-0.367
366	56.812	-0.307	20.874	0	10.99	0	1.67	2.036	-0.367
366.1	56.812	-0.307	20.592	0	10.95	0	1.67	2.037	-0.367
366.2	56.812	-0.3	20.578	0	10.26	0	1.67	2.037	-0.367
366.3	56.812	-0.317	20.666	0	7.37	0	1.67	2.037	-0.367
366.4	56.812	-0.307	20.984	0	4.35	0	1.67	2.037	-0.367
366.5	56.812	-0.307	20.874	0	3.22	0	1.671	2.038	-0.367

366.6	56.806	-0.305	20.493	0	3.25	0	1.671	2.038	-0.367
366.7	56.8	-0.285	20.91	0	3.21	0	1.671	2.038	-0.367
366.8	56.8	-0.285	20.645	0	3.25	0	1.671	2.038	-0.367
366.9	56.8	-0.282	21.115	0	3.34	0	1.671	2.038	-0.367
367	56.793	-0.262	22.764	0	3.38	0	1.671	2.038	-0.367
367.1	56.787	-0.262	22.958	0	3.41	0	1.671	2.038	-0.367
367.2	56.793	-0.247	23.343	0	3.38	0	1.671	2.038	-0.367
367.3	56.787	-0.247	23.915	0	3.42	0	1.671	2.038	-0.367
367.4	56.787	-0.247	23.94	0	3.39	0	1.671	2.038	-0.367
367.5	56.787	-0.247	24.487	0	3.43	0	1.672	2.038	-0.367
367.6	56.781	-0.237	24.042	0	3.42	0	1.672	2.039	-0.367
367.7	56.781	-0.237	23.421	0	3.42	0	1.672	2.039	-0.367
367.8	56.787	-0.25	24.583	0	3.44	0	1.672	2.039	-0.367
367.9	56.787	-0.24	24.455	0	3.42	0	1.672	2.039	-0.367
368	56.781	-0.24	23.844	0	3.44	0	1.672	2.039	-0.367
368.1	56.787	-0.247	24.131	0	3.43	0	1.672	2.039	-0.367
368.2	56.781	-0.265	24.643	0	4.41	0	1.672	2.039	-0.367
368.3	56.787	-0.24	23.753	0	4.43	0	1.672	2.039	-0.367
368.4	56.787	-0.24	24.36	0	4.52	0	1.672	2.039	-0.367
368.5	56.787	-0.242	24.357	0	5.77	0	1.673	2.04	-0.367
368.6	56.793	-0.242	24.293	0	6.22	0	1.673	2.04	-0.367
368.7	56.8	-0.222	24.417	0	6.16	0	1.673	2.04	-0.367
368.8	56.806	-0.217	23.901	0	6.03	0	1.673	2.04	-0.367
368.9	56.812	-0.217	24.558	0	6.01	0	1.673	2.04	-0.367
369	56.818	-0.235	25.487	0	5.96	0	1.673	2.04	-0.367
369.1	56.824	-0.235	25.13	0	5.94	0	1.674	2.041	-0.367
369.2	56.831	-0.227	25.193	0	5.7	0	1.674	2.041	-0.367
369.3	56.843	-0.232	24.946	0	5.7	0	1.674	2.041	-0.367
369.4	56.843	-0.235	24.96	0	5.71	0	1.674	2.041	-0.367
369.5	56.849	-0.235	24.876	0	5.7	0	1.674	2.041	-0.367
369.6	56.855	-0.24	25.144	0	5.65	0	1.674	2.041	-0.367
369.7	56.862	-0.237	25.144	0	5.64	0	1.675	2.041	-0.367
369.8	56.868	-0.237	24.756	0	5.66	0	1.675	2.042	-0.367
369.9	56.874	-0.225	25.278	0	5.64	0	1.675	2.042	-0.367
370	56.887	-0.217	25.045	0	5.65	0	1.675	2.042	-0.367
370.1	56.887	-0.217	24.53	0	5.57	0	1.675	2.042	-0.367
370.2	56.893	-0.227	24.982	0	4.91	0	1.675	2.042	-0.367
370.3	56.899	-0.237	25.25	0	4.86	0	1.675	2.042	-0.367
370.4	56.905	-0.237	25.25	0	4.79	0	1.676	2.043	-0.367
370.5	56.905	-0.26	25.105	0	4.64	0	1.676	2.043	-0.367
370.6	56.911	-0.25	25.158	0	4.63	0	1.676	2.043	-0.367
370.7	56.911	-0.25	24.851	0	4.34	0	1.676	2.043	-0.367
370.8	56.911	-0.25	24.24	0	3.82	0	1.676	2.043	-0.367
370.9	56.918	-0.247	24.145	0	3.81	0	1.676	2.043	-0.367
371	56.918	-0.247	24.229	0	3.83	0	1.676	2.043	-0.367
371.1	56.918	-0.235	24.049	0	3.23	0	1.676	2.043	-0.367
371.2	56.918	-0.235	23.873	0	3.1	0	1.676	2.043	-0.367

371.3	56.918	-0.25	24.515	0	3.09	0	1.677	2.043	-0.367
371.4	56.918	-0.24	24.731	0	3.1	0	1.677	2.044	-0.367
371.5	56.918	-0.21	24.812	0	3.11	0	1.677	2.044	-0.367
371.6	56.918	-0.21	24.215	0	2.75	0	1.677	2.044	-0.367
371.7	56.918	-0.237	23.95	0	2.29	0	1.677	2.044	-0.367
371.8	56.918	-0.235	24.95	0	2.28	0	1.677	2.044	-0.367
371.9	56.911	-0.235	25.105	0	2.29	0	1.677	2.044	-0.367
372	56.911	-0.232	23.936	0	2.29	0	1.677	2.044	-0.367
372.1	56.911	-0.232	24.72	0	2.28	0	1.677	2.044	-0.367
372.2	56.911	-0.227	25.063	0	2.29	0	1.677	2.044	-0.367
372.3	56.911	-0.222	24.378	0	2.27	0	1.677	2.044	-0.367
372.4	56.911	-0.22	25.063	0	1.75	0	1.677	2.044	-0.367
372.5	56.911	-0.22	25.063	0	1.89	0	1.677	2.044	-0.367
372.6	56.911	-0.217	25.448	0	2.29	0	1.677	2.044	-0.367
372.7	56.918	-0.212	24.967	0	2.3	0	1.677	2.044	-0.367
372.8	56.918	-0.212	25.419	0	2.31	0	1.678	2.044	-0.367
372.9	56.918	-0.215	25.808	0	2.31	0	1.678	2.045	-0.367
373	56.924	-0.225	26.136	0	2.28	0	1.678	2.045	-0.367
373.1	56.924	-0.225	26.179	0	2.31	0	1.678	2.045	-0.367
373.2	56.924	-0.23	26.08	0	2.29	0	1.678	2.045	-0.367
373.3	56.93	-0.19	25.582	0	2.31	0	1.678	2.045	-0.367
373.4	56.93	-0.19	25.497	0	2.3	0	1.678	2.045	-0.367
373.5	56.93	-0.207	25.621	0	2.31	0	1.678	2.045	-0.367
373.6	56.936	-0.197	26.218	0	2.31	0	1.678	2.045	-0.367
373.7	56.93	-0.197	25.25	0	2.32	0	1.678	2.045	-0.367
373.8	56.936	-0.197	25.165	0	2.31	0	1.678	2.045	-0.367
373.9	56.942	-0.21	25.434	0	2.3	0	1.678	2.045	-0.367
374	56.936	-0.21	25.391	0	2.37	0	1.678	2.045	-0.367
374.1	56.942	-0.227	25.709	0	2.38	0	1.678	2.045	-0.367
374.2	56.949	-0.222	25.236	0	2.4	0	1.678	2.045	-0.367
374.3	56.949	-0.21	24.773	0	2.38	0	1.679	2.045	-0.367
374.4	56.942	-0.212	25.123	0	2.4	0	1.679	2.046	-0.367
374.5	56.949	-0.23	25.123	0	2.38	0	1.679	2.046	-0.367
374.6	56.942	-0.23	25.388	0	2.4	0	1.679	2.046	-0.367
374.7	56.942	-0.24	25.222	0	2.4	0	1.679	2.046	-0.367
374.8	56.942	-0.235	24.162	0	2.39	0	1.679	2.046	-0.367
374.9	56.936	-0.235	24.279	0	2.41	0	1.679	2.046	-0.367
375	56.936	-0.217	24.36	0	2.39	0	1.679	2.046	-0.367
375.1	56.936	-0.217	24.201	0	2.41	0	1.679	2.046	-0.367
375.2	56.936	-0.227	24.65	0	2.38	0	1.679	2.046	-0.367
375.3	56.93	-0.217	24.674	0	2.4	0	1.679	2.046	-0.367
375.4	56.936	-0.212	24.251	0	2.39	0	1.679	2.046	-0.367
375.5	56.93	-0.212	24.36	0	2.4	0	1.679	2.046	-0.367
375.6	56.93	-0.23	25.01	0	2.41	0	1.679	2.046	-0.367
375.7	56.93	-0.237	25.003	0	2.41	0	1.679	2.046	-0.367
375.8	56.93	-0.237	24.339	0	2.48	0	1.68	2.046	-0.367
375.9	56.93	-0.26	24.717	0	2.47	0	1.68	2.047	-0.367

376	56.93	-0.255	24.869	0	2.49	0	1.68	2.047	-0.367
376.1	56.93	-0.255	24.434	0	2.4	0	1.68	2.047	-0.367
376.2	56.93	-0.25	25.236	0	1.85	0	1.68	2.047	-0.367
376.3	56.93	-0.225	24.434	0	2.1	0	1.68	2.047	-0.367
376.4	56.93	-0.225	24.533	0	1.41	0	1.68	2.047	-0.367
376.5	56.93	-0.212	25.105	0	0.72	0	1.68	2.047	-0.367
376.6	56.936	-0.212	24.664	0	0	0	1.68	2.047	-0.367
376.7	56.936	-0.212	25.275	0	0	0	1.68	2.047	-0.367
376.8	56.93	-0.222	26.352	0	0	0	1.68	2.047	-0.367
376.9	56.924	-0.23	25.593	0	0.62	0	1.68	2.047	-0.367
377	56.918	-0.23	25.197	0	0.98	0	1.68	2.047	-0.367
377.1	56.905	-0.245	25.112	0	1.7	0	1.68	2.047	-0.367
377.2	56.899	-0.257	24.621	0	2	0	1.68	2.047	-0.367
377.3	56.887	-0.255	23.82	0	2.56	0	1.68	2.047	-0.367
377.4	56.88	-0.27	22.668	0	3.06	0	1.68	2.047	-0.367
377.5	56.874	-0.282	22.668	0	2.87	0	1.68	2.047	-0.367
377.6	56.868	-0.282	22.594	0	2.62	0	1.68	2.047	-0.367
377.7	56.862	-0.29	21.817	0	2.13	0	1.68	2.047	-0.367
377.8	56.849	-0.292	21.687	0	1.33	0	1.68	2.047	-0.367
377.9	56.843	-0.292	21.789	0	1.14	0	1.68	2.047	-0.367
378	56.831	-0.292	21.238	0	1.28	0	1.68	2.047	-0.367
378.1	56.818	-0.292	21.39	0	0.86	0	1.681	2.047	-0.367
378.2	56.806	-0.297	20.546	0	0	0	1.681	2.047	-0.367
378.3	56.787	-0.325	20.942	0	-1.37	0	1.68	2.047	-0.367
378.4	56.768	-0.335	19.91	0	0	0	1.68	2.047	-0.367
378.5	56.75	-0.335	20.023	0	0.71	0	1.68	2.047	-0.367
378.6	56.719	-0.352	19.646	0	1.45	0	1.681	2.048	-0.367
378.7	56.694	-0.383	18.812	0	2.01	0	1.681	2.048	-0.367
378.8	56.675	-0.383	18.593	0	1.4	0	1.681	2.048	-0.367
378.9	56.644	-0.377	17	0	1.39	0	1.681	2.048	-0.367
379	56.619	-0.38	15.817	0	1.36	0	1.681	2.048	-0.367
379.1	56.594	-0.38	15.662	0	0	0	1.681	2.048	-0.367
379.2	56.57	-0.388	16.079	0	0	0	1.681	2.048	-0.367
379.3	56.539	-0.4	16.333	0	0	0	1.681	2.048	-0.367
379.4	56.507	-0.4	16.527	0	0	0	1.681	2.048	-0.367
379.5	56.476	-0.383	15.761	0	0.94	0	1.681	2.048	-0.367
379.6	56.445	-0.388	15.199	0	1.27	0	1.681	2.048	-0.367
379.7	56.421	-0.388	15.493	0	1.66	0	1.681	2.048	-0.367
379.8	56.383	-0.415	15.496	0	1.71	0	1.681	2.048	-0.367
379.9	56.358	-0.44	14.822	0	1.83	0	1.681	2.048	-0.367
380	56.327	-0.44	14.867	0	2	0	1.681	2.048	-0.367
380.1	56.296	-0.44	14.465	0	2.17	0	1.681	2.048	-0.367
380.2	56.259	-0.42	13.165	0	2.69	0	1.681	2.048	-0.367
380.3	56.228	-0.423	13.504	0	3.25	0	1.681	2.048	-0.367
380.4	56.197	-0.413	13.289	0	3.25	0	1.681	2.048	-0.367
380.5	56.166	-0.403	13.289	0	3.26	0	1.681	2.048	-0.367
380.6	56.135	-0.403	13.289	0	3.27	0	1.681	2.049	-0.367

380.7	56.11	-0.425	13.208	0	3.26	0	1.682	2.049	-0.367
380.8	56.073	-0.435	13.836	0	3.26	0	1.682	2.049	-0.367
380.9	56.041	-0.435	13.547	0	3.26	0	1.682	2.049	-0.367
381	56.017	-0.448	13.533	0	3.25	0	1.682	2.049	-0.367
381.1	55.992	-0.448	13.388	0	3.26	0	1.682	2.049	-0.367
381.2	55.967	-0.405	12.89	0	3.27	0	1.682	2.049	-0.367
381.3	55.948	-0.352	14.603	0	3.26	0	1.682	2.049	-0.367
381.4	55.93	-0.345	16.368	0	3.26	0	1.682	2.049	-0.367
381.5	55.917	-0.345	16.287	0	3.28	0	1.682	2.049	-0.367
381.6	55.899	-0.33	17.566	0	3.27	0	1.682	2.049	-0.367
381.7	55.886	-0.32	18.438	0	3.26	0	1.682	2.049	-0.367
381.8	55.874	-0.32	19.511	0	3.28	0	1.683	2.05	-0.367
381.9	55.867	-0.31	19.865	0	3.26	0	1.683	2.05	-0.367
382	55.861	-0.28	20.408	0	3.26	0	1.683	2.05	-0.367
382.1	55.855	-0.28	20.355	0	3.3	0	1.683	2.05	-0.367
382.2	55.849	-0.272	21.016	0	3.29	0	1.683	2.05	-0.367
382.3	55.855	-0.28	22.771	0	3.28	0	1.683	2.05	-0.367
382.4	55.855	-0.28	22.771	0	3.3	0	1.683	2.05	-0.367
382.5	55.849	-0.26	22.474	0	3.28	0	1.683	2.05	-0.367
382.6	55.855	-0.255	22.898	0	3.25	0	1.683	2.05	-0.367
382.7	55.855	-0.255	23.17	0	3.27	0	1.683	2.05	-0.367
382.8	55.855	-0.225	24.081	0	3.27	0	1.683	2.051	-0.367
382.9	55.861	-0.212	24.265	0	3.26	0	1.684	2.051	-0.367
383	55.874	-0.212	24.809	0	3.28	0	1.684	2.051	-0.367
383.1	55.88	-0.212	25.409	0	3.25	0	1.684	2.051	-0.367
383.2	55.886	-0.212	25.886	0	3.25	0	1.684	2.051	-0.367
383.3	55.899	-0.21	26.232	0	3.27	0	1.684	2.051	-0.367
383.4	55.911	-0.195	26.581	0	3.28	0	1.684	2.051	-0.367
383.5	55.923	-0.18	26.666	0	3.26	0	1.684	2.051	-0.367
383.6	55.942	-0.18	26.606	0	3.29	0	1.684	2.051	-0.367
383.7	55.967	-0.152	26.942	0	3.28	0	1.684	2.051	-0.367
383.8	55.979	-0.127	27.856	0	3.25	0	1.684	2.051	-0.367
383.9	56.01	-0.127	28.764	0	3.29	0	1.684	2.052	-0.367
384	56.029	-0.127	30.116	0	3.27	0	1.685	2.052	-0.367
384.1	56.054	-0.127	31.024	0	3.24	0	1.685	2.052	-0.367
384.2	56.079	-0.102	30.614	0	3.29	0	1.685	2.052	-0.367
384.3	56.104	-0.08	31.667	0	3.27	0	1.685	2.052	-0.367
384.4	56.135	-0.087	32.677	0	3.26	0	1.685	2.052	-0.367
384.5	56.16	-0.087	32.592	0	3.29	0	1.685	2.052	-0.367
384.6	56.191	-0.077	32.754	0	3.27	0	1.685	2.052	-0.367
384.7	56.215	-0.087	32.447	0	3.26	0	1.685	2.052	-0.367
384.8	56.24	-0.087	33.507	0	3.31	0	1.685	2.052	-0.367
384.9	56.271	-0.067	32.603	0	3.27	0	1.685	2.052	-0.367
385	56.296	-0.072	32.779	0	3.32	0	1.685	2.053	-0.367
385.1	56.327	-0.072	33.496	0	3.32	0	1.686	2.053	-0.367
385.2	56.358	-0.082	33.383	0	3.33	0	1.686	2.053	-0.367
385.3	56.383	-0.072	32.896	0	2.58	0	1.686	2.053	-0.367

385.4	56.414	-0.072	32.952	0	2.08	0	1.686	2.053	-0.367
385.5	56.439	-0.075	33.104	0	1.08	0	1.686	2.053	-0.367
385.6	56.47	-0.082	32.5	0	0.9	0	1.686	2.053	-0.367
385.7	56.489	-0.082	32.744	0	0.6	0	1.686	2.053	-0.367
385.8	56.514	-0.105	32.942	0	0.86	0	1.686	2.053	-0.367
385.9	56.539	-0.12	32.899	0	1.52	0	1.686	2.053	-0.367
386	56.551	-0.12	32.864	0	2.43	0	1.686	2.053	-0.367
386.1	56.576	-0.122	32.055	0	2.93	0	1.686	2.053	-0.367
386.2	56.594	-0.1	30.844	0	3.23	0	1.686	2.053	-0.367
386.3	56.613	-0.127	30.879	0	3.38	0	1.686	2.053	-0.367
386.4	56.638	-0.135	30.731	0	3.34	0	1.686	2.053	-0.367
386.5	56.663	-0.137	30.816	0	3.38	0	1.686	2.053	-0.367
386.6	56.681	-0.137	30.261	0	3.36	0	1.687	2.054	-0.367
386.7	56.7	-0.13	29.986	0	3.35	0	1.687	2.054	-0.367
386.8	56.719	-0.115	30.032	0	3.34	0	1.687	2.054	-0.367
386.9	56.744	-0.115	29.901	0	3.31	0	1.687	2.054	-0.367
387	56.762	-0.125	30.427	0	3.33	0	1.687	2.054	-0.367
387.1	56.787	-0.125	30.681	0	3.28	0	1.687	2.054	-0.367
387.2	56.806	-0.14	30.876	0	3.31	0	1.687	2.054	-0.367
387.3	56.831	-0.12	30.692	0	3.28	0	1.687	2.054	-0.367
387.4	56.855	-0.125	31.155	0	3.28	0	1.687	2.054	-0.367
387.5	56.874	-0.125	31.07	0	3.29	0	1.687	2.054	-0.367
387.6	56.893	-0.122	31.684	0	3.26	0	1.687	2.054	-0.367
387.7	56.918	-0.11	31.37	0	3.29	0	1.688	2.055	-0.367
387.8	56.936	-0.11	31.225	0	3.24	0	1.688	2.055	-0.367
387.9	56.961	-0.102	31.25	0	3.29	0	1.688	2.055	-0.367
388	56.986	-0.117	31.465	0	3.24	0	1.688	2.055	-0.367
388.1	57.005	-0.117	31.875	0	3.29	0	1.688	2.055	-0.367
388.2	57.023	-0.107	31.479	0	3.24	0	1.688	2.055	-0.367
388.3	57.048	-0.13	30.713	0	3.28	0	1.688	2.055	-0.367
388.4	57.067	-0.13	30.713	0	3.26	0	1.688	2.055	-0.367
388.5	57.092	-0.102	32.027	0	3.27	0	1.688	2.055	-0.367
388.6	57.116	-0.1	30.974	0	3.28	0	1.688	2.055	-0.367
388.7	57.135	-0.1	31.441	0	3.25	0	1.688	2.055	-0.367
388.8	57.154	-0.102	31.621	0	3.28	0	1.689	2.056	-0.367
388.9	57.179	-0.107	31.427	0	3.25	0	1.689	2.056	-0.367
389	57.197	-0.107	31.631	0	3.29	0	1.689	2.056	-0.367
389.1	57.222	-0.105	31.275	0	3.25	0	1.689	2.056	-0.367
389.2	57.247	-0.12	31.631	0	3.28	0	1.689	2.056	-0.367
389.3	57.266	-0.097	31.822	0	3.25	0	1.689	2.056	-0.367
389.4	57.284	-0.095	31.451	0	3.3	0	1.689	2.056	-0.367
389.5	57.309	-0.08	31.536	0	3.24	0	1.689	2.056	-0.367
389.6	57.328	-0.08	31.593	0	3.28	0	1.689	2.056	-0.367
389.7	57.346	-0.102	31.511	0	2.56	0	1.689	2.056	-0.367
389.8	57.371	-0.112	31.889	0	1.55	0	1.689	2.056	-0.367
389.9	57.384	-0.112	31.593	0	0.54	0	1.689	2.056	-0.367
390	57.402	-0.122	31.522	0	-0.62	0	1.689	2.056	-0.367

390.1	57.421	-0.122	31.328	0	0	0	1.689	2.056	-0.367
390.2	57.433	-0.145	31.511	0	0.69	0	1.689	2.056	-0.367
390.3	57.44	-0.167	32.161	0	0.67	0	1.689	2.056	-0.367
390.4	57.446	-0.185	29.915	0	1.01	0	1.689	2.057	-0.367
390.5	57.458	-0.185	29.89	0	1.47	0	1.689	2.057	-0.367
390.6	57.464	-0.197	30.325	0	0	0	1.69	2.057	-0.367
390.7	57.477	-0.162	28.887	0	0	0	1.689	2.057	-0.367
390.8	57.477	-0.162	27.182	0	-0.73	0	1.689	2.057	-0.367
390.9	57.483	-0.185	27.542	0	-1.14	0	1.689	2.057	-0.367
391	57.483	-0.202	27.715	0	-1.44	0	1.689	2.057	-0.367
391.1	57.477	-0.202	27.729	0	-1.38	0	1.689	2.057	-0.367
391.2	57.471	-0.207	26.482	0	-1.25	0	1.689	2.057	-0.367
391.3	57.464	-0.217	26.112	0	-1.92	0	1.689	2.057	-0.367
391.4	57.458	-0.217	26.112	0	-2.34	0	1.689	2.057	-0.367
391.5	57.446	-0.25	24.636	0	-1.91	0	1.689	2.057	-0.367
391.6	57.433	-0.275	23.929	0	-1.5	0	1.689	2.057	-0.367
391.7	57.415	-0.275	23.181	0	-0.89	0	1.689	2.057	-0.367
391.8	57.396	-0.302	22.647	0	0	0	1.689	2.057	-0.367
391.9	57.371	-0.325	21.09	0	0	0	1.689	2.057	-0.367
392	57.346	-0.325	20.737	0	0.88	0	1.689	2.057	-0.367
392.1	57.328	-0.355	20.045	0	1.75	0	1.689	2.057	-0.367
392.2	57.303	-0.365	18.417	0	2	0	1.689	2.057	-0.367
392.3	57.278	-0.385	17.378	0	2.2	0	1.689	2.057	-0.367
392.4	57.253	-0.372	16.45	0	2.37	0	1.689	2.057	-0.367
392.5	57.235	-0.362	16.45	0	2.42	0	1.689	2.057	-0.367
392.6	57.21	-0.362	16.174	0	2.46	0	1.689	2.057	-0.367
392.7	57.191	-0.375	16.435	0	2.53	0	1.69	2.057	-0.367
392.8	57.166	-0.372	16.556	0	2.69	0	1.69	2.057	-0.367
392.9	57.141	-0.372	16.697	0	2.75	0	1.69	2.057	-0.367
393	57.123	-0.355	16.287	0	2.82	0	1.69	2.057	-0.367
393.1	57.104	-0.355	16.033	0	2.88	0	1.69	2.057	-0.367
393.2	57.079	-0.362	16.548	0	2.81	0	1.69	2.057	-0.367
393.3	57.054	-0.372	16.835	0	2.93	0	1.69	2.057	-0.367
393.4	57.029	-0.385	16.969	0	3.04	0	1.69	2.058	-0.367
393.5	57.005	-0.385	17.05	0	3.19	0	1.69	2.058	-0.367
393.6	56.986	-0.37	16.623	0	3.22	0	1.69	2.058	-0.367
393.7	56.961	-0.362	16.125	0	3.3	0	1.69	2.058	-0.367
393.8	56.936	-0.362	16.517	0	3.25	0	1.69	2.058	-0.367
393.9	56.911	-0.383	16.485	0	3.35	0	1.691	2.058	-0.367
394	56.893	-0.388	16.28	0	3.4	0	1.691	2.058	-0.367
394.1	56.868	-0.388	16.757	0	3.33	0	1.691	2.058	-0.367
394.2	56.843	-0.37	16.28	0	3.4	0	1.691	2.058	-0.367
394.3	56.824	-0.38	15.955	0	3.29	0	1.691	2.058	-0.367
394.4	56.8	-0.38	15.983	0	3.35	0	1.691	2.058	-0.367
394.5	56.775	-0.388	16.393	0	3.39	0	1.691	2.059	-0.367
394.6	56.756	-0.39	16.036	0	3.29	0	1.691	2.059	-0.367
394.7	56.731	-0.39	16.464	0	2.78	0	1.691	2.059	-0.367

394.8	56.706	-0.377	15.817	0	2.73	0	1.691	2.059	-0.367
394.9	56.681	-0.372	15.994	0	2.22	0	1.691	2.059	-0.367
395	56.657	-0.372	16.096	0	2.22	0	1.691	2.059	-0.367
395.1	56.626	-0.377	16.206	0	2.82	0	1.692	2.059	-0.367
395.2	56.607	-0.367	15.846	0	3.26	0	1.692	2.059	-0.367
395.3	56.576	-0.38	15.214	0	3.09	0	1.692	2.059	-0.367
395.4	56.545	-0.38	15.154	0	1.21	0	1.692	2.059	-0.367
395.5	56.52	-0.395	15.154	0	0	0	1.692	2.059	-0.367
395.6	56.489	-0.395	15.238	0	0	0	1.692	2.059	-0.367
395.7	56.458	-0.39	15.457	0	0	0	1.692	2.059	-0.367
395.8	56.427	-0.38	14.536	0	0.66	0	1.692	2.059	-0.367
395.9	56.396	-0.38	14.225	0	1.46	0	1.692	2.059	-0.367
396	56.358	-0.415	15.659	0	2.48	0	1.692	2.059	-0.367
396.1	56.327	-0.415	15.821	0	3	0	1.692	2.059	-0.367
396.2	56.29	-0.418	14.507	0	3.18	0	1.692	2.06	-0.367
396.3	56.259	-0.448	13.621	0	3.18	0	1.692	2.06	-0.367
396.4	56.228	-0.445	12.568	0	3.18	0	1.692	2.06	-0.367
396.5	56.197	-0.445	12.678	0	3.17	0	1.692	2.06	-0.367
396.6	56.166	-0.445	12.325	0	3.18	0	1.692	2.06	-0.367
396.7	56.128	-0.445	12.258	0	3.18	0	1.693	2.06	-0.367
396.8	56.104	-0.445	13.021	0	3.19	0	1.693	2.06	-0.367
396.9	56.073	-0.453	12.763	0	3.18	0	1.693	2.06	-0.367
397	56.048	-0.408	12.833	0	3.17	0	1.693	2.06	-0.367
397.1	56.035	-0.408	11.898	0	3.2	0	1.693	2.06	-0.367
397.2	56.023	-0.342	13.501	0	3.17	0	1.693	2.06	-0.367
397.3	56.023	-0.272	15.98	0	3.19	0	1.693	2.061	-0.367
397.4	56.023	-0.252	16.065	0	3.2	0	1.693	2.061	-0.367
397.5	56.029	-0.212	21.45	0	3.18	0	1.693	2.061	-0.367
397.6	56.035	-0.177	22.591	0	3.21	0	1.693	2.061	-0.367
397.7	56.041	-0.177	24.752	0	3.21	0	1.693	2.061	-0.367
397.8	56.06	-0.125	26.634	0	3.26	0	1.693	2.061	-0.367
397.9	56.079	-0.095	27.704	0	3.22	0	1.694	2.061	-0.367
398	56.104	-0.095	28.923	0	3.22	0	1.694	2.061	-0.367
398.1	56.135	-0.08	31.162	0	3.18	0	1.694	2.061	-0.367
398.2	56.166	-0.055	32.592	0	3.23	0	1.694	2.061	-0.367
398.3	56.197	-0.017	34.697	0	3.2	0	1.694	2.061	-0.367
398.4	56.24	-0.002	36.258	0	3.23	0	1.694	2.062	-0.367
398.5	56.278	0	36.092	0	3.3	0	1.694	2.062	-0.367
398.6	56.315	0	36.914	0	3.62	0	1.694	2.062	-0.367
398.7	56.365	0.025	38.027	0	4.15	0	1.694	2.062	-0.367
398.8	56.414	0.073	38.486	0	4.97	0	1.694	2.062	-0.367
398.9	56.47	0.073	39.051	0	5.06	0	1.695	2.062	-0.367
399	56.532	0.123	40.852	0	5.06	0	1.695	2.062	-0.367
399.1	56.594	0.123	43.268	0	5.05	0	1.695	2.062	-0.367
399.2	56.657	0.113	44.175	0	4.89	0	1.695	2.063	-0.367
399.3	56.725	0.105	45.266	0	4.87	0	1.695	2.063	-0.367
399.4	56.781	0.128	44.994	0	4.89	0	1.695	2.063	-0.367

399.5	56.843	0.128	44.994	0	4.8	0	1.695	2.063	-0.367
399.6	56.905	0.123	45.213	0	4.72	0	1.696	2.063	-0.367
399.7	56.967	0.11	46.128	0	4.66	0	1.696	2.063	-0.367
399.8	57.029	0.11	45.704	0	4.53	0	1.696	2.063	-0.367
399.9	57.092	0.125	45.461	0	4.43	0	1.696	2.063	-0.367
400	57.16	0.115	45.874	0	3.51	0	1.696	2.064	-0.367
400.1	57.222	0.115	46.418	0	3.46	0	1.696	2.064	-0.367
400.2	57.284	0.118	46.471	0	3.28	0	1.696	2.064	-0.367
400.3	57.346	0.131	46.079	0	2.86	0	1.696	2.064	-0.367
400.4	57.408	0.131	46.054	0	1.48	0	1.696	2.064	-0.367
400.5	57.464	0.153	46.206	0	0.73	0	1.696	2.064	-0.367
400.6	57.527	0.148	46.142	0	-1.27	0	1.696	2.064	-0.368
400.7	57.576	0.148	46.283	0	-6.67	0	1.696	2.064	-0.368
400.8	57.626	0.093	46.933	0	-9.23	0	1.696	2.064	-0.368
400.9	57.657	0.083	47.06	0	-10.81	0	1.696	2.064	-0.368
401	57.682	0.083	45.023	0	-9.33	0	1.695	2.064	-0.369
401.1	57.701	0.048	43.755	0	-5.71	0	1.695	2.064	-0.369
401.2	57.707	0	41.926	0	-2.97	0	1.695	2.064	-0.369
401.3	57.707	-0.127	38.613	0	-1.09	0	1.695	2.064	-0.369
401.4	57.719	-0.17	31.751	0	0	0	1.695	2.064	-0.369
401.5	57.719	-0.192	31.642	0	1.3	0	1.695	2.064	-0.369
401.6	57.719	-0.192	28.421	0	2.16	0	1.695	2.064	-0.369
401.7	57.732	-0.24	26.694	0	2.75	0	1.695	2.064	-0.369
401.8	57.732	-0.237	25.462	0	3.27	0	1.695	2.064	-0.369
401.9	57.738	-0.237	24.304	0	3.24	0	1.695	2.064	-0.369
402	57.744	-0.227	24.462	0	3.28	0	1.696	2.064	-0.369
402.1	57.75	-0.227	24.533	0	3.24	0	1.696	2.064	-0.369
402.2	57.75	-0.215	24.452	0	3.28	0	1.696	2.064	-0.369
402.3	57.756	-0.2	24.688	0	3.25	0	1.696	2.065	-0.369
402.4	57.756	-0.195	24.688	0	3.26	0	1.696	2.065	-0.369
402.5	57.763	-0.195	24.688	0	3.26	0	1.696	2.065	-0.369
402.6	57.769	-0.21	25.045	0	3.25	0	1.696	2.065	-0.369
402.7	57.775	-0.195	25.854	0	3.26	0	1.696	2.065	-0.369
402.8	57.781	-0.195	26.253	0	3.25	0	1.696	2.065	-0.369
402.9	57.788	-0.185	25.568	0	3.27	0	1.696	2.065	-0.369
403	57.788	-0.177	25.924	0	3.24	0	1.696	2.065	-0.369
403.1	57.794	-0.177	26.366	0	3.27	0	1.697	2.065	-0.369
403.2	57.8	-0.17	25.953	0	3.24	0	1.697	2.065	-0.369
403.3	57.806	-0.187	26.119	0	2.65	0	1.697	2.065	-0.369
403.4	57.812	-0.187	26.119	0	2.71	0	1.697	2.066	-0.369
403.5	57.812	-0.192	26.377	0	2.96	0	1.697	2.066	-0.369
403.6	57.819	-0.205	26.472	0	3.13	0	1.697	2.066	-0.369
403.7	57.825	-0.205	26.737	0	3.21	0	1.697	2.066	-0.369
403.8	57.831	-0.19	26.429	0	3.26	0	1.697	2.066	-0.369
403.9	57.831	-0.195	26.182	0	3.24	0	1.697	2.066	-0.369
404	57.837	-0.195	26.737	0	3.26	0	1.697	2.066	-0.369
404.1	57.843	-0.192	26.362	0	3.23	0	1.697	2.066	-0.369

404.2	57.843	-0.202	26.345	0	3.27	0	1.697	2.066	-0.369
404.3	57.85	-0.202	26.278	0	3.22	0	1.698	2.066	-0.369
404.4	57.85	-0.202	25.815	0	3.27	0	1.698	2.066	-0.369
404.5	57.856	-0.197	25.84	0	3.24	0	1.698	2.067	-0.369
404.6	57.862	-0.197	25.649	0	2.51	0	1.698	2.067	-0.369
404.7	57.862	-0.172	25.981	0	0.58	0	1.698	2.067	-0.369
404.8	57.862	-0.165	25.896	0	0	0	1.698	2.067	-0.369
404.9	57.862	-0.165	25.854	0	0.63	0	1.698	2.067	-0.369
405	57.862	-0.17	26.292	0	1.35	0	1.698	2.067	-0.369
405.1	57.862	-0.17	25.854	0	1.87	0	1.698	2.067	-0.369
405.2	57.856	-0.195	25.783	0	2.27	0	1.698	2.067	-0.369
405.3	57.85	-0.22	25.575	0	2.65	0	1.698	2.067	-0.369
405.4	57.85	-0.235	24.109	0	2.83	0	1.698	2.067	-0.369
405.5	57.843	-0.235	24.053	0	2.98	0	1.698	2.067	-0.369
405.6	57.837	-0.25	24.395	0	3.11	0	1.698	2.067	-0.369
405.7	57.837	-0.252	23.961	0	3.2	0	1.698	2.067	-0.369
405.8	57.825	-0.252	23.241	0	3.18	0	1.699	2.067	-0.369
405.9	57.819	-0.252	23.195	0	3.24	0	1.699	2.067	-0.369
406	57.819	-0.242	23.431	0	3.23	0	1.699	2.067	-0.369
406.1	57.812	-0.242	22.909	0	3.23	0	1.699	2.068	-0.369
406.2	57.806	-0.242	23.064	0	3.23	0	1.699	2.068	-0.369
406.3	57.806	-0.232	23.212	0	3.22	0	1.699	2.068	-0.369
406.4	57.8	-0.232	23.156	0	3.25	0	1.699	2.068	-0.369
406.5	57.794	-0.242	22.884	0	3.21	0	1.699	2.068	-0.369
406.6	57.794	-0.252	23.541	0	3.24	0	1.699	2.068	-0.369
406.7	57.788	-0.252	23.618	0	3.22	0	1.699	2.068	-0.369
406.8	57.788	-0.245	23.015	0	3.27	0	1.699	2.068	-0.369
406.9	57.788	-0.242	23.276	0	3.26	0	1.699	2.068	-0.369
407	57.781	-0.242	23.89	0	3.29	0	1.7	2.068	-0.369
407.1	57.781	-0.227	23.746	0	3.28	0	1.7	2.068	-0.369
407.2	57.781	-0.225	23.276	0	3.32	0	1.7	2.069	-0.369
407.3	57.775	-0.227	23.834	0	3.34	0	1.7	2.069	-0.369
407.4	57.775	-0.237	23.661	0	3.33	0	1.7	2.069	-0.369
407.5	57.769	-0.24	23.661	0	3.34	0	1.7	2.069	-0.369
407.6	57.769	-0.24	24.014	0	3.32	0	1.7	2.069	-0.369
407.7	57.769	-0.235	23.534	0	3.35	0	1.7	2.069	-0.369
407.8	57.763	-0.24	23.576	0	3.31	0	1.7	2.069	-0.369
407.9	57.763	-0.24	23.534	0	3.34	0	1.7	2.069	-0.369
408	57.763	-0.235	23.749	0	3.32	0	1.701	2.069	-0.369
408.1	57.756	-0.235	23.414	0	3.35	0	1.701	2.069	-0.369
408.2	57.756	-0.232	23.318	0	3.31	0	1.701	2.069	-0.369
408.3	57.756	-0.22	23.806	0	3.34	0	1.701	2.07	-0.369
408.4	57.75	-0.24	23.633	0	3.32	0	1.701	2.07	-0.369
408.5	57.75	-0.24	23.548	0	3.34	0	1.701	2.07	-0.369
408.6	57.744	-0.235	24.402	0	3.33	0	1.701	2.07	-0.369
408.7	57.744	-0.237	23.329	0	3.34	0	1.701	2.07	-0.369
408.8	57.738	-0.237	23.509	0	3.34	0	1.701	2.07	-0.369

408.9	57.738	-0.237	23.848	0	3.39	0	1.701	2.07	-0.369
409	57.738	-0.235	23.844	0	3.48	0	1.701	2.07	-0.369
409.1	57.738	-0.235	23.414	0	3.47	0	1.702	2.07	-0.369
409.2	57.732	-0.247	23.498	0	3.51	0	1.702	2.07	-0.369
409.3	57.732	-0.24	23.834	0	3.49	0	1.702	2.071	-0.369
409.4	57.732	-0.24	23.834	0	3.52	0	1.702	2.071	-0.369
409.5	57.725	-0.245	23.484	0	3.49	0	1.702	2.071	-0.369
409.6	57.725	-0.242	23.537	0	3.54	0	1.702	2.071	-0.369
409.7	57.725	-0.242	23.844	0	3.5	0	1.702	2.071	-0.369
409.8	57.719	-0.24	23.128	0	3.53	0	1.702	2.071	-0.369
409.9	57.719	-0.237	23.714	0	3.51	0	1.702	2.071	-0.369
410	57.719	-0.237	23.873	0	3.53	0	1.702	2.071	-0.369
410.1	57.713	-0.232	23.347	0	3.52	0	1.703	2.071	-0.369
410.2	57.713	-0.242	23.834	0	3.52	0	1.703	2.071	-0.369
410.3	57.713	-0.227	23.844	0	3.53	0	1.703	2.072	-0.369
410.4	57.707	-0.23	23.728	0	3.54	0	1.703	2.072	-0.369
410.5	57.707	-0.23	23.643	0	3.54	0	1.703	2.072	-0.369
410.6	57.701	-0.23	23.834	0	3.52	0	1.703	2.072	-0.369
410.7	57.701	-0.25	23.385	0	3.55	0	1.703	2.072	-0.369
410.8	57.701	-0.24	24.141	0	3.35	0	1.703	2.072	-0.369
410.9	57.694	-0.24	23.085	0	3.38	0	1.703	2.072	-0.369
411	57.694	-0.217	23.262	0	3.34	0	1.703	2.072	-0.369
411.1	57.694	-0.217	22.99	0	3.37	0	1.703	2.072	-0.369
411.2	57.688	-0.225	23.015	0	3.33	0	1.704	2.072	-0.369
411.3	57.682	-0.24	23.788	0	3.36	0	1.704	2.072	-0.369
411.4	57.682	-0.235	23.304	0	3.34	0	1.704	2.073	-0.369
411.5	57.688	-0.235	23.304	0	3.36	0	1.704	2.073	-0.369
411.6	57.682	-0.215	23.347	0	3.32	0	1.704	2.073	-0.369
411.7	57.682	-0.207	23.897	0	3.36	0	1.704	2.073	-0.369
411.8	57.682	-0.207	23.7	0	3.34	0	1.704	2.073	-0.369
411.9	57.682	-0.212	23.887	0	3.35	0	1.704	2.073	-0.369
412	57.682	-0.222	24.371	0	3.33	0	1.704	2.073	-0.369
412.1	57.682	-0.222	24.784	0	3.35	0	1.704	2.073	-0.369
412.2	57.682	-0.222	24.328	0	3.34	0	1.704	2.073	-0.369
412.3	57.688	-0.225	24.681	0	3.35	0	1.705	2.073	-0.369
412.4	57.688	-0.225	24.6	0	3.35	0	1.705	2.073	-0.369
412.5	57.688	-0.235	24.583	0	3.32	0	1.705	2.074	-0.369
412.6	57.688	-0.217	25.116	0	3.37	0	1.705	2.074	-0.369
412.7	57.694	-0.217	25.01	0	3.33	0	1.705	2.074	-0.369
412.8	57.694	-0.197	24.226	0	3.36	0	1.705	2.074	-0.369
412.9	57.701	-0.205	25.116	0	3.3	0	1.705	2.074	-0.369
413	57.707	-0.205	25.769	0	3.36	0	1.705	2.074	-0.369
413.1	57.713	-0.187	26.045	0	3.33	0	1.705	2.074	-0.369
413.2	57.719	-0.187	25.903	0	3.36	0	1.705	2.074	-0.369
413.3	57.725	-0.17	26.737	0	3.34	0	1.706	2.074	-0.369
413.4	57.732	-0.157	26.751	0	3.33	0	1.706	2.074	-0.369
413.5	57.738	-0.172	26.751	0	3.33	0	1.706	2.074	-0.369

413.6	57.75	-0.172	27.853	0	3.35	0	1.706	2.075	-0.369
413.7	57.756	-0.17	28.16	0	3.35	0	1.706	2.075	-0.369
413.8	57.769	-0.165	27.344	0	3.33	0	1.706	2.075	-0.369
413.9	57.775	-0.165	27.846	0	3.36	0	1.706	2.075	-0.369
414	57.788	-0.16	28.146	0	3.32	0	1.706	2.075	-0.369
414.1	57.794	-0.16	28.28	0	3.36	0	1.706	2.075	-0.369
414.2	57.806	-0.162	28.121	0	3.31	0	1.706	2.075	-0.369
414.3	57.819	-0.157	27.81	0	3.36	0	1.706	2.075	-0.369
414.4	57.825	-0.15	28.393	0	3.33	0	1.707	2.075	-0.369
414.5	57.843	-0.15	28.393	0	3.37	0	1.707	2.075	-0.369
414.6	57.856	-0.132	28.566	0	3.34	0	1.707	2.076	-0.369
414.7	57.875	-0.117	29.29	0	3.35	0	1.707	2.076	-0.369
414.8	57.887	-0.117	29.569	0	3.37	0	1.707	2.076	-0.369
414.9	57.912	-0.102	29.788	0	3.34	0	1.707	2.076	-0.369
415	57.924	-0.102	30.307	0	3.38	0	1.707	2.076	-0.369
415.1	57.943	-0.102	30.893	0	3.34	0	1.707	2.076	-0.369
415.2	57.968	-0.09	31.063	0	3.38	0	1.707	2.076	-0.369
415.3	57.986	-0.062	31.932	0	3.35	0	1.707	2.076	-0.369
415.4	58.017	-0.062	31.932	0	3.37	0	1.707	2.076	-0.369
415.5	58.036	-0.057	32.422	0	3.36	0	1.708	2.076	-0.369
415.6	58.061	-0.055	33.228	0	3.35	0	1.708	2.076	-0.369
415.7	58.086	-0.055	33.228	0	3.38	0	1.708	2.077	-0.369
415.8	58.117	-0.04	34.047	0	3.35	0	1.708	2.077	-0.369
415.9	58.148	-0.045	34.598	0	3.38	0	1.708	2.077	-0.369
416	58.179	-0.045	34.739	0	3.35	0	1.708	2.077	-0.369
416.1	58.21	-0.045	35.851	0	3.36	0	1.708	2.077	-0.369
416.2	58.235	-0.022	35.491	0	3.38	0	1.708	2.077	-0.369
416.3	58.266	-0.027	35.601	0	3.34	0	1.708	2.077	-0.369
416.4	58.297	-0.012	36.032	0	3.39	0	1.708	2.077	-0.369
416.5	58.334	-0.01	36.035	0	3.36	0	1.708	2.077	-0.369
416.6	58.365	-0.01	36.438	0	3.35	0	1.709	2.077	-0.369
416.7	58.396	0.015	36.766	0	3.38	0	1.709	2.077	-0.369
416.8	58.428	0.01	36.053	0	3.35	0	1.709	2.078	-0.369
416.9	58.465	0.01	36.007	0	3.37	0	1.709	2.078	-0.369
417	58.49	-0.022	36.911	0	3.36	0	1.709	2.078	-0.369
417.1	58.527	-0.022	36.823	0	3.35	0	1.709	2.078	-0.369
417.2	58.558	-0.002	36.554	0	3.38	0	1.709	2.078	-0.369
417.3	58.589	0.01	36.459	0	3.35	0	1.709	2.078	-0.369
417.4	58.626	0.008	36.971	0	3.35	0	1.709	2.078	-0.369
417.5	58.657	0.008	36.801	0	3.39	0	1.709	2.078	-0.369
417.6	58.695	-0.002	37.155	0	3.35	0	1.71	2.078	-0.369
417.7	58.732	0.003	37.08	0	3.37	0	1.71	2.078	-0.369
417.8	58.763	0.003	36.858	0	3.39	0	1.71	2.079	-0.369
417.9	58.8	-0.012	37.239	0	3.38	0	1.71	2.079	-0.369
418	58.831	-0.005	37.239	0	3.37	0	1.71	2.079	-0.369
418.1	58.862	-0.005	36.872	0	3.41	0	1.71	2.079	-0.369
418.2	58.9	0	36.833	0	3.39	0	1.71	2.079	-0.369

418.3	58.931	-0.007	37.119	0	3.39	0	1.71	2.079	-0.369
418.4	58.962	0	37.119	0	3.42	0	1.71	2.079	-0.369
418.5	58.999	-0.002	37.204	0	3.39	0	1.71	2.079	-0.369
418.6	59.024	-0.002	37.137	0	3.37	0	1.71	2.079	-0.369
418.7	59.068	-0.002	36.904	0	3.41	0	1.711	2.079	-0.369
418.8	59.099	0.005	37.176	0	3.4	0	1.711	2.079	-0.369
418.9	59.13	0.008	37.003	0	3.37	0	1.711	2.08	-0.369
419	59.167	0.008	36.858	0	3.39	0	1.711	2.08	-0.369
419.1	59.198	0	37.713	0	3.4	0	1.711	2.08	-0.369
419.2	59.229	0.01	37.522	0	3.37	0	1.711	2.08	-0.369
419.3	59.26	0.005	37.522	0	3.38	0	1.711	2.08	-0.369
419.4	59.291	-0.007	37.31	0	3.41	0	1.711	2.08	-0.369
419.5	59.322	-0.007	37.31	0	3.39	0	1.711	2.08	-0.369
419.6	59.353	-0.007	37.109	0	3.38	0	1.711	2.08	-0.369
419.7	59.384	0.018	36.936	0	3.4	0	1.712	2.08	-0.369
419.8	59.428	0.01	36.54	0	3.39	0	1.712	2.08	-0.369
419.9	59.453	0.01	37.313	0	3.39	0	1.712	2.08	-0.369
420	59.478	-0.01	37.013	0	3.38	0	1.712	2.081	-0.369
420.1	59.509	-0.005	37.056	0	3.26	0	1.712	2.081	-0.369
420.2	59.54	-0.005	37.08	0	2.39	0	1.712	2.081	-0.369
420.3	59.571	-0.007	36.657	0	1.1	0	1.712	2.081	-0.369
420.4	59.596	-0.005	37.261	0	0.96	0	1.712	2.081	-0.369
420.5	59.627	-0.005	37.317	0	1.5	0	1.712	2.081	-0.369
420.6	59.652	0.01	36.537	0	2.12	0	1.712	2.081	-0.369
420.7	59.676	0.003	36.784	0	2.5	0	1.712	2.081	-0.369
420.8	59.708	0.003	36.883	0	2.91	0	1.712	2.081	-0.369
420.9	59.726	-0.02	36.9	0	2.68	0	1.712	2.081	-0.369
421	59.751	-0.03	36.053	0	2.3	0	1.712	2.081	-0.369
421.1	59.776	-0.03	35.911	0	2.73	0	1.712	2.081	-0.369
421.2	59.795	-0.02	35.318	0	2.61	0	1.713	2.081	-0.369
421.3	59.819	-0.005	34.905	0	-1.03	0	1.713	2.081	-0.369
421.4	59.838	-0.005	34.88	0	-3.33	0	1.712	2.081	-0.369
421.5	59.85	-0.022	35.184	0	-2.18	0	1.712	2.081	-0.369
421.6	59.863	-0.032	35.548	0	-0.83	0	1.712	2.081	-0.369
421.7	59.869	-0.032	35.043	0	0	0	1.712	2.081	-0.369
421.8	59.875	-0.092	34.736	0	1.31	0	1.712	2.081	-0.369
421.9	59.882	-0.125	33.595	0	1.42	0	1.712	2.081	-0.369
422	59.888	-0.125	32.083	0	1.59	0	1.712	2.081	-0.369
422.1	59.894	-0.15	30.844	0	1.82	0	1.713	2.082	-0.369
422.2	59.9	-0.155	30.173	0	1.3	0	1.713	2.082	-0.369
422.3	59.906	-0.145	28.432	0	0	0	1.713	2.082	-0.369
422.4	59.906	-0.15	28.668	0	0.67	0	1.713	2.082	-0.369
422.5	59.906	-0.142	28.725	0	1.74	0	1.713	2.082	-0.369
422.6	59.906	-0.142	27.542	0	2.28	0	1.713	2.082	-0.369
422.7	59.906	-0.17	27.687	0	2.3	0	1.713	2.082	-0.369
422.8	59.913	-0.175	28.485	0	1.76	0	1.713	2.082	-0.369
422.9	59.913	-0.175	28.11	0	2.56	0	1.713	2.082	-0.369

423	59.906	-0.165	26.758	0	1.2	0	1.713	2.082	-0.369
423.1	59.906	-0.165	26.687	0	0	0	1.713	2.082	-0.369
423.2	59.906	-0.18	27.408	0	0	0	1.713	2.082	-0.369
423.3	59.9	-0.195	26.627	0	0	0	1.713	2.082	-0.369
423.4	59.894	-0.185	25.434	0	0.79	0	1.713	2.082	-0.369
423.5	59.875	-0.185	25.434	0	1.59	0	1.713	2.082	-0.369
423.6	59.869	-0.205	25.405	0	1.4	0	1.713	2.082	-0.369
423.7	59.857	-0.22	25.063	0	1.52	0	1.713	2.082	-0.369
423.8	59.844	-0.22	24.169	0	1.16	0	1.713	2.082	-0.369
423.9	59.832	-0.227	23.763	0	1.51	0	1.713	2.082	-0.369
424	59.819	-0.222	22.997	0	2.06	0	1.713	2.082	-0.369
424.1	59.807	-0.222	22.559	0	2.5	0	1.713	2.082	-0.369
424.2	59.795	-0.232	22.358	0	2.9	0	1.713	2.082	-0.369
424.3	59.782	-0.26	22.82	0	2.95	0	1.713	2.082	-0.369
424.4	59.77	-0.26	22.849	0	3.02	0	1.714	2.083	-0.369
424.5	59.757	-0.26	21.432	0	3.08	0	1.714	2.083	-0.369
424.6	59.745	-0.257	21.574	0	3.41	0	1.714	2.083	-0.369
424.7	59.732	-0.257	21.768	0	3.38	0	1.714	2.083	-0.369
424.8	59.714	-0.257	21.634	0	2.79	0	1.714	2.083	-0.369
424.9	59.708	-0.265	21.549	0	2.09	0	1.714	2.083	-0.369
425	59.689	-0.265	21.648	0	2.79	0	1.714	2.083	-0.369
425.1	59.676	-0.255	21.485	0	3.2	0	1.714	2.083	-0.369
425.2	59.664	-0.262	21.214	0	3.21	0	1.714	2.083	-0.369
425.3	59.645	-0.275	21.443	0	3.19	0	1.714	2.083	-0.369
425.4	59.633	-0.29	21.387	0	3.27	0	1.714	2.083	-0.369
425.5	59.614	-0.277	21.387	0	3.26	0	1.714	2.083	-0.369
425.6	59.596	-0.277	20.68	0	3.28	0	1.715	2.084	-0.369
425.7	59.583	-0.26	20.285	0	3.37	0	1.715	2.084	-0.369
425.8	59.565	-0.257	20.811	0	3.49	0	1.715	2.084	-0.369
425.9	59.552	-0.257	20.027	0	3.48	0	1.715	2.084	-0.369
426	59.54	-0.292	21.104	0	3.5	0	1.715	2.084	-0.369
426.1	59.521	-0.292	21.454	0	3.54	0	1.715	2.084	-0.369
426.2	59.503	-0.292	20.822	0	3.49	0	1.715	2.084	-0.369
426.3	59.49	-0.282	20.578	0	3.53	0	1.715	2.084	-0.369
426.4	59.478	-0.272	20.461	0	3.48	0	1.715	2.084	-0.369
426.5	59.459	-0.272	20.377	0	3.37	0	1.715	2.084	-0.369
426.6	59.447	-0.277	20.518	0	3.31	0	1.715	2.085	-0.369
426.7	59.434	-0.287	20.956	0	3.35	0	1.716	2.085	-0.369
426.8	59.416	-0.287	21.228	0	3.25	0	1.716	2.085	-0.369
426.9	59.403	-0.275	20.454	0	3.3	0	1.716	2.085	-0.369
427	59.384	-0.277	20.539	0	3.24	0	1.716	2.085	-0.369
427.1	59.372	-0.277	21.228	0	3.3	0	1.716	2.085	-0.369
427.2	59.36	-0.265	20.818	0	3.21	0	1.716	2.085	-0.369
427.3	59.341	-0.282	20.539	0	3.31	0	1.716	2.085	-0.369
427.4	59.329	-0.282	20.567	0	2.89	0	1.716	2.085	-0.369
427.5	59.31	-0.262	20.61	0	2.53	0	1.716	2.085	-0.369
427.6	59.297	-0.267	20.783	0	2.22	0	1.716	2.085	-0.369

427.7	59.279	-0.267	20.959	0	1.56	0	1.716	2.085	-0.369
427.8	59.254	-0.29	21.069	0	1.12	0	1.716	2.085	-0.369
427.9	59.242	-0.292	21.171	0	1.34	0	1.716	2.085	-0.369
428	59.217	-0.292	20.73	0	1.62	0	1.716	2.086	-0.369
428.1	59.192	-0.295	20.359	0	1.89	0	1.717	2.086	-0.369
428.2	59.167	-0.307	20.115	0	1.85	0	1.717	2.086	-0.369
428.3	59.142	-0.337	20.059	0	1.99	0	1.717	2.086	-0.369
428.4	59.123	-0.332	18.194	0	2.71	0	1.717	2.086	-0.369
428.5	59.092	-0.33	18.251	0	3.03	0	1.717	2.086	-0.369
428.6	59.068	-0.33	18.063	0	3.1	0	1.717	2.086	-0.369
428.7	59.043	-0.345	18.049	0	3.15	0	1.717	2.086	-0.369
428.8	59.024	-0.345	17.943	0	3.2	0	1.717	2.086	-0.369
428.9	58.993	-0.345	17.032	0	3.36	0	1.717	2.086	-0.369
429	58.968	-0.347	17.438	0	3.38	0	1.717	2.086	-0.369
429.1	58.943	-0.347	17.159	0	3.35	0	1.717	2.086	-0.369
429.2	58.918	-0.367	17.354	0	3.34	0	1.717	2.086	-0.369
429.3	58.894	-0.365	17.809	0	3.35	0	1.718	2.087	-0.369
429.4	58.869	-0.357	17.272	0	3.36	0	1.718	2.087	-0.369
429.5	58.844	-0.357	17.188	0	3.33	0	1.718	2.087	-0.369
429.6	58.819	-0.312	17.315	0	3.35	0	1.718	2.087	-0.369
429.7	58.788	-0.327	17.032	0	3.34	0	1.718	2.087	-0.369
429.8	58.769	-0.327	17.618	0	3.34	0	1.718	2.087	-0.369
429.9	58.738	-0.337	17.594	0	3.36	0	1.718	2.087	-0.369
430	58.72	-0.33	17.576	0	3.33	0	1.718	2.087	-0.369
430.1	58.701	-0.33	17.647	0	3.34	0	1.718	2.087	-0.369
430.2	58.682	-0.325	17.513	0	3.34	0	1.718	2.087	-0.369
430.3	58.657	-0.317	17.869	0	3.34	0	1.718	2.087	-0.369
430.4	58.639	-0.317	17.954	0	3.35	0	1.719	2.088	-0.369
430.5	58.614	-0.332	18.473	0	3.35	0	1.719	2.088	-0.369
430.6	58.595	-0.322	18.515	0	3.33	0	1.719	2.088	-0.369
430.7	58.577	-0.322	18.544	0	3.35	0	1.719	2.088	-0.369
430.8	58.558	-0.302	18.063	0	3.33	0	1.719	2.088	-0.369
430.9	58.546	-0.292	18.932	0	3.33	0	1.719	2.088	-0.369
431	58.533	-0.292	19.458	0	3.35	0	1.719	2.088	-0.369
431.1	58.521	-0.282	19.903	0	3.32	0	1.719	2.088	-0.369
431.2	58.508	-0.282	20.952	0	3.35	0	1.719	2.088	-0.369
431.3	58.496	-0.26	21.199	0	3.34	0	1.719	2.088	-0.369
431.4	58.49	-0.237	21.464	0	3.34	0	1.719	2.089	-0.369
431.5	58.477	-0.23	21.549	0	3.36	0	1.72	2.089	-0.369
431.6	58.471	-0.23	22.132	0	3.33	0	1.72	2.089	-0.369
431.7	58.465	-0.245	23.096	0	3.35	0	1.72	2.089	-0.369
431.8	58.459	-0.245	23.17	0	3.34	0	1.72	2.089	-0.369
431.9	58.452	-0.245	22.605	0	3.33	0	1.72	2.089	-0.369
432	58.446	-0.23	23.17	0	3.36	0	1.72	2.089	-0.369
432.1	58.44	-0.23	23.343	0	3.34	0	1.72	2.089	-0.369
432.2	58.44	-0.22	23.714	0	3.33	0	1.72	2.089	-0.369
432.3	58.44	-0.212	23.569	0	3.35	0	1.72	2.089	-0.369

432.4	58.428	-0.217	24.597	0	3.32	0	1.72	2.089	-0.369
432.5	58.428	-0.217	24.597	0	3.35	0	1.721	2.09	-0.369
432.6	58.428	-0.222	24.244	0	3.2	0	1.721	2.09	-0.369
432.7	58.421	-0.227	24.597	0	3.13	0	1.721	2.09	-0.369
432.8	58.421	-0.227	24.385	0	3.34	0	1.721	2.09	-0.369
432.9	58.415	-0.235	24.957	0	3.33	0	1.721	2.09	-0.369
433	58.409	-0.235	24.169	0	3.35	0	1.721	2.09	-0.369
433.1	58.409	-0.235	23.802	0	3.35	0	1.721	2.09	-0.369
433.2	58.409	-0.255	24.512	0	3.33	0	1.721	2.09	-0.369
433.3	58.403	-0.23	24.039	0	3.35	0	1.721	2.09	-0.369
433.4	58.403	-0.23	24.039	0	3.32	0	1.721	2.09	-0.369
433.5	58.396	-0.227	23.495	0	3.34	0	1.721	2.09	-0.369
433.6	58.39	-0.222	24.325	0	3.33	0	1.722	2.091	-0.369
433.7	58.39	-0.222	23.763	0	3.31	0	1.722	2.091	-0.369
433.8	58.384	-0.225	23.859	0	3.35	0	1.722	2.091	-0.369
433.9	58.384	-0.23	24.042	0	3.32	0	1.722	2.091	-0.369
434	58.384	-0.23	24.134	0	3.35	0	1.722	2.091	-0.369
434.1	58.378	-0.23	24.025	0	3.35	0	1.722	2.091	-0.369
434.2	58.378	-0.23	23.604	0	3.34	0	1.722	2.091	-0.369
434.3	58.372	-0.235	23.601	0	3.35	0	1.722	2.091	-0.369
434.4	58.372	-0.227	23.844	0	3.32	0	1.722	2.091	-0.369
434.5	58.365	-0.222	23.385	0	3.35	0	1.722	2.091	-0.369
434.6	58.365	-0.222	23.604	0	3.34	0	1.722	2.091	-0.369
434.7	58.359	-0.25	23.562	0	3.33	0	1.723	2.092	-0.369
434.8	58.359	-0.242	24	0	3.36	0	1.723	2.092	-0.369
434.9	58.353	-0.242	23.601	0	3.33	0	1.723	2.092	-0.369
435	58.353	-0.232	22.824	0	3.34	0	1.723	2.092	-0.369
435.1	58.347	-0.232	23.534	0	3.35	0	1.723	2.092	-0.369
435.2	58.347	-0.252	24.448	0	3.3	0	1.723	2.092	-0.369
435.3	58.341	-0.252	23.834	0	2.9	0	1.723	2.092	-0.369
435.4	58.334	-0.222	23.205	0	1.95	0	1.723	2.092	-0.369
435.5	58.334	-0.222	23.29	0	1.56	0	1.723	2.092	-0.369
435.6	58.328	-0.23	22.99	0	1.6	0	1.723	2.092	-0.369
435.7	58.322	-0.24	24.374	0	1.29	0	1.723	2.092	-0.369
435.8	58.316	-0.24	23.862	0	1.46	0	1.723	2.092	-0.369
435.9	58.309	-0.255	23.961	0	1.54	0	1.723	2.092	-0.369
436	58.297	-0.26	23.29	0	2.06	0	1.723	2.092	-0.369
436.1	58.291	-0.26	22.76	0	2.34	0	1.723	2.093	-0.369
436.2	58.278	-0.272	22.923	0	2.62	0	1.724	2.093	-0.369
436.3	58.266	-0.29	22.107	0	2.7	0	1.724	2.093	-0.369
436.4	58.247	-0.29	22.192	0	2.88	0	1.724	2.093	-0.369
436.5	58.235	-0.275	21.528	0	2.89	0	1.724	2.093	-0.369
436.6	58.229	-0.262	20.737	0	2.98	0	1.724	2.093	-0.369
436.7	58.216	-0.262	20.836	0	2.98	0	1.724	2.093	-0.369
436.8	58.204	-0.307	21.171	0	3.08	0	1.724	2.093	-0.369
436.9	58.191	-0.305	21.454	0	3.1	0	1.724	2.093	-0.369
437	58.185	-0.305	21.086	0	3.09	0	1.724	2.093	-0.369

437.1	58.173	-0.29	20.44	0	3.07	0	1.724	2.093	-0.369
437.2	58.16	-0.28	21.051	0	3.03	0	1.724	2.093	-0.369
437.3	58.154	-0.265	21.065	0	3.02	0	1.724	2.093	-0.369
437.4	58.135	-0.28	21.57	0	3.15	0	1.725	2.094	-0.369
437.5	58.129	-0.295	21.485	0	3.28	0	1.725	2.094	-0.369
437.6	58.117	-0.295	21.39	0	3.2	0	1.725	2.094	-0.369
437.7	58.104	-0.292	20.896	0	3.28	0	1.725	2.094	-0.369
437.8	58.092	-0.287	20.564	0	3.2	0	1.725	2.094	-0.369
437.9	58.08	-0.287	20.807	0	3.22	0	1.725	2.094	-0.369
438	58.073	-0.287	20.709	0	3.21	0	1.725	2.094	-0.369
438.1	58.061	-0.287	21.175	0	3.14	0	1.725	2.094	-0.369
438.2	58.048	-0.297	21.132	0	3.16	0	1.725	2.094	-0.369
438.3	58.036	-0.277	20.91	0	3.17	0	1.725	2.094	-0.369
438.4	58.03	-0.27	20.211	0	3.07	0	1.725	2.094	-0.369
438.5	58.017	-0.27	20.211	0	3.07	0	1.726	2.095	-0.369
438.6	58.011	-0.297	21.221	0	3.17	0	1.726	2.095	-0.369
438.7	57.999	-0.285	21.542	0	3.2	0	1.726	2.095	-0.369
438.8	57.986	-0.285	20.765	0	3.19	0	1.726	2.095	-0.369
438.9	57.974	-0.27	20.55	0	3.19	0	1.726	2.095	-0.369
439	57.968	-0.28	20.98	0	3.11	0	1.726	2.095	-0.369
439.1	57.949	-0.28	21.072	0	3.14	0	1.726	2.095	-0.369
439.2	57.943	-0.295	21.086	0	3.07	0	1.726	2.095	-0.369
439.3	57.93	-0.275	21.146	0	3.16	0	1.726	2.095	-0.369
439.4	57.918	-0.287	21.146	0	3.14	0	1.726	2.095	-0.369
439.5	57.912	-0.29	20.938	0	3.24	0	1.726	2.095	-0.369
439.6	57.899	-0.275	20.807	0	3.19	0	1.726	2.096	-0.369
439.7	57.881	-0.275	20.098	0	3.15	0	1.727	2.096	-0.369
439.8	57.875	-0.282	19.861	0	3.15	0	1.727	2.096	-0.369
439.9	57.862	-0.297	20.412	0	3.29	0	1.727	2.096	-0.369
440	57.85	-0.297	21.023	0	3.36	0	1.727	2.096	-0.369
440.1	57.837	-0.285	20.281	0	3.45	0	1.727	2.096	-0.369
440.2	57.825	-0.275	19.917	0	3.5	0	1.727	2.096	-0.369
440.3	57.812	-0.282	20.493	0	3.47	0	1.727	2.096	-0.369
440.4	57.8	-0.292	20.85	0	3.5	0	1.727	2.096	-0.369
440.5	57.788	-0.295	20.793	0	3.48	0	1.727	2.096	-0.369
440.6	57.775	-0.295	20.564	0	3.49	0	1.727	2.096	-0.369
440.7	57.763	-0.28	20.271	0	3.48	0	1.728	2.097	-0.369
440.8	57.75	-0.295	20.154	0	3.49	0	1.728	2.097	-0.369
440.9	57.738	-0.295	19.96	0	3.5	0	1.728	2.097	-0.369
441	57.732	-0.32	20.588	0	3.53	0	1.728	2.097	-0.369
441.1	57.713	-0.305	20.793	0	3.52	0	1.728	2.097	-0.369
441.2	57.701	-0.305	20.44	0	3.53	0	1.728	2.097	-0.369
441.3	57.688	-0.297	20.228	0	3.54	0	1.728	2.097	-0.369
441.4	57.676	-0.285	20.412	0	3.51	0	1.728	2.097	-0.369
441.5	57.669	-0.285	20.412	0	3.54	0	1.728	2.097	-0.369
441.6	57.663	-0.265	20.281	0	3.53	0	1.728	2.097	-0.369
441.7	57.657	-0.265	21.097	0	3.47	0	1.729	2.098	-0.369

441.8	57.651	-0.265	21.613	0	3.33	0	1.729	2.098	-0.369
441.9	57.645	-0.25	22.05	0	3.37	0	1.729	2.098	-0.369
442	57.638	-0.242	22.418	0	3.33	0	1.729	2.098	-0.369
442.1	57.638	-0.242	22.605	0	3.36	0	1.729	2.098	-0.369
442.2	57.632	-0.237	22.824	0	3.33	0	1.729	2.098	-0.369
442.3	57.632	-0.257	23.258	0	3.36	0	1.729	2.098	-0.369
442.4	57.632	-0.257	23.343	0	3.33	0	1.729	2.098	-0.369
442.5	57.626	-0.235	23.304	0	3.36	0	1.729	2.098	-0.369
442.6	57.626	-0.227	23.004	0	3.34	0	1.729	2.098	-0.369
442.7	57.626	-0.227	23.862	0	3.36	0	1.729	2.098	-0.369
442.8	57.626	-0.225	24.233	0	3.33	0	1.73	2.099	-0.369
442.9	57.632	-0.215	24.787	0	3.36	0	1.73	2.099	-0.369
443	57.632	-0.215	24.918	0	3.34	0	1.73	2.099	-0.369
443.1	57.632	-0.22	24.731	0	3.35	0	1.73	2.099	-0.369
443.2	57.632	-0.22	25.43	0	3.34	0	1.73	2.099	-0.369
443.3	57.638	-0.19	25.377	0	3.34	0	1.73	2.099	-0.369
443.4	57.645	-0.187	24.862	0	3.35	0	1.73	2.099	-0.369
443.5	57.651	-0.185	25.179	0	3.33	0	1.73	2.099	-0.369
443.6	57.657	-0.185	26.387	0	3.35	0	1.73	2.099	-0.369
443.7	57.663	-0.19	26.412	0	3.31	0	1.73	2.099	-0.369
443.8	57.676	-0.19	26.991	0	3.36	0	1.73	2.099	-0.369
443.9	57.682	-0.19	27.019	0	3.32	0	1.731	2.1	-0.369
444	57.694	-0.167	27.168	0	3.36	0	1.731	2.1	-0.369
444.1	57.701	-0.145	28.054	0	3.33	0	1.731	2.1	-0.369
444.2	57.713	-0.145	27.507	0	3.37	0	1.731	2.1	-0.369
444.3	57.725	-0.137	28.269	0	3.33	0	1.731	2.1	-0.369
444.4	57.744	-0.137	28.615	0	3.34	0	1.731	2.1	-0.369
444.5	57.756	-0.137	28.615	0	3.34	0	1.731	2.1	-0.369
444.6	57.769	-0.117	29.325	0	3.36	0	1.731	2.1	-0.369
444.7	57.788	-0.122	29.346	0	3.35	0	1.731	2.1	-0.369
444.8	57.8	-0.122	29.767	0	3.35	0	1.731	2.1	-0.369
444.9	57.819	-0.13	30.395	0	3.36	0	1.731	2.101	-0.369
445	57.837	-0.13	30.385	0	3.33	0	1.732	2.101	-0.369
445.1	57.85	-0.13	30.198	0	3.37	0	1.732	2.101	-0.369
445.2	57.875	-0.127	30.466	0	3.34	0	1.732	2.101	-0.369
445.3	57.893	-0.1	30.607	0	3.37	0	1.732	2.101	-0.369
445.4	57.912	-0.1	30.607	0	3.34	0	1.732	2.101	-0.369
445.5	57.937	-0.075	30.861	0	3.34	0	1.732	2.101	-0.369
445.6	57.962	-0.072	31.787	0	2.18	0	1.732	2.101	-0.369
445.7	57.98	-0.072	32.246	0	-0.66	0	1.732	2.101	-0.369
445.8	58.005	-0.08	32.97	0	-1.72	0	1.732	2.101	-0.369
445.9	58.017	-0.077	33.178	0	-0.56	0	1.732	2.101	-0.369
446	58.03	-0.077	33.065	0	0.54	0	1.732	2.101	-0.369
446.1	58.042	-0.107	32.881	0	0.97	0	1.732	2.101	-0.369
446.2	58.055	-0.107	32.966	0	1.11	0	1.732	2.101	-0.369
446.3	58.061	-0.127	31.868	0	1.04	0	1.732	2.101	-0.369
446.4	58.073	-0.127	30.328	0	0.55	0	1.732	2.101	-0.369

446.5	58.08	-0.142	29.283	0	1.03	0	1.732	2.101	-0.369
446.6	58.086	-0.142	29.205	0	1.65	0	1.732	2.101	-0.369
446.7	58.098	-0.157	29.05	0	2.22	0	1.732	2.101	-0.369
446.8	58.104	-0.18	27.937	0	2.87	0	1.732	2.101	-0.369
446.9	58.111	-0.18	27.997	0	3.36	0	1.732	2.102	-0.369
447	58.117	-0.182	27.422	0	3.35	0	1.733	2.102	-0.369
447.1	58.123	-0.182	26.486	0	3.36	0	1.733	2.102	-0.369
447.2	58.129	-0.195	26.514	0	3.36	0	1.733	2.102	-0.369
447.3	58.135	-0.177	26.645	0	3.28	0	1.733	2.102	-0.369
447.4	58.142	-0.167	26.09	0	3.19	0	1.733	2.102	-0.369
447.5	58.154	-0.167	26.172	0	3.22	0	1.733	2.102	-0.369
447.6	58.16	-0.165	26.906	0	3.27	0	1.733	2.102	-0.369
447.7	58.173	-0.17	27.358	0	3.33	0	1.733	2.102	-0.369
447.8	58.179	-0.17	27.976	0	3.31	0	1.733	2.102	-0.369
447.9	58.185	-0.15	27.263	0	3.33	0	1.733	2.102	-0.369
448	58.198	-0.165	27.182	0	2.47	0	1.733	2.103	-0.369
448.1	58.204	-0.165	27.789	0	1.66	0	1.733	2.103	-0.369
448.2	58.21	-0.18	27.704	0	2.04	0	1.734	2.103	-0.369
448.3	58.216	-0.182	27.609	0	2.77	0	1.734	2.103	-0.369
448.4	58.222	-0.185	27.528	0	3.06	0	1.734	2.103	-0.369
448.5	58.222	-0.2	27.115	0	2.62	0	1.734	2.103	-0.369
448.6	58.229	-0.202	27.387	0	1.98	0	1.734	2.103	-0.369
448.7	58.235	-0.202	26.818	0	0	0	1.734	2.103	-0.369
448.8	58.235	-0.182	26.175	0	-0.93	0	1.734	2.103	-0.369
448.9	58.235	-0.182	25.737	0	-1.59	0	1.734	2.103	-0.369
449	58.229	-0.182	25.819	0	-1.23	0	1.734	2.103	-0.369
449.1	58.216	-0.21	26.09	0	0	0	1.734	2.103	-0.369
449.2	58.21	-0.227	25.857	0	1.19	0	1.734	2.103	-0.369
449.3	58.198	-0.25	24.876	0	1.69	0	1.734	2.103	-0.369
449.4	58.185	-0.267	22.803	0	1.83	0	1.734	2.103	-0.369
449.5	58.173	-0.29	22.718	0	1.16	0	1.734	2.103	-0.369
449.6	58.16	-0.29	22.577	0	0.59	0	1.734	2.103	-0.369
449.7	58.154	-0.275	21.782	0	0	0	1.734	2.103	-0.369
449.8	58.135	-0.28	20.68	0	0.86	0	1.734	2.103	-0.369
449.9	58.117	-0.28	20.726	0	0.73	0	1.734	2.103	-0.369
450	58.104	-0.29	20.98	0	1.5	0	1.734	2.103	-0.369
450.1	58.086	-0.29	20.168	0	1.83	0	1.734	2.103	-0.369
450.2	58.067	-0.32	20.726	0	1.99	0	1.734	2.103	-0.369
450.3	58.048	-0.325	20.055	0	2.1	0	1.734	2.103	-0.369
450.4	58.03	-0.332	19.112	0	2.22	0	1.734	2.103	-0.369
450.5	58.011	-0.332	19.028	0	2.55	0	1.734	2.104	-0.369
450.6	57.993	-0.33	18.402	0	3.3	0	1.734	2.104	-0.369
450.7	57.968	-0.337	18.233	0	3.34	0	1.734	2.104	-0.369
450.8	57.949	-0.337	18.533	0	3.31	0	1.735	2.104	-0.369
450.9	57.937	-0.32	18.406	0	3.33	0	1.735	2.104	-0.369
451	57.912	-0.31	18.06	0	3.33	0	1.735	2.104	-0.369
451.1	57.899	-0.31	17.908	0	3.32	0	1.735	2.104	-0.369

451.2	57.893	-0.307	18.604	0	3.34	0	1.735	2.104	-0.369
451.3	57.881	-0.292	18.862	0	3.32	0	1.735	2.104	-0.369
451.4	57.875	-0.292	18.946	0	3.35	0	1.735	2.104	-0.369
451.5	57.868	-0.262	21.083	0	3.32	0	1.735	2.104	-0.369
451.6	57.856	-0.26	20.864	0	3.35	0	1.735	2.105	-0.369
451.7	57.856	-0.26	21.74	0	3.32	0	1.735	2.105	-0.369
451.8	57.85	-0.23	22.315	0	3.34	0	1.735	2.105	-0.369
451.9	57.843	-0.225	22.446	0	3.33	0	1.736	2.105	-0.369
452	57.843	-0.225	23.484	0	3.35	0	1.736	2.105	-0.369
452.1	57.843	-0.225	24.381	0	3.33	0	1.736	2.105	-0.369
452.2	57.843	-0.225	24.424	0	3.33	0	1.736	2.105	-0.369
452.3	57.843	-0.225	24.914	0	3.35	0	1.736	2.105	-0.369
452.4	57.843	-0.217	24.985	0	3.32	0	1.736	2.105	-0.369
452.5	57.843	-0.215	24.985	0	3.36	0	1.736	2.105	-0.369
452.6	57.843	-0.215	25.352	0	3.32	0	1.736	2.105	-0.369
452.7	57.85	-0.205	25.66	0	3.35	0	1.736	2.106	-0.369
452.8	57.85	-0.205	25.564	0	3.32	0	1.736	2.106	-0.369
452.9	57.856	-0.205	25.547	0	3.35	0	1.737	2.106	-0.369
453	57.856	-0.19	25.967	0	3.33	0	1.737	2.106	-0.369
453.1	57.862	-0.19	25.674	0	3.36	0	1.737	2.106	-0.369
453.2	57.868	-0.19	26.235	0	3.34	0	1.737	2.106	-0.369
453.3	57.875	-0.185	26.391	0	3.33	0	1.737	2.106	-0.369
453.4	57.881	-0.202	26.419	0	3.35	0	1.737	2.106	-0.369
453.5	57.887	-0.202	26.391	0	3.3	0	1.737	2.106	-0.369
453.6	57.887	-0.212	26.504	0	3.36	0	1.737	2.106	-0.369
453.7	57.893	-0.202	26.348	0	3.34	0	1.737	2.106	-0.369
453.8	57.906	-0.202	26.405	0	3.36	0	1.737	2.107	-0.369
453.9	57.906	-0.207	26.207	0	3.35	0	1.737	2.107	-0.369
454	57.918	-0.207	26.952	0	3.36	0	1.738	2.107	-0.369
454.1	57.918	-0.207	26.306	0	3.33	0	1.738	2.107	-0.369
454.2	57.924	-0.195	26.472	0	3.32	0	1.738	2.107	-0.369
454.3	57.937	-0.19	26.747	0	3.34	0	1.738	2.107	-0.369
454.4	57.937	-0.19	26.663	0	3.31	0	1.738	2.107	-0.369
454.5	57.943	-0.2	26.708	0	3.34	0	1.738	2.107	-0.369
454.6	57.949	-0.19	26.885	0	3.3	0	1.738	2.107	-0.369
454.7	57.955	-0.19	26.098	0	3.47	0	1.738	2.107	-0.369
454.8	57.962	-0.167	25.801	0	3.46	0	1.738	2.108	-0.369
454.9	57.974	-0.18	26.101	0	3.47	0	1.738	2.108	-0.369
455	57.974	-0.18	26.553	0	3.49	0	1.738	2.108	-0.369
455.1	57.986	-0.202	26.712	0	3.47	0	1.739	2.108	-0.369
455.2	57.993	-0.202	26.723	0	3.52	0	1.739	2.108	-0.369
455.3	57.999	-0.195	26.281	0	3.49	0	1.739	2.108	-0.369
455.4	58.005	-0.197	26.684	0	3.52	0	1.739	2.108	-0.369
455.5	58.017	-0.185	26.684	0	3.5	0	1.739	2.108	-0.369
455.6	58.017	-0.185	26.143	0	3.51	0	1.739	2.108	-0.369
455.7	58.024	-0.185	26.295	0	3.51	0	1.739	2.108	-0.369
455.8	58.03	-0.192	26.504	0	3.5	0	1.739	2.108	-0.369

455.9	58.036	-0.192	26.726	0	3.53	0	1.739	2.109	-0.369
456	58.048	-0.197	27.086	0	3.49	0	1.739	2.109	-0.369
456.1	58.048	-0.197	26.61	0	3.54	0	1.74	2.109	-0.369
456.2	58.055	-0.195	26.401	0	3.51	0	1.74	2.109	-0.369
456.3	58.067	-0.21	26.514	0	3.53	0	1.74	2.109	-0.369
456.4	58.073	-0.215	27.217	0	3.54	0	1.74	2.109	-0.369
456.5	58.08	-0.215	27.302	0	3.46	0	1.74	2.109	-0.369
456.6	58.092	-0.165	26.408	0	3.37	0	1.74	2.109	-0.369
456.7	58.092	-0.162	26.154	0	3.34	0	1.74	2.109	-0.369
456.8	58.104	-0.162	26.694	0	3.36	0	1.74	2.109	-0.369
456.9	58.111	-0.19	27.044	0	3.34	0	1.74	2.11	-0.369
457	58.117	-0.175	27.263	0	3.34	0	1.74	2.11	-0.369
457.1	58.123	-0.175	26.694	0	3.35	0	1.74	2.11	-0.369
457.2	58.129	-0.172	26.656	0	3.33	0	1.741	2.11	-0.369
457.3	58.135	-0.18	26.832	0	3.35	0	1.741	2.11	-0.369
457.4	58.142	-0.18	26.832	0	3.32	0	1.741	2.11	-0.369
457.5	58.148	-0.177	27.485	0	2.77	0	1.741	2.11	-0.369
457.6	58.154	-0.187	26.97	0	1.43	0	1.741	2.11	-0.369
457.7	58.16	-0.187	27.058	0	0	0	1.741	2.11	-0.369
457.8	58.16	-0.202	27.192	0	-1.17	0	1.741	2.11	-0.369
457.9	58.16	-0.192	27.019	0	0	0	1.741	2.11	-0.369
458	58.154	-0.2	26.553	0	0.98	0	1.741	2.11	-0.369
458.1	58.148	-0.2	26.271	0	1.55	0	1.741	2.11	-0.369
458.2	58.142	-0.21	26.045	0	2.04	0	1.741	2.11	-0.369
458.3	58.142	-0.24	25.458	0	2.92	0	1.741	2.11	-0.369
458.4	58.135	-0.257	23.77	0	3.33	0	1.741	2.11	-0.369
458.5	58.129	-0.255	23.83	0	3.34	0	1.741	2.111	-0.369
458.6	58.123	-0.255	23.636	0	3.32	0	1.741	2.111	-0.369
458.7	58.123	-0.245	23.106	0	3.23	0	1.741	2.111	-0.369
458.8	58.117	-0.237	22.559	0	3.19	0	1.742	2.111	-0.369
458.9	58.111	-0.237	22.379	0	3.3	0	1.742	2.111	-0.369
459	58.111	-0.26	23.212	0	3.33	0	1.742	2.111	-0.369
459.1	58.111	-0.26	23.551	0	3.32	0	1.742	2.111	-0.369
459.2	58.104	-0.255	23.184	0	3.33	0	1.742	2.111	-0.369
459.3	58.098	-0.25	23.431	0	3.32	0	1.742	2.111	-0.369
459.4	58.098	-0.25	22.93	0	3.34	0	1.742	2.111	-0.369
459.5	58.092	-0.25	22.817	0	3.31	0	1.742	2.111	-0.369
459.6	58.092	-0.252	22.912	0	3.35	0	1.742	2.112	-0.369
459.7	58.086	-0.267	23.092	0	3.33	0	1.742	2.112	-0.369
459.8	58.086	-0.262	23.537	0	3.32	0	1.742	2.112	-0.369
459.9	58.08	-0.252	23.403	0	3.33	0	1.743	2.112	-0.369
460	58.08	-0.252	23.06	0	3.31	0	1.743	2.112	-0.369
460.1	58.073	-0.252	23.509	0	3.35	0	1.743	2.112	-0.369
460.2	58.08	-0.245	23.417	0	3.31	0	1.743	2.112	-0.369
460.3	58.073	-0.225	23.661	0	3.34	0	1.743	2.112	-0.369
460.4	58.073	-0.217	23.551	0	3.33	0	1.743	2.112	-0.369
460.5	58.073	-0.227	23.975	0	3.33	0	1.743	2.112	-0.369

460.6	58.073	-0.222	25.088	0	3.34	0	1.743	2.112	-0.369
460.7	58.073	-0.222	24.678	0	3.32	0	1.743	2.113	-0.369
460.8	58.073	-0.21	24.102	0	3.34	0	1.743	2.113	-0.369
460.9	58.067	-0.227	24.523	0	3.32	0	1.743	2.113	-0.369
461	58.073	-0.227	24.494	0	3.34	0	1.744	2.113	-0.369
461.1	58.073	-0.235	25.088	0	3.32	0	1.744	2.113	-0.369
461.2	58.067	-0.207	24.505	0	3.31	0	1.744	2.113	-0.369
461.3	58.073	-0.207	24.07	0	3.33	0	1.744	2.113	-0.369
461.4	58.073	-0.225	25.54	0	3.32	0	1.744	2.113	-0.369
461.5	58.073	-0.227	25.536	0	3.34	0	1.744	2.113	-0.369
461.6	58.073	-0.21	24.731	0	3.31	0	1.744	2.113	-0.369
461.7	58.073	-0.2	24.646	0	3.35	0	1.744	2.113	-0.369
461.8	58.073	-0.227	24.646	0	3.33	0	1.744	2.114	-0.369
461.9	58.08	-0.227	25.402	0	3.32	0	1.744	2.114	-0.369
462	58.08	-0.205	25.977	0	3.34	0	1.744	2.114	-0.369
462.1	58.08	-0.205	24.558	0	3.32	0	1.745	2.114	-0.369
462.2	58.086	-0.207	25.006	0	3.36	0	1.745	2.114	-0.369
462.3	58.092	-0.195	25.578	0	3.3	0	1.745	2.114	-0.369
462.4	58.098	-0.182	26.073	0	3.35	0	1.745	2.114	-0.369
462.5	58.104	-0.182	26.073	0	3.34	0	1.745	2.114	-0.369
462.6	58.111	-0.182	26.832	0	3.32	0	1.745	2.114	-0.369
462.7	58.117	-0.172	27.178	0	3.34	0	1.745	2.114	-0.369
462.8	58.129	-0.167	26.995	0	3.31	0	1.745	2.114	-0.369
462.9	58.135	-0.182	26.641	0	3.36	0	1.745	2.115	-0.369
463	58.148	-0.2	27.369	0	3.32	0	1.745	2.115	-0.369
463.1	58.148	-0.187	28.121	0	3.34	0	1.745	2.115	-0.369
463.2	58.154	-0.187	27.666	0	3.33	0	1.746	2.115	-0.369
463.3	58.167	-0.185	26.956	0	3.32	0	1.746	2.115	-0.369
463.4	58.173	-0.185	27.581	0	3.35	0	1.746	2.115	-0.369
463.5	58.179	-0.185	27.595	0	2.95	0	1.746	2.115	-0.369
463.6	58.191	-0.177	27.909	0	3.11	0	1.746	2.115	-0.369
463.7	58.198	-0.177	27.814	0	2.62	0	1.746	2.115	-0.369
463.8	58.21	-0.185	27.397	0	2.73	0	1.746	2.115	-0.369
463.9	58.21	-0.177	27.609	0	2.97	0	1.746	2.115	-0.369
464	58.216	-0.177	27.411	0	3.06	0	1.746	2.116	-0.369
464.1	58.222	-0.18	27.231	0	3.13	0	1.746	2.116	-0.369
464.2	58.229	-0.18	27.259	0	3.25	0	1.746	2.116	-0.369
464.3	58.235	-0.215	26.832	0	3.24	0	1.747	2.116	-0.369
464.4	58.241	-0.225	26.846	0	2.85	0	1.747	2.116	-0.369
464.5	58.247	-0.21	26.79	0	3.01	0	1.747	2.116	-0.369
464.6	58.247	-0.197	26.129	0	3.33	0	1.747	2.116	-0.369
464.7	58.254	-0.19	26.338	0	3.32	0	1.747	2.116	-0.369
464.8	58.26	-0.197	26.271	0	3.33	0	1.747	2.116	-0.369
464.9	58.26	-0.205	26.232	0	3.08	0	1.747	2.116	-0.369
465	58.266	-0.215	26.271	0	2.07	0	1.747	2.116	-0.369
465.1	58.266	-0.22	25.886	0	2.65	0	1.747	2.116	-0.369
465.2	58.272	-0.22	26.313	0	3.03	0	1.747	2.117	-0.369

465.3	58.272	-0.215	25.924	0	3.25	0	1.747	2.117	-0.369
465.4	58.278	-0.202	25.165	0	3.29	0	1.747	2.117	-0.369
465.5	58.278	-0.202	25.193	0	3.31	0	1.748	2.117	-0.369
465.6	58.278	-0.227	25.405	0	3.35	0	1.748	2.117	-0.369
465.7	58.278	-0.22	26.009	0	3.32	0	1.748	2.117	-0.369
465.8	58.285	-0.22	24.766	0	3.34	0	1.748	2.117	-0.369
465.9	58.285	-0.215	24.777	0	2.62	0	1.748	2.117	-0.369
466	58.285	-0.21	24.851	0	2.01	0	1.748	2.117	-0.369
466.1	58.291	-0.202	24.823	0	2.14	0	1.748	2.117	-0.369
466.2	58.285	-0.202	24.823	0	1.71	0	1.748	2.117	-0.369
466.3	58.285	-0.225	25.391	0	1.96	0	1.748	2.117	-0.369
466.4	58.278	-0.225	25.321	0	2.34	0	1.748	2.117	-0.369
466.5	58.272	-0.242	25.035	0	1.96	0	1.748	2.117	-0.369
466.6	58.272	-0.245	24.233	0	0	0	1.748	2.117	-0.369
466.7	58.266	-0.245	23.961	0	0.7	0	1.748	2.118	-0.369
466.8	58.26	-0.25	24.099	0	1.09	0	1.748	2.118	-0.369
466.9	58.254	-0.25	23.707	0	1.22	0	1.748	2.118	-0.369
467	58.241	-0.25	23.608	0	1.92	0	1.748	2.118	-0.369
467.1	58.235	-0.257	23.389	0	2.3	0	1.748	2.118	-0.369
467.2	58.222	-0.257	22.902	0	2.49	0	1.748	2.118	-0.369
467.3	58.21	-0.275	22.259	0	2.61	0	1.749	2.118	-0.369
467.4	58.204	-0.287	22.284	0	2.9	0	1.749	2.118	-0.369
467.5	58.191	-0.3	21.563	0	3.14	0	1.749	2.118	-0.369
467.6	58.179	-0.3	20.878	0	2.99	0	1.749	2.118	-0.369
467.7	58.167	-0.295	21.009	0	2.95	0	1.749	2.118	-0.369
467.8	58.154	-0.292	20.709	0	2.92	0	1.749	2.118	-0.369
467.9	58.142	-0.295	20.74	0	2.03	0	1.749	2.118	-0.369
468	58.129	-0.292	20.769	0	2.43	0	1.749	2.118	-0.369
468.1	58.117	-0.292	20.539	0	2.62	0	1.749	2.118	-0.369
468.2	58.104	-0.297	20.917	0	1.62	0	1.749	2.119	-0.369
468.3	58.092	-0.28	20.889	0	0	0	1.749	2.119	-0.369
468.4	58.073	-0.292	20.761	0	0	0	1.749	2.119	-0.369
468.5	58.061	-0.302	20.927	0	0.75	0	1.749	2.119	-0.369
468.6	58.042	-0.297	21.033	0	0.86	0	1.749	2.119	-0.369
468.7	58.024	-0.3	20.242	0	1.28	0	1.749	2.119	-0.369
468.8	57.999	-0.3	19.674	0	1.14	0	1.749	2.119	-0.369
468.9	57.98	-0.337	19.494	0	1.87	0	1.749	2.119	-0.369
469	57.955	-0.342	19.176	0	2.31	0	1.749	2.119	-0.369
469.1	57.937	-0.342	18.448	0	2.68	0	1.75	2.119	-0.369
469.2	57.918	-0.342	17.562	0	2.73	0	1.75	2.119	-0.369
469.3	57.893	-0.372	17.636	0	2.88	0	1.75	2.119	-0.369
469.4	57.868	-0.372	17.576	0	2.9	0	1.75	2.119	-0.369
469.5	57.85	-0.36	16.524	0	2.82	0	1.75	2.119	-0.369
469.6	57.825	-0.37	16.605	0	2.23	0	1.75	2.119	-0.369
469.7	57.8	-0.365	16.887	0	2.66	0	1.75	2.119	-0.369
469.8	57.775	-0.355	16.718	0	3.12	0	1.75	2.119	-0.369
469.9	57.756	-0.355	16.503	0	3.16	0	1.75	2.119	-0.369

470	57.732	-0.357	17.135	0	3.25	0	1.75	2.12	-0.369
470.1	57.701	-0.357	16.693	0	3.29	0	1.75	2.12	-0.369
470.2	57.676	-0.36	16.548	0	3.31	0	1.75	2.12	-0.369
470.3	57.651	-0.37	16.372	0	3.36	0	1.751	2.12	-0.369
470.4	57.632	-0.377	15.959	0	3.35	0	1.751	2.12	-0.369
470.5	57.607	-0.39	16.04	0	3.37	0	1.751	2.12	-0.369
470.6	57.582	-0.39	16.548	0	3.44	0	1.751	2.12	-0.369
470.7	57.558	-0.367	16.231	0	3.31	0	1.751	2.12	-0.369
470.8	57.527	-0.375	15.729	0	3.45	0	1.751	2.12	-0.369
470.9	57.508	-0.385	16.414	0	3.44	0	1.751	2.12	-0.369
471	57.483	-0.395	16.658	0	3.52	0	1.751	2.12	-0.369
471.1	57.458	-0.395	16.746	0	3.43	0	1.751	2.121	-0.369
471.2	57.44	-0.385	16.079	0	3.35	0	1.751	2.121	-0.369
471.3	57.415	-0.372	15.969	0	3.33	0	1.751	2.121	-0.369
471.4	57.39	-0.383	16.255	0	3.33	0	1.752	2.121	-0.369
471.5	57.365	-0.375	16.34	0	3.31	0	1.752	2.121	-0.369
471.6	57.34	-0.362	16.255	0	3.33	0	1.752	2.121	-0.369
471.7	57.321	-0.37	16.178	0	3.32	0	1.752	2.121	-0.369
471.8	57.297	-0.383	16.375	0	3.33	0	1.752	2.121	-0.369
471.9	57.272	-0.395	16.813	0	2.78	0	1.752	2.121	-0.369
472	57.253	-0.377	16.644	0	1.46	0	1.752	2.121	-0.369
472.1	57.228	-0.347	16.63	0	1.57	0	1.752	2.121	-0.369
472.2	57.203	-0.347	15.952	0	2.42	0	1.752	2.121	-0.369
472.3	57.179	-0.372	15.807	0	2.72	0	1.752	2.122	-0.369
472.4	57.154	-0.372	17.117	0	2.94	0	1.752	2.122	-0.369
472.5	57.123	-0.38	16.714	0	3.14	0	1.752	2.122	-0.369
472.6	57.098	-0.395	16.036	0	2.24	0	1.752	2.122	-0.369
472.7	57.073	-0.395	15.782	0	0.99	0	1.753	2.122	-0.369
472.8	57.042	-0.385	15.98	0	0.75	0	1.753	2.122	-0.369
472.9	57.017	-0.388	14.85	0	0	0	1.753	2.122	-0.369
473	56.986	-0.393	15.461	0	-0.79	0	1.753	2.122	-0.369
473.1	56.949	-0.395	15.708	0	-1.15	0	1.752	2.122	-0.369
473.2	56.918	-0.395	15.281	0	-1.2	0	1.752	2.122	-0.369
473.3	56.88	-0.408	15.404	0	-1.3	0	1.752	2.122	-0.369
473.4	56.843	-0.425	14.557	0	-1.31	0	1.752	2.122	-0.369
473.5	56.806	-0.42	14.638	0	-1.2	0	1.752	2.122	-0.369
473.6	56.768	-0.4	14.221	0	-1.19	0	1.752	2.122	-0.37
473.7	56.731	-0.405	13.589	0	-1.16	0	1.752	2.122	-0.37
473.8	56.694	-0.415	14.151	0	-1.15	0	1.752	2.122	-0.37
473.9	56.663	-0.433	14.74	0	-1.15	0	1.752	2.122	-0.37
474	56.626	-0.425	14.666	0	-1.19	0	1.752	2.122	-0.37
474.1	56.594	-0.425	14.497	0	-1.62	0	1.752	2.122	-0.37
474.2	56.557	-0.408	13.847	0	-1.46	0	1.752	2.122	-0.37
474.3	56.52	-0.408	14.105	0	-2.13	0	1.752	2.122	-0.37
474.4	56.483	-0.405	14.719	0	-2.81	0	1.752	2.122	-0.37
474.5	56.445	-0.405	14.659	0	-3.85	0	1.752	2.122	-0.37
474.6	56.408	-0.418	14.352	0	-4.03	0	1.752	2.122	-0.37

474.7	56.365	-0.408	14.606	0	-3.12	0	1.752	2.122	-0.37
474.8	56.321	-0.383	14.694	0	-2.28	0	1.752	2.122	-0.37
474.9	56.284	-0.408	13.706	0	-1.32	0	1.752	2.122	-0.37
475	56.247	-0.453	15.238	0	0	0	1.752	2.122	-0.37
475.1	56.203	-0.465	15.468	0	0	0	1.752	2.122	-0.37
475.2	56.16	-0.465	13.391	0	1.07	0	1.752	2.122	-0.37
475.3	56.116	-0.47	11.95	0	3.24	0	1.752	2.122	-0.37
475.4	56.079	-0.47	11.442	0	3.22	0	1.752	2.122	-0.37
475.5	56.048	-0.475	10.139	0	3.19	0	1.752	2.122	-0.37
475.6	56.01	-0.5	10.7	0	1.89	0	1.752	2.122	-0.37
475.7	55.986	-0.5	11.241	0	0	0	1.752	2.122	-0.37
475.8	55.967	-0.362	10.87	0	0	0	1.752	2.122	-0.37
475.9	55.948	-0.327	11.128	0	0	0	1.752	2.122	-0.37
476	55.923	-0.35	15.196	0	-0.73	0	1.752	2.122	-0.37
476.1	55.905	-0.357	18.876	0	-0.73	0	1.752	2.122	-0.37
476.2	55.88	-0.357	18.922	0	-0.6	0	1.752	2.122	-0.37
476.3	55.855	-0.33	18.24	0	0	0	1.752	2.122	-0.37
476.4	55.83	-0.332	17.767	0	-0.72	0	1.752	2.122	-0.37
476.5	55.812	-0.35	17.739	0	-0.61	0	1.752	2.122	-0.37
476.6	55.787	-0.36	18.618	0	0	0	1.752	2.122	-0.37
476.7	55.768	-0.357	18.565	0	0	0	1.752	2.122	-0.37
476.8	55.749	-0.36	18.325	0	0	0	1.752	2.122	-0.37
476.9	55.725	-0.367	18.123	0	0	0	1.752	2.122	-0.37
477	55.706	-0.37	18.438	0	0	0	1.752	2.122	-0.37
477.1	55.687	-0.37	18.463	0	0	0	1.752	2.122	-0.37
477.2	55.662	-0.36	17.947	0	0	0	1.752	2.122	-0.37
477.3	55.644	-0.352	17.513	0	0	0	1.752	2.122	-0.37
477.4	55.625	-0.352	17.686	0	0	0	1.752	2.122	-0.37
477.5	55.607	-0.352	17.597	0	0	0	1.752	2.122	-0.371
477.6	55.582	-0.34	17.94	0	0	0	1.752	2.122	-0.371
477.7	55.563	-0.342	17.375	0	0	0	1.752	2.122	-0.371
477.8	55.544	-0.372	17.587	0	0	0	1.752	2.122	-0.371
477.9	55.526	-0.37	18.3	0	0	0	1.752	2.122	-0.371
478	55.501	-0.355	18.194	0	0	0	1.752	2.122	-0.371
478.1	55.482	-0.36	17.375	0	0	0	1.752	2.122	-0.371
478.2	55.464	-0.36	17.919	0	-0.85	0	1.752	2.122	-0.371
478.3	55.445	-0.352	17.629	0	-1.06	0	1.752	2.122	-0.371
478.4	55.42	-0.352	17.573	0	-0.68	0	1.752	2.122	-0.371
478.5	55.401	-0.372	17.919	0	0	0	1.752	2.122	-0.371
478.6	55.377	-0.365	17.806	0	0	0	1.752	2.122	-0.371
478.7	55.352	-0.375	16.965	0	0	0	1.751	2.122	-0.371
478.8	55.333	-0.372	17.544	0	0	0	1.751	2.122	-0.371
478.9	55.314	-0.37	17.311	0	0	0	1.751	2.122	-0.371
479	55.29	-0.375	16.884	0	0	0	1.751	2.122	-0.371
479.1	55.271	-0.375	16.764	0	0	0	1.751	2.122	-0.371
479.2	55.252	-0.37	16.863	0	0	0	1.751	2.122	-0.371
479.3	55.234	-0.357	16.87	0	0	0	1.751	2.122	-0.371

479.4	55.215	-0.36	17.456	0	0	0	1.751	2.122	-0.371
479.5	55.196	-0.355	17.371	0	0	0	1.751	2.122	-0.371
479.6	55.172	-0.357	17.629	0	0	0	1.751	2.122	-0.371
479.7	55.153	-0.36	17.629	0	0	0	1.751	2.122	-0.371
479.8	55.134	-0.357	18.141	0	0	0	1.751	2.122	-0.371
479.9	55.116	-0.345	17.806	0	0	0	1.751	2.122	-0.371
480	55.097	-0.337	17.35	0	0	0	1.751	2.122	-0.371
480.1	55.078	-0.337	17.46	0	0	0	1.751	2.122	-0.371
480.2	55.06	-0.345	17.968	0	0	0	1.751	2.122	-0.371
480.3	55.041	-0.34	18.053	0	0	0	1.751	2.122	-0.371
480.4	55.022	-0.35	17.7	0	0	0	1.751	2.122	-0.371
480.5	55.004	-0.355	17.7	0	2.98	0	1.751	2.122	-0.371
480.6	54.985	-0.34	18.053	0	2.92	0	1.751	2.122	-0.371
480.7	54.979	-0.337	17.876	0	2.82	0	1.752	2.122	-0.371
480.8	54.966	-0.322	18.572	0	0.69	0	1.752	2.122	-0.371
480.9	54.966	-0.317	19.105	0	0	0	1.752	2.122	-0.371
481	54.954	-0.315	19.017	0	2.48	0	1.752	2.123	-0.371
481.1	54.942	-0.305	20.292	0	3.17	0	1.752	2.123	-0.371
481.2	54.935	-0.305	19.925	0	3.1	0	1.752	2.123	-0.371
481.3	54.935	-0.297	20.857	0	2.43	0	1.752	2.123	-0.371
481.4	54.935	-0.297	21.344	0	2.55	0	1.752	2.123	-0.371
481.5	54.935	-0.262	21.651	0	0	0	1.752	2.123	-0.371
481.6	54.935	-0.257	21.443	0	-0.52	0	1.752	2.123	-0.371
481.7	54.935	-0.262	21.429	0	0	0	1.752	2.123	-0.371
481.8	54.929	-0.262	22.577	0	0	0	1.752	2.123	-0.371
481.9	54.929	-0.26	22.577	0	0	0	1.752	2.123	-0.371
482	54.929	-0.25	23.029	0	0	0	1.752	2.123	-0.371
482.1	54.929	-0.25	23.124	0	0	0	1.752	2.123	-0.371
482.2	54.923	-0.24	23.029	0	0	0	1.752	2.123	-0.371
482.3	54.923	-0.252	23.357	0	-0.61	0	1.752	2.123	-0.371
482.4	54.923	-0.242	23.343	0	-1.22	0	1.752	2.123	-0.371
482.5	54.923	-0.235	23.343	0	-1.13	0	1.752	2.123	-0.371
482.6	54.917	-0.235	23	0	-0.55	0	1.752	2.123	-0.371
482.7	54.917	-0.247	23.438	0	0	0	1.752	2.123	-0.371
482.8	54.911	-0.26	23.788	0	0	0	1.752	2.123	-0.371
482.9	54.911	-0.267	23.438	0	-0.54	0	1.752	2.123	-0.371
483	54.911	-0.265	23.135	0	-0.91	0	1.752	2.123	-0.371
483.1	54.904	-0.265	22.76	0	-0.79	0	1.752	2.123	-0.371
483.2	54.898	-0.26	22.107	0	0	0	1.752	2.123	-0.371
483.3	54.892	-0.285	22.086	0	0	0	1.752	2.123	-0.371
483.4	54.886	-0.292	22.605	0	0	0	1.752	2.123	-0.371
483.5	54.886	-0.267	22.439	0	0	0	1.752	2.123	-0.371
483.6	54.88	-0.262	21.899	0	0	0	1.752	2.123	-0.371
483.7	54.88	-0.262	22.171	0	0	0	1.752	2.123	-0.371
483.8	54.873	-0.255	22.566	0	0	0	1.752	2.123	-0.371
483.9	54.873	-0.247	22.495	0	0.89	0	1.752	2.123	-0.371
484	54.873	-0.255	22.852	0	0	0	1.752	2.123	-0.371

484.1	54.873	-0.252	23.128	0	0	0	1.752	2.123	-0.371
484.2	54.873	-0.252	23.604	0	0	0	1.752	2.123	-0.371
484.3	54.873	-0.22	23.29	0	-0.74	0	1.752	2.123	-0.371
484.4	54.88	-0.22	23.219	0	-0.73	0	1.752	2.123	-0.371
484.5	54.88	-0.255	24.515	0	-0.62	0	1.752	2.123	-0.371
484.6	54.88	-0.237	24.89	0	1.58	0	1.752	2.123	-0.371
484.7	54.88	-0.23	24.381	0	3.36	0	1.752	2.123	-0.371
484.8	54.886	-0.235	23.89	0	3.43	0	1.752	2.123	-0.371
484.9	54.892	-0.22	25.119	0	3.42	0	1.752	2.123	-0.371
485	54.904	-0.212	24.794	0	3.05	0	1.752	2.123	-0.371
485.1	54.923	-0.21	25.391	0	1.08	0	1.752	2.123	-0.371
485.2	54.935	-0.21	25.893	0	2.67	0	1.752	2.123	-0.371
485.3	54.954	-0.172	26.288	0	1.64	0	1.752	2.123	-0.371
485.4	54.966	-0.18	27.662	0	0	0	1.752	2.123	-0.371
485.5	54.985	-0.167	27.662	0	0	0	1.752	2.123	-0.371
485.6	54.998	-0.157	28.029	0	0	0	1.752	2.123	-0.371
485.7	55.016	-0.15	28.096	0	0	0	1.752	2.123	-0.371
485.8	55.029	-0.137	28.831	0	-0.56	0	1.752	2.123	-0.371
485.9	55.047	-0.14	29.057	0	-1.4	0	1.752	2.123	-0.371
486	55.06	-0.15	28.923	0	-1.95	0	1.752	2.123	-0.371
486.1	55.072	-0.15	29.894	0	-1.57	0	1.752	2.123	-0.372
486.2	55.091	-0.142	29.198	0	-1.13	0	1.752	2.123	-0.372
486.3	55.097	-0.142	29.113	0	-0.96	0	1.752	2.123	-0.372
486.4	55.109	-0.142	29.17	0	-0.71	0	1.752	2.123	-0.372
486.5	55.122	-0.155	29.17	0	-0.58	0	1.752	2.123	-0.372
486.6	55.134	-0.155	29.032	0	-0.52	0	1.752	2.123	-0.372
486.7	55.14	-0.16	28.365	0	0	0	1.752	2.123	-0.372
486.8	55.153	-0.165	27.793	0	-0.91	0	1.752	2.123	-0.372
486.9	55.165	-0.162	27.718	0	-4.73	0	1.752	2.123	-0.372
487	55.178	-0.18	27.436	0	-6.69	0	1.751	2.123	-0.372
487.1	55.184	-0.177	28.033	0	-6.58	0	1.751	2.123	-0.372
487.2	55.178	-0.177	27.595	0	-5.93	0	1.751	2.123	-0.372
487.3	55.172	-0.195	27.316	0	-5.17	0	1.751	2.123	-0.372
487.4	55.159	-0.195	27.146	0	-3.97	0	1.751	2.123	-0.373
487.5	55.147	-0.252	26.02	0	-2.95	0	1.751	2.123	-0.373
487.6	55.134	-0.275	24.477	0	-2.01	0	1.751	2.123	-0.373
487.7	55.122	-0.272	23.403	0	-0.7	0	1.751	2.123	-0.373
487.8	55.109	-0.275	21.983	0	0	0	1.751	2.123	-0.373
487.9	55.103	-0.3	20.419	0	-0.61	0	1.751	2.123	-0.373
488	55.091	-0.31	20.942	0	-0.67	0	1.751	2.123	-0.373
488.1	55.085	-0.31	20.225	0	-0.79	0	1.751	2.123	-0.373
488.2	55.072	-0.31	19.766	0	-0.57	0	1.751	2.123	-0.373
488.3	55.066	-0.285	19.744	0	0	0	1.751	2.123	-0.373
488.4	55.053	-0.285	19.9	0	0	0	1.751	2.123	-0.373
488.5	55.041	-0.282	19.985	0	0	0	1.751	2.123	-0.373
488.6	55.035	-0.292	20.253	0	0	0	1.751	2.123	-0.373
488.7	55.029	-0.305	20.433	0	0	0	1.751	2.123	-0.373

488.8	55.022	-0.295	21.132	0	0	0	1.751	2.123	-0.373
488.9	55.016	-0.285	20.864	0	0	0	1.751	2.123	-0.373
489	55.01	-0.277	20.959	0	0	0	1.751	2.123	-0.373
489.1	55.004	-0.277	21.044	0	0	0	1.751	2.123	-0.373
489.2	54.998	-0.27	21.595	0	0	0	1.751	2.123	-0.373
489.3	54.991	-0.25	21.793	0	0	0	1.751	2.123	-0.373
489.4	54.991	-0.252	21.51	0	0	0	1.751	2.123	-0.373
489.5	54.985	-0.255	21.514	0	0	0	1.751	2.123	-0.373
489.6	54.979	-0.255	22.216	0	0	0	1.751	2.123	-0.373
489.7	54.979	-0.262	22.093	0	0	0	1.751	2.123	-0.373
489.8	54.973	-0.265	21.998	0	0	0	1.751	2.123	-0.373
489.9	54.966	-0.265	22.234	0	0	0	1.751	2.123	-0.373
490	54.966	-0.28	21.835	0	0	0	1.751	2.123	-0.373
490.1	54.96	-0.285	22.488	0	0	0	1.751	2.123	-0.373
490.2	54.954	-0.285	22.351	0	0	0	1.751	2.123	-0.373
490.3	54.954	-0.25	21.711	0	0	0	1.751	2.123	-0.373
490.4	54.948	-0.25	21.959	0	0	0	1.751	2.123	-0.373
490.5	54.948	-0.255	22.513	0	0	0	1.75	2.123	-0.373
490.6	54.942	-0.272	22.46	0	0	0	1.75	2.123	-0.373
490.7	54.935	-0.252	23.156	0	0	0	1.75	2.123	-0.373
490.8	54.935	-0.232	22.471	0	0	0	1.75	2.123	-0.373
490.9	54.929	-0.25	21.754	0	0	0	1.75	2.123	-0.373
491	54.929	-0.257	22.57	0	0	0	1.75	2.123	-0.373
491.1	54.929	-0.257	22.813	0	0	0	1.75	2.123	-0.373
491.2	54.923	-0.255	22.301	0	0	0	1.75	2.123	-0.373
491.3	54.917	-0.247	22.64	0	0	0	1.75	2.123	-0.373
491.4	54.917	-0.242	22.245	0	0	0	1.75	2.123	-0.373
491.5	54.917	-0.255	22.16	0	0	0	1.75	2.123	-0.373
491.6	54.911	-0.272	22.64	0	0	0	1.75	2.123	-0.373
491.7	54.911	-0.255	23.35	0	0	0	1.75	2.123	-0.373
491.8	54.904	-0.24	22.527	0	1.36	0	1.75	2.124	-0.373
491.9	54.904	-0.245	21.669	0	4.4	0	1.751	2.124	-0.373
492	54.904	-0.26	22.573	0	3.86	0	1.751	2.124	-0.373
492.1	54.911	-0.26	23.089	0	3.33	0	1.751	2.124	-0.373
492.2	54.923	-0.252	22.993	0	2.38	0	1.751	2.124	-0.373
492.3	54.929	-0.217	22.499	0	0	0	1.751	2.124	-0.373
492.4	54.935	-0.21	24.183	0	0	0	1.751	2.124	-0.373
492.5	54.942	-0.205	24.183	0	0	0	1.751	2.124	-0.373
492.6	54.948	-0.217	25.088	0	0	0	1.751	2.124	-0.373
492.7	54.954	-0.215	26.105	0	0	0	1.751	2.124	-0.373
492.8	54.96	-0.197	25.995	0	0	0	1.751	2.124	-0.373
492.9	54.973	-0.185	25.759	0	0	0	1.751	2.124	-0.373
493	54.979	-0.185	26.076	0	0	0	1.751	2.124	-0.373
493.1	54.991	-0.185	26.419	0	0	0	1.751	2.124	-0.373
493.2	54.998	-0.185	27.076	0	0	0	1.751	2.124	-0.373
493.3	55.004	-0.172	26.751	0	0	0	1.751	2.124	-0.373
493.4	55.016	-0.172	26.924	0	0	0	1.751	2.124	-0.373

493.5	55.029	-0.177	27.009	0	-0.94	0	1.751	2.124	-0.373
493.6	55.035	-0.187	27.048	0	-0.89	0	1.751	2.124	-0.373
493.7	55.041	-0.19	26.924	0	-1.04	0	1.751	2.124	-0.373
493.8	55.047	-0.192	26.86	0	-2.83	0	1.751	2.124	-0.373
493.9	55.053	-0.2	27.217	0	-3.71	0	1.75	2.124	-0.373
494	55.06	-0.192	26.49	0	-2.7	0	1.75	2.124	-0.374
494.1	55.06	-0.172	26.528	0	-1.85	0	1.75	2.124	-0.374
494.2	55.06	-0.172	25.706	0	-1.35	0	1.75	2.124	-0.374
494.3	55.06	-0.232	26.143	0	-0.98	0	1.75	2.124	-0.374
494.4	55.06	-0.225	24.537	0	-0.87	0	1.75	2.124	-0.374
494.5	55.06	-0.217	24.537	0	-1.78	0	1.75	2.124	-0.374
494.6	55.06	-0.23	23.297	0	-2.24	0	1.75	2.124	-0.374
494.7	55.053	-0.235	24.198	0	-1.91	0	1.75	2.124	-0.374
494.8	55.047	-0.252	23.562	0	-1.71	0	1.75	2.124	-0.374
494.9	55.047	-0.277	23.308	0	-1.15	0	1.75	2.124	-0.374
495	55.041	-0.242	24.003	0	-1.06	0	1.75	2.124	-0.374
495.1	55.029	-0.24	22.534	0	-2.22	0	1.75	2.124	-0.374
495.2	55.022	-0.24	21.454	0	-2	0	1.75	2.124	-0.374
495.3	55.016	-0.277	23.131	0	-1.93	0	1.75	2.124	-0.374
495.4	55.01	-0.27	21.538	0	-1.59	0	1.75	2.124	-0.374
495.5	54.998	-0.262	21.514	0	-1.82	0	1.75	2.124	-0.374
495.6	54.985	-0.28	21.425	0	-1.2	0	1.75	2.124	-0.374
495.7	54.973	-0.302	21.429	0	-0.92	0	1.75	2.124	-0.374
495.8	54.96	-0.307	21.471	0	-0.85	0	1.75	2.124	-0.374
495.9	54.948	-0.295	20.963	0	-0.67	0	1.75	2.124	-0.374
496	54.942	-0.292	19.942	0	0	0	1.75	2.124	-0.374
496.1	54.929	-0.302	19.663	0	0.65	0	1.75	2.124	-0.374
496.2	54.917	-0.302	19.903	0	4.55	0	1.75	2.124	-0.374
496.3	54.904	-0.3	19.762	0	4.14	0	1.75	2.124	-0.374
496.4	54.904	-0.3	19.511	0	3.21	0	1.75	2.124	-0.374
496.5	54.904	-0.287	19.688	0	1.2	0	1.75	2.124	-0.374
496.6	54.904	-0.252	19.804	0	0	0	1.75	2.124	-0.374
496.7	54.904	-0.247	19.787	0	0	0	1.75	2.124	-0.374
496.8	54.904	-0.255	21.104	0	0	0	1.75	2.124	-0.374
496.9	54.898	-0.257	22.333	0	0	0	1.75	2.124	-0.374
497	54.898	-0.25	22.517	0	0	0	1.75	2.124	-0.374
497.1	54.892	-0.252	22.531	0	-0.6	0	1.75	2.124	-0.374
497.2	54.892	-0.252	22.616	0	0	0	1.75	2.124	-0.374
497.3	54.88	-0.265	23.237	0	0	0	1.75	2.124	-0.374
497.4	54.873	-0.265	22.559	0	0	0	1.75	2.124	-0.374
497.5	54.867	-0.265	22.587	0	0	0	1.75	2.124	-0.374
497.6	54.861	-0.262	21.934	0	0	0	1.75	2.124	-0.374
497.7	54.855	-0.26	22.093	0	0	0	1.75	2.124	-0.374
497.8	54.848	-0.267	21.496	0	0	0	1.75	2.124	-0.374
497.9	54.848	-0.275	21.549	0	-1	0	1.75	2.124	-0.374
498	54.842	-0.262	22.276	0	-1.3	0	1.75	2.124	-0.374
498.1	54.83	-0.262	21.74	0	-0.97	0	1.75	2.124	-0.375

498.2	54.824	-0.265	21.309	0	-0.7	0	1.75	2.124	-0.375
498.3	54.817	-0.282	21.581	0	-1.79	0	1.75	2.124	-0.375
498.4	54.805	-0.282	21.39	0	-3.21	0	1.75	2.124	-0.375
498.5	54.799	-0.287	21.309	0	-2.6	0	1.75	2.124	-0.375
498.6	54.78	-0.292	21.09	0	-1.91	0	1.749	2.124	-0.375
498.7	54.768	-0.295	21.259	0	-1.56	0	1.749	2.124	-0.375
498.8	54.749	-0.295	20.822	0	-1.35	0	1.749	2.124	-0.375
498.9	54.737	-0.3	20.822	0	-0.76	0	1.749	2.124	-0.375
499	54.724	-0.307	19.465	0	-0.96	0	1.749	2.124	-0.375
499.1	54.706	-0.315	19.649	0	-0.98	0	1.749	2.124	-0.375
499.2	54.693	-0.315	19.518	0	-0.63	0	1.749	2.124	-0.375
499.3	54.681	-0.305	19.07	0	0	0	1.749	2.124	-0.375
499.4	54.662	-0.305	18.244	0	0	0	1.749	2.124	-0.375
499.5	54.65	-0.315	19.593	0	0	0	1.749	2.124	-0.375
499.6	54.637	-0.3	19.55	0	-0.51	0	1.749	2.124	-0.375
499.7	54.625	-0.325	18.42	0	-0.53	0	1.749	2.124	-0.375
499.8	54.606	-0.347	18.851	0	-0.51	0	1.749	2.124	-0.375
499.9	54.594	-0.33	19.285	0	-0.84	0	1.749	2.124	-0.375
500	54.581	-0.322	18.621	0	-1.11	0	1.749	2.124	-0.375
500.1	54.569	-0.322	18.498	0	-0.99	0	1.749	2.124	-0.375
500.2	54.55	-0.325	18.893	0	-0.9	0	1.749	2.124	-0.375
500.3	54.538	-0.327	18.561	0	-1.12	0	1.749	2.124	-0.375
500.4	54.519	-0.327	18.621	0	-0.94	0	1.749	2.124	-0.375
500.5	54.507	-0.34	18.706	0	-0.85	0	1.749	2.124	-0.375
500.6	54.488	-0.332	18.794	0	-0.58	0	1.749	2.124	-0.375
500.7	54.469	-0.32	18.314	0	0	0	1.749	2.124	-0.375
500.8	54.457	-0.32	17.862	0	-0.61	0	1.749	2.124	-0.375
500.9	54.445	-0.317	18.96	0	0	0	1.749	2.124	-0.375
501	54.426	-0.322	18.632	0	0	0	1.749	2.124	-0.375
501.1	54.413	-0.322	18.533	0	0	0	1.749	2.124	-0.375
501.2	54.395	-0.312	17.929	0	0	0	1.749	2.124	-0.375
501.3	54.382	-0.337	18.41	0	0	0	1.749	2.124	-0.375
501.4	54.364	-0.337	18.946	0	0	0	1.749	2.124	-0.375
501.5	54.358	-0.33	18.946	0	0	0	1.749	2.124	-0.375
501.6	54.339	-0.322	18.381	0	0	0	1.749	2.124	-0.375
501.7	54.326	-0.302	18.438	0	0	0	1.749	2.124	-0.375
501.8	54.32	-0.297	18.353	0	0	0	1.749	2.124	-0.375
501.9	54.308	-0.297	18.946	0	0.55	0	1.749	2.124	-0.375
502	54.295	-0.297	19.529	0	0	0	1.749	2.124	-0.375
502.1	54.289	-0.295	19.476	0	0	0	1.749	2.124	-0.375
502.2	54.277	-0.295	19.603	0	0	0	1.749	2.124	-0.375
502.3	54.271	-0.295	19.713	0	0	0	1.749	2.124	-0.375
502.4	54.264	-0.295	20.228	0	0	0	1.749	2.124	-0.375
502.5	54.252	-0.28	20.348	0	0	0	1.749	2.124	-0.375
502.6	54.246	-0.267	20.483	0	0	0	1.749	2.124	-0.375
502.7	54.239	-0.267	20.398	0	0	0	1.749	2.124	-0.375
502.8	54.233	-0.275	21.185	0	0	0	1.749	2.124	-0.375

502.9	54.227	-0.295	21.009	0	0	0	1.749	2.124	-0.375
503	54.227	-0.302	21.574	0	0	0	1.749	2.124	-0.375
503.1	54.215	-0.302	21.62	0	0	0	1.749	2.124	-0.375
503.2	54.208	-0.295	21.295	0	0	0	1.749	2.124	-0.375
503.3	54.208	-0.277	21.129	0	0	0	1.749	2.124	-0.375
503.4	54.202	-0.27	21.224	0	0	0	1.749	2.124	-0.375
503.5	54.196	-0.285	21.196	0	0	0	1.749	2.124	-0.375
503.6	54.19	-0.29	21.86	0	0	0	1.749	2.124	-0.375
503.7	54.19	-0.297	21.832	0	0	0	1.749	2.124	-0.375
503.8	54.184	-0.285	21.334	0	0	0	1.749	2.124	-0.376
503.9	54.177	-0.28	21.464	0	0	0	1.749	2.124	-0.376
504	54.171	-0.277	20.726	0	0	0	1.749	2.124	-0.376
504.1	54.171	-0.277	21.817	0	0	0	1.749	2.124	-0.376
504.2	54.165	-0.272	21.789	0	0	0	1.749	2.124	-0.376
504.3	54.165	-0.267	21.747	0	0	0	1.749	2.124	-0.376
504.4	54.159	-0.27	21.888	0	0	0	1.749	2.124	-0.376
504.5	54.152	-0.27	21.888	0	0	0	1.749	2.124	-0.376
504.6	54.152	-0.265	21.485	0	0	0	1.749	2.124	-0.376
504.7	54.146	-0.27	21.404	0	0	0	1.749	2.124	-0.376
504.8	54.146	-0.275	21.549	0	0	0	1.749	2.124	-0.376
504.9	54.14	-0.267	21.807	0	0	0	1.749	2.124	-0.376
505	54.134	-0.262	21.793	0	0	0	1.749	2.124	-0.376
505.1	54.134	-0.27	21.521	0	0	0	1.749	2.124	-0.376
505.2	54.128	-0.27	21.973	0	0	0	1.749	2.124	-0.376
505.3	54.121	-0.26	21.807	0	0	0	1.749	2.124	-0.376
505.4	54.115	-0.26	21.634	0	0	0	1.749	2.124	-0.376
505.5	54.109	-0.292	21.577	0	0	0	1.749	2.124	-0.376
505.6	54.109	-0.29	22.234	0	0	0	1.749	2.124	-0.376
505.7	54.103	-0.28	22.075	0	0	0	1.749	2.124	-0.376
505.8	54.097	-0.27	21.415	0	0	0	1.749	2.124	-0.376
505.9	54.09	-0.262	21.44	0	0	0	1.749	2.124	-0.376
506	54.09	-0.282	21.185	0	0	0	1.749	2.124	-0.376
506.1	54.084	-0.275	21.807	0	0	0	1.749	2.124	-0.376
506.2	54.078	-0.275	21.93	0	0	0	1.749	2.124	-0.376
506.3	54.072	-0.28	20.73	0	0	0	1.749	2.124	-0.376
506.4	54.072	-0.272	21.764	0	0	0	1.749	2.124	-0.376
506.5	54.066	-0.26	21.764	0	0	0	1.749	2.124	-0.376
506.6	54.059	-0.27	20.585	0	0	0	1.749	2.124	-0.376
506.7	54.053	-0.272	21.945	0	0	0	1.749	2.124	-0.376
506.8	54.047	-0.275	21.708	0	0	0	1.748	2.124	-0.376
506.9	54.041	-0.262	21.365	0	0	0	1.748	2.124	-0.376
507	54.041	-0.257	21.252	0	0	0	1.748	2.124	-0.376
507.1	54.034	-0.257	20.917	0	0	0	1.748	2.124	-0.376
507.2	54.028	-0.265	21.521	0	0	0	1.748	2.124	-0.376
507.3	54.028	-0.287	21.334	0	0	0	1.748	2.124	-0.376
507.4	54.022	-0.275	21.199	0	0	0	1.748	2.124	-0.376
507.5	54.016	-0.277	21.199	0	0	0	1.748	2.124	-0.376

507.6	54.01	-0.282	20.98	0	0	0	1.748	2.124	-0.376
507.7	54.003	-0.26	21.62	0	0	0	1.748	2.124	-0.376
507.8	54.003	-0.24	21.252	0	0	0	1.748	2.124	-0.376
507.9	53.997	-0.25	20.772	0	0	0	1.748	2.124	-0.376
508	53.991	-0.26	21.348	0	0	0	1.748	2.124	-0.376
508.1	53.991	-0.255	22.096	0	0	0	1.748	2.124	-0.376
508.2	53.985	-0.255	21.86	0	0	0	1.748	2.124	-0.376
508.3	53.985	-0.255	22.118	0	0	0	1.748	2.124	-0.376
508.4	53.985	-0.255	22.471	0	0	0	1.748	2.124	-0.376
508.5	53.979	-0.265	21.987	0	0	0	1.748	2.124	-0.376
508.6	53.979	-0.275	22.573	0	0	0	1.748	2.124	-0.376
508.7	53.979	-0.27	22.743	0	0	0	1.748	2.124	-0.376
508.8	53.979	-0.252	22.64	0	-0.94	0	1.748	2.124	-0.376
508.9	53.972	-0.26	21.86	0	-0.78	0	1.748	2.124	-0.376
509	53.972	-0.282	22.488	0	0	0	1.748	2.124	-0.376
509.1	53.972	-0.262	23.113	0	0	0	1.748	2.124	-0.376
509.2	53.966	-0.262	22.404	0	-0.5	0	1.748	2.124	-0.376
509.3	53.96	-0.257	21.863	0	-0.5	0	1.748	2.124	-0.376
509.4	53.96	-0.267	22.485	0	0	0	1.748	2.124	-0.376
509.5	53.96	-0.267	22.404	0	0	0	1.748	2.124	-0.376
509.6	53.954	-0.267	21.916	0	0	0	1.748	2.124	-0.376
509.7	53.954	-0.257	21.764	0	0	0	1.748	2.124	-0.376
509.8	53.947	-0.25	22.001	0	0	0	1.748	2.124	-0.376
509.9	53.941	-0.252	21.666	0	0	0	1.748	2.124	-0.376
510	53.941	-0.252	21.793	0	0	0	1.748	2.124	-0.376
510.1	53.935	-0.252	21.655	0	0	0	1.748	2.124	-0.376
510.2	53.935	-0.25	21.92	0	0	0	1.748	2.124	-0.376
510.3	53.935	-0.235	21.764	0	0	0	1.748	2.124	-0.376
510.4	53.935	-0.237	21.68	0	0	0	1.748	2.124	-0.376
510.5	53.935	-0.25	21.74	0	0	0	1.748	2.124	-0.376
510.6	53.935	-0.242	22.912	0	0	0	1.748	2.124	-0.376
510.7	53.935	-0.24	22.644	0	0	0	1.748	2.124	-0.376
510.8	53.935	-0.23	22.778	0	0	0	1.748	2.124	-0.376
510.9	53.935	-0.22	23.159	0	0	0	1.748	2.124	-0.376
511	53.935	-0.217	23.131	0	0	0	1.748	2.124	-0.376
511.1	53.941	-0.222	23.509	0	0	0	1.748	2.124	-0.376
511.2	53.947	-0.222	23.265	0	0	0	1.748	2.124	-0.376
511.3	53.947	-0.227	23.926	0	0	0	1.748	2.124	-0.376
511.4	53.954	-0.227	23.756	0	0	0	1.748	2.124	-0.376
511.5	53.954	-0.222	23.527	0	0	0	1.748	2.124	-0.376
511.6	53.96	-0.237	23.887	0	-0.65	0	1.748	2.124	-0.376
511.7	53.96	-0.222	24.59	0	0	0	1.748	2.124	-0.376
511.8	53.96	-0.197	24.275	0	-0.82	0	1.748	2.124	-0.376
511.9	53.96	-0.195	23.541	0	-0.95	0	1.748	2.124	-0.377
512	53.972	-0.222	23.573	0	-0.83	0	1.748	2.124	-0.377
512.1	53.972	-0.222	24.413	0	0	0	1.748	2.124	-0.377
512.2	53.972	-0.227	24.59	0	0	0	1.748	2.124	-0.377

512.3	53.979	-0.202	24.07	0	0	0	1.748	2.124	-0.377
512.4	53.985	-0.22	24.286	0	0	0	1.748	2.124	-0.377
512.5	53.991	-0.232	24.371	0	0	0	1.748	2.124	-0.377
512.6	53.997	-0.215	24.745	0	0	0	1.748	2.124	-0.377
512.7	54.003	-0.207	24.24	0	0	0	1.748	2.124	-0.377
512.8	54.003	-0.212	24.226	0	0	0	1.748	2.124	-0.377
512.9	54.01	-0.215	24.413	0	-0.5	0	1.748	2.124	-0.377
513	54.016	-0.225	24.056	0	0	0	1.748	2.124	-0.377
513.1	54.016	-0.225	24.371	0	0	0	1.748	2.124	-0.377
513.2	54.022	-0.222	24.455	0	0	0	1.748	2.124	-0.377
513.3	54.028	-0.212	24.028	0	0	0	1.748	2.124	-0.377
513.4	54.034	-0.195	24.275	0	0	0	1.748	2.124	-0.377
513.5	54.041	-0.2	24.275	0	0	0	1.748	2.124	-0.377
513.6	54.047	-0.207	24.508	0	0	0	1.748	2.124	-0.377
513.7	54.053	-0.197	25.391	0	0	0	1.748	2.124	-0.377
513.8	54.059	-0.202	24.731	0	-0.55	0	1.748	2.124	-0.377
513.9	54.066	-0.21	24.773	0	-0.53	0	1.748	2.124	-0.377
514	54.072	-0.207	25.405	0	-0.55	0	1.748	2.124	-0.377
514.1	54.084	-0.2	25.261	0	-1.06	0	1.747	2.124	-0.377
514.2	54.09	-0.2	25.497	0	-1.82	0	1.747	2.124	-0.377
514.3	54.097	-0.197	25.271	0	-1.57	0	1.747	2.124	-0.377
514.4	54.103	-0.197	25.578	0	-1.02	0	1.747	2.124	-0.377
514.5	54.109	-0.192	25.455	0	-0.79	0	1.747	2.124	-0.377
514.6	54.115	-0.192	25.271	0	-0.68	0	1.747	2.124	-0.377
514.7	54.115	-0.227	24.618	0	0	0	1.747	2.124	-0.377
514.8	54.115	-0.24	25.804	0	0	0	1.747	2.124	-0.377
514.9	54.128	-0.217	25.434	0	0	0	1.747	2.124	-0.377
515	54.134	-0.21	23.661	0	0	0	1.747	2.124	-0.377
515.1	54.134	-0.215	23.746	0	0	0	1.747	2.124	-0.377
515.2	54.14	-0.215	24.36	0	-0.81	0	1.747	2.124	-0.377
515.3	54.146	-0.207	24.523	0	-1.46	0	1.747	2.124	-0.377
515.4	54.146	-0.202	23.989	0	-1.99	0	1.747	2.124	-0.377
515.5	54.152	-0.22	23.904	0	-1.9	0	1.747	2.124	-0.377
515.6	54.152	-0.232	24.452	0	-1.71	0	1.747	2.124	-0.377
515.7	54.152	-0.235	25.073	0	-0.94	0	1.747	2.124	-0.377
515.8	54.152	-0.232	24.604	0	0	0	1.747	2.124	-0.377
515.9	54.152	-0.23	23.816	0	0	0	1.747	2.124	-0.377
516	54.152	-0.235	23.198	0	0	0	1.747	2.124	-0.377
516.1	54.152	-0.237	23.336	0	0	0	1.747	2.124	-0.377
516.2	54.152	-0.237	22.993	0	0	0	1.747	2.124	-0.377
516.3	54.152	-0.235	22.651	0	0	0	1.747	2.124	-0.377
516.4	54.159	-0.23	22.28	0	0	0	1.747	2.124	-0.377
516.5	54.159	-0.227	22.28	0	0	0	1.747	2.124	-0.377
516.6	54.159	-0.227	23.064	0	0	0	1.747	2.124	-0.377
516.7	54.165	-0.222	23.336	0	0	0	1.747	2.124	-0.377
516.8	54.165	-0.222	23.255	0	0	0	1.747	2.124	-0.377
516.9	54.171	-0.23	23.431	0	0	0	1.747	2.124	-0.377

517	54.165	-0.24	23.961	0	0	0	1.747	2.124	-0.377
517.1	54.171	-0.232	23.95	0	0	0	1.747	2.124	-0.377
517.2	54.171	-0.232	24.102	0	0	0	1.747	2.124	-0.377
517.3	54.177	-0.237	23.961	0	0	0	1.747	2.124	-0.378
517.4	54.177	-0.237	23.961	0	0	0	1.747	2.124	-0.378
517.5	54.184	-0.22	24.332	0	0	0	1.747	2.124	-0.378
517.6	54.184	-0.205	23.961	0	3.04	0	1.747	2.124	-0.378
517.7	54.196	-0.207	23.608	0	3.17	0	1.747	2.125	-0.378
517.8	54.202	-0.215	24.332	0	4.11	0	1.747	2.125	-0.378
517.9	54.221	-0.212	24.837	0	4.56	0	1.747	2.125	-0.378
518	54.227	-0.207	24.851	0	4.7	0	1.747	2.125	-0.378
518.1	54.246	-0.19	25.119	0	3.7	0	1.747	2.125	-0.378
518.2	54.271	-0.19	25.939	0	3.22	0	1.748	2.125	-0.378
518.3	54.295	-0.145	26.186	0	3.21	0	1.748	2.125	-0.378
518.4	54.314	-0.13	27.598	0	3.21	0	1.748	2.125	-0.378
518.5	54.339	-0.112	27.598	0	3.19	0	1.748	2.125	-0.378
518.6	54.364	-0.102	28.485	0	3.13	0	1.748	2.125	-0.378
518.7	54.389	-0.095	28.94	0	2.54	0	1.748	2.126	-0.378
518.8	54.42	-0.085	29.71	0	1.71	0	1.748	2.126	-0.378
518.9	54.451	-0.08	30.085	0	0	0	1.748	2.126	-0.378
519	54.482	-0.07	31.215	0	-0.58	0	1.748	2.126	-0.378
519.1	54.507	-0.07	31.833	0	-0.95	0	1.748	2.126	-0.378
519.2	54.532	-0.055	32.345	0	-1.72	0	1.748	2.126	-0.378
519.3	54.556	-0.06	32.525	0	-2.36	0	1.748	2.126	-0.378
519.4	54.581	-0.047	32.5	0	-2.15	0	1.748	2.126	-0.378
519.5	54.606	-0.055	32.585	0	-1.91	0	1.748	2.126	-0.378
519.6	54.625	-0.07	32.783	0	-1.6	0	1.748	2.126	-0.378
519.7	54.65	-0.072	33.33	0	-1.28	0	1.748	2.126	-0.378
519.8	54.674	-0.082	32.599	0	-1.09	0	1.748	2.126	-0.378
519.9	54.693	-0.087	32.098	0	-1.08	0	1.748	2.126	-0.378
520	54.712	-0.085	31.868	0	-1.01	0	1.748	2.126	-0.378
520.1	54.737	-0.077	31.172	0	-0.88	0	1.748	2.126	-0.378
520.2	54.755	-0.077	31.211	0	-0.8	0	1.748	2.126	-0.378
520.3	54.774	-0.097	31.027	0	-0.66	0	1.748	2.126	-0.378
520.4	54.799	-0.097	31.43	0	0	0	1.748	2.126	-0.378
520.5	54.824	-0.1	31.218	0	0	0	1.748	2.126	-0.378
520.6	54.842	-0.097	30.756	0	0	0	1.747	2.126	-0.378
520.7	54.867	-0.1	30.904	0	0	0	1.747	2.126	-0.378
520.8	54.892	-0.097	30.847	0	0	0	1.747	2.126	-0.378
520.9	54.917	-0.08	30.89	0	0	0	1.747	2.126	-0.378
521	54.929	-0.087	30.583	0	-1.18	0	1.747	2.126	-0.378
521.1	54.948	-0.087	30.918	0	-4.33	0	1.747	2.126	-0.378
521.2	54.966	-0.087	31.275	0	-5.04	0	1.747	2.126	-0.378
521.3	54.979	-0.1	30.731	0	-4.33	0	1.747	2.126	-0.379
521.4	54.991	-0.105	31.01	0	-3.43	0	1.747	2.126	-0.379
521.5	55.004	-0.115	30.982	0	-2.72	0	1.747	2.126	-0.379
521.6	55.004	-0.152	30.805	0	-1.86	0	1.747	2.126	-0.379

521.7	55.01	-0.177	29.813	0	-1.27	0	1.747	2.126	-0.379
521.8	55.022	-0.187	29.166	0	-0.89	0	1.747	2.126	-0.379
521.9	55.029	-0.197	27.341	0	-0.67	0	1.747	2.126	-0.379
522	55.035	-0.21	26.797	0	-1.4	0	1.747	2.126	-0.379
522.1	55.047	-0.21	26.458	0	-2.21	0	1.747	2.126	-0.379
522.2	55.053	-0.19	25.942	0	-1.45	0	1.747	2.126	-0.379
522.3	55.053	-0.182	24.862	0	-0.96	0	1.747	2.126	-0.379
522.4	55.06	-0.2	25.55	0	-1.1	0	1.747	2.126	-0.379
522.5	55.066	-0.202	25.635	0	-0.64	0	1.747	2.126	-0.379
522.6	55.066	-0.207	25.165	0	0	0	1.747	2.126	-0.379
522.7	55.066	-0.21	24.452	0	0	0	1.747	2.126	-0.379
522.8	55.066	-0.22	24.508	0	0	0	1.746	2.126	-0.379
522.9	55.072	-0.235	23.816	0	0	0	1.746	2.126	-0.379
523	55.072	-0.242	23.957	0	0	0	1.746	2.126	-0.379
523.1	55.072	-0.237	23.975	0	0	0	1.746	2.126	-0.379
523.2	55.072	-0.237	23.417	0	0	0	1.746	2.126	-0.379
523.3	55.072	-0.22	22.986	0	0	0	1.746	2.126	-0.379
523.4	55.072	-0.22	23.721	0	0	0	1.746	2.126	-0.379
523.5	55.078	-0.2	24.032	0	0	0	1.746	2.126	-0.379
523.6	55.085	-0.195	23.943	0	0	0	1.746	2.126	-0.379
523.7	55.091	-0.197	23.961	0	0	0	1.746	2.126	-0.379
523.8	55.091	-0.205	24.763	0	0	0	1.746	2.126	-0.379
523.9	55.097	-0.2	25.508	0	0	0	1.746	2.126	-0.379
524	55.097	-0.2	24.996	0	0	0	1.746	2.126	-0.379
524.1	55.103	-0.2	24.862	0	0	0	1.746	2.126	-0.379
524.2	55.109	-0.215	24.964	0	0	0	1.746	2.126	-0.379
524.3	55.116	-0.2	25.395	0	0	0	1.746	2.126	-0.379
524.4	55.122	-0.187	24.876	0	-0.7	0	1.746	2.126	-0.379
524.5	55.128	-0.19	24.9	0	-1.35	0	1.746	2.126	-0.379
524.6	55.128	-0.205	25.352	0	-1.69	0	1.746	2.126	-0.379
524.7	55.134	-0.207	25.928	0	-1.17	0	1.746	2.126	-0.379
524.8	55.134	-0.197	26.041	0	-0.72	0	1.746	2.126	-0.379
524.9	55.14	-0.195	25.19	0	0	0	1.746	2.126	-0.379
525	55.14	-0.21	26.094	0	-0.53	0	1.746	2.126	-0.379
525.1	55.14	-0.21	25.621	0	-0.62	0	1.746	2.126	-0.379
525.2	55.14	-0.21	24.833	0	0	0	1.746	2.126	-0.379
525.3	55.14	-0.215	23.573	0	0	0	1.746	2.126	-0.379
525.4	55.147	-0.21	24.388	0	0	0	1.746	2.126	-0.379
525.5	55.153	-0.2	24.364	0	0	0	1.746	2.126	-0.379
525.6	55.159	-0.202	23.83	0	0	0	1.746	2.126	-0.379
525.7	55.159	-0.2	25.261	0	0	0	1.746	2.126	-0.379
525.8	55.165	-0.185	25.035	0	1.1	0	1.746	2.126	-0.379
525.9	55.172	-0.192	24.727	0	3.6	0	1.746	2.126	-0.379
526	55.184	-0.192	24.731	0	2.55	0	1.746	2.126	-0.379
526.1	55.203	-0.19	25.967	0	0	0	1.746	2.126	-0.379
526.2	55.215	-0.19	26.193	0	0	0	1.746	2.126	-0.379
526.3	55.221	-0.155	26.235	0	0	0	1.746	2.126	-0.379

526.4	55.234	-0.155	26.507	0	0	0	1.746	2.126	-0.379
526.5	55.246	-0.15	27.397	0	-0.5	0	1.746	2.126	-0.379
526.6	55.252	-0.152	27.93	0	-1.69	0	1.746	2.126	-0.379
526.7	55.265	-0.127	28.527	0	-1.35	0	1.746	2.126	-0.379
526.8	55.277	-0.12	27.722	0	-1	0	1.746	2.126	-0.379
526.9	55.283	-0.132	27.531	0	-0.71	0	1.746	2.126	-0.379
527	55.296	-0.15	28.527	0	-0.58	0	1.746	2.126	-0.379
527.1	55.308	-0.17	28.298	0	0	0	1.746	2.126	-0.38
527.2	55.314	-0.17	27.63	0	0	0	1.746	2.126	-0.38
527.3	55.321	-0.17	27.796	0	0	0	1.746	2.126	-0.38
527.4	55.333	-0.17	26.62	0	0	0	1.746	2.126	-0.38
527.5	55.339	-0.16	26.592	0	0	0	1.746	2.126	-0.38
527.6	55.352	-0.147	26.274	0	0	0	1.746	2.126	-0.38
527.7	55.364	-0.147	26.468	0	0	0	1.746	2.126	-0.38
527.8	55.37	-0.137	27.115	0	0	0	1.746	2.126	-0.38
527.9	55.383	-0.135	27.076	0	0	0	1.746	2.126	-0.38
528	55.395	-0.135	27.009	0	0	0	1.746	2.126	-0.38
528.1	55.408	-0.135	27.909	0	0	0	1.746	2.126	-0.38
528.2	55.42	-0.125	27.99	0	0	0	1.746	2.126	-0.38
528.3	55.433	-0.13	28.34	0	0	0	1.746	2.126	-0.38
528.4	55.445	-0.112	27.708	0	0	0	1.746	2.126	-0.38
528.5	55.457	-0.125	27.793	0	0	0	1.746	2.126	-0.38
528.6	55.47	-0.137	28.7	0	0	0	1.746	2.126	-0.38
528.7	55.482	-0.127	29.251	0	-0.59	0	1.746	2.126	-0.38
528.8	55.501	-0.14	28.301	0	-0.8	0	1.746	2.126	-0.38
528.9	55.513	-0.142	28.7	0	-0.58	0	1.746	2.126	-0.38
529	55.52	-0.122	29.131	0	-1.08	0	1.746	2.126	-0.38
529.1	55.532	-0.115	28.513	0	-1.82	0	1.746	2.126	-0.38
529.2	55.544	-0.115	28.428	0	-2	0	1.746	2.126	-0.38
529.3	55.557	-0.135	28.661	0	-1.51	0	1.746	2.126	-0.38
529.4	55.563	-0.135	28.718	0	-1.26	0	1.746	2.126	-0.38
529.5	55.575	-0.142	28.704	0	-1.08	0	1.746	2.126	-0.38
529.6	55.582	-0.14	28.63	0	-0.89	0	1.746	2.126	-0.38
529.7	55.588	-0.15	27.867	0	-0.74	0	1.746	2.126	-0.38
529.8	55.6	-0.157	27.867	0	-0.61	0	1.746	2.126	-0.38
529.9	55.607	-0.142	27.768	0	-0.55	0	1.746	2.126	-0.38
530	55.619	-0.14	27.228	0	0	0	1.746	2.126	-0.38
530.1	55.625	-0.15	26.772	0	0	0	1.746	2.126	-0.38
530.2	55.638	-0.15	27.33	0	0	0	1.746	2.126	-0.38
530.3	55.644	-0.167	27.478	0	0	0	1.746	2.126	-0.38
530.4	55.65	-0.157	26.571	0	0	0	1.746	2.126	-0.38
530.5	55.662	-0.165	26.567	0	0	0	1.746	2.126	-0.38
530.6	55.662	-0.162	26.606	0	0	0	1.746	2.126	-0.38
530.7	55.675	-0.157	26.889	0	0	0	1.746	2.126	-0.38
530.8	55.687	-0.157	25.903	0	0	0	1.746	2.126	-0.38
530.9	55.694	-0.162	26.663	0	0	0	1.746	2.126	-0.38
531	55.7	-0.17	26.772	0	0	0	1.746	2.126	-0.38

531.1	55.706	-0.17	26.543	0	0	0	1.746	2.126	-0.38
531.2	55.718	-0.167	27.196	0	0	0	1.746	2.126	-0.38
531.3	55.725	-0.165	26.977	0	0	0	1.746	2.126	-0.38
531.4	55.731	-0.16	26.486	0	0	0	1.746	2.126	-0.38
531.5	55.743	-0.147	26.405	0	0	0	1.746	2.126	-0.38
531.6	55.749	-0.147	26.581	0	-0.54	0	1.746	2.126	-0.38
531.7	55.756	-0.16	27.023	0	-0.79	0	1.746	2.126	-0.38
531.8	55.762	-0.162	27.079	0	0	0	1.746	2.126	-0.38
531.9	55.768	-0.155	27.115	0	-0.55	0	1.746	2.126	-0.38
532	55.78	-0.15	26.97	0	-0.91	0	1.745	2.126	-0.38
532.1	55.787	-0.162	26.567	0	-0.85	0	1.745	2.126	-0.38
532.2	55.793	-0.162	26.938	0	-0.59	0	1.745	2.126	-0.38
532.3	55.799	-0.162	27.242	0	-0.97	0	1.745	2.126	-0.38
532.4	55.805	-0.162	26.938	0	-0.85	0	1.745	2.126	-0.38
532.5	55.818	-0.17	26.924	0	-0.59	0	1.745	2.126	-0.38
532.6	55.824	-0.15	27.535	0	-0.95	0	1.745	2.126	-0.38
532.7	55.83	-0.142	26.924	0	-0.83	0	1.745	2.126	-0.38
532.8	55.843	-0.155	26.754	0	-0.7	0	1.745	2.126	-0.38
532.9	55.849	-0.147	27.56	0	-0.96	0	1.745	2.126	-0.381
533	55.855	-0.157	27.09	0	-0.98	0	1.745	2.126	-0.381
533.1	55.861	-0.157	27.302	0	-0.97	0	1.745	2.126	-0.381
533.2	55.867	-0.162	27.507	0	-0.96	0	1.745	2.126	-0.381
533.3	55.88	-0.155	26.942	0	-0.97	0	1.745	2.126	-0.381
533.4	55.886	-0.152	27.517	0	-0.97	0	1.745	2.126	-0.381
533.5	55.892	-0.137	27.602	0	-0.82	0	1.745	2.126	-0.381
533.6	55.899	-0.14	26.79	0	-0.67	0	1.745	2.126	-0.381
533.7	55.905	-0.167	26.754	0	-1	0	1.745	2.126	-0.381
533.8	55.911	-0.177	27.288	0	-0.98	0	1.745	2.126	-0.381
533.9	55.917	-0.157	27.09	0	-0.98	0	1.745	2.126	-0.381
534	55.923	-0.152	26.211	0	-1	0	1.745	2.126	-0.381
534.1	55.93	-0.152	26.249	0	-1.49	0	1.745	2.126	-0.381
534.2	55.936	-0.172	26.963	0	-2.46	0	1.745	2.126	-0.381
534.3	55.942	-0.172	26.924	0	-2.43	0	1.745	2.126	-0.381
534.4	55.948	-0.165	26.624	0	-2.27	0	1.745	2.126	-0.381
534.5	55.948	-0.172	26.624	0	-1.61	0	1.745	2.126	-0.381
534.6	55.948	-0.175	26.758	0	-1.12	0	1.745	2.126	-0.381
534.7	55.954	-0.185	27.037	0	-0.8	0	1.745	2.126	-0.381
534.8	55.954	-0.205	26.606	0	-0.73	0	1.745	2.126	-0.381
534.9	55.954	-0.212	26.571	0	-1.83	0	1.745	2.126	-0.381
535	55.954	-0.2	26.027	0	-1.62	0	1.745	2.126	-0.381
535.1	55.954	-0.192	25.179	0	-1.31	0	1.745	2.126	-0.381
535.2	55.954	-0.192	24.699	0	-1.05	0	1.744	2.126	-0.381
535.3	55.954	-0.197	25.342	0	-0.91	0	1.744	2.126	-0.381
535.4	55.954	-0.197	25.155	0	-0.82	0	1.744	2.126	-0.381
535.5	55.948	-0.21	24.558	0	-0.83	0	1.744	2.126	-0.381
535.6	55.948	-0.215	24.427	0	-0.72	0	1.744	2.126	-0.381
535.7	55.942	-0.215	24.106	0	-0.6	0	1.744	2.126	-0.381

535.8	55.942	-0.207	24.092	0	-0.82	0	1.744	2.126	-0.381
535.9	55.942	-0.2	24.24	0	-0.83	0	1.744	2.126	-0.381
536	55.936	-0.202	23.435	0	-0.85	0	1.744	2.126	-0.381
536.1	55.936	-0.227	23.576	0	-0.74	0	1.744	2.126	-0.382
536.2	55.93	-0.227	23.852	0	-0.6	0	1.744	2.126	-0.382
536.3	55.923	-0.235	24.212	0	0	0	1.744	2.126	-0.382
536.4	55.923	-0.205	23.392	0	-0.73	0	1.744	2.126	-0.382
536.5	55.923	-0.207	23.311	0	-0.62	0	1.744	2.126	-0.382
536.6	55.917	-0.225	23.382	0	0	0	1.744	2.126	-0.382
536.7	55.917	-0.232	24.505	0	0	0	1.744	2.126	-0.382
536.8	55.917	-0.23	24.106	0	-0.69	0	1.744	2.126	-0.382
536.9	55.911	-0.212	24.325	0	-0.72	0	1.744	2.126	-0.382
537	55.911	-0.21	23.753	0	-0.75	0	1.744	2.126	-0.382
537.1	55.905	-0.22	23.749	0	-0.74	0	1.744	2.126	-0.382
537.2	55.905	-0.22	24.462	0	-0.72	0	1.744	2.126	-0.382
537.3	55.905	-0.227	24.049	0	-0.74	0	1.744	2.126	-0.382
537.4	55.905	-0.215	23.59	0	-0.73	0	1.744	2.126	-0.382
537.5	55.899	-0.222	23.562	0	-0.71	0	1.744	2.126	-0.382
537.6	55.899	-0.225	24.025	0	-0.73	0	1.744	2.126	-0.382
537.7	55.892	-0.212	24.265	0	-0.73	0	1.744	2.126	-0.382
537.8	55.892	-0.22	23.777	0	-0.71	0	1.744	2.126	-0.382
537.9	55.886	-0.22	23.763	0	-0.75	0	1.744	2.126	-0.382
538	55.886	-0.207	24.134	0	-0.91	0	1.744	2.126	-0.382
538.1	55.886	-0.21	23.601	0	-0.94	0	1.744	2.126	-0.382
538.2	55.88	-0.21	23.777	0	-0.95	0	1.744	2.126	-0.382
538.3	55.88	-0.24	24.406	0	-0.95	0	1.744	2.126	-0.382
538.4	55.88	-0.24	24.664	0	-0.95	0	1.744	2.126	-0.382
538.5	55.88	-0.187	24.092	0	-0.96	0	1.744	2.126	-0.382
538.6	55.88	-0.202	23.601	0	-0.95	0	1.744	2.126	-0.382
538.7	55.88	-0.205	24.515	0	-0.95	0	1.744	2.126	-0.382
538.8	55.874	-0.19	24.929	0	-0.83	0	1.744	2.126	-0.382
538.9	55.874	-0.182	24.575	0	-0.61	0	1.744	2.126	-0.382
539	55.874	-0.182	24.876	0	-0.95	0	1.744	2.126	-0.382
539.1	55.874	-0.19	25.02	0	-0.96	0	1.744	2.126	-0.382
539.2	55.874	-0.19	25.193	0	-0.85	0	1.744	2.126	-0.382
539.3	55.867	-0.2	25.035	0	-0.59	0	1.744	2.126	-0.382
539.4	55.874	-0.2	25.222	0	-0.95	0	1.744	2.126	-0.382
539.5	55.874	-0.202	25.137	0	-0.96	0	1.744	2.126	-0.382
539.6	55.874	-0.207	24.819	0	-0.86	0	1.744	2.126	-0.382
539.7	55.874	-0.2	24.862	0	-0.62	0	1.744	2.126	-0.382
539.8	55.874	-0.185	24.491	0	-0.99	0	1.743	2.126	-0.382
539.9	55.874	-0.185	24.692	0	-0.98	0	1.743	2.126	-0.382
540	55.874	-0.192	24.992	0	-0.98	0	1.743	2.126	-0.382
540.1	55.874	-0.192	24.996	0	-1.78	0	1.743	2.126	-0.382
540.2	55.874	-0.192	24.819	0	-0.99	0	1.743	2.126	-0.382
540.3	55.874	-0.195	24.477	0	-1.79	0	1.743	2.126	-0.382
540.4	55.874	-0.197	25.006	0	-2.91	0	1.743	2.126	-0.383

540.5	55.874	-0.202	25.01	0	-4.12	0	1.743	2.126	-0.383
540.6	55.874	-0.17	25.13	0	-5.61	0	1.743	2.126	-0.383
540.7	55.88	-0.127	25.19	0	-6.21	0	1.743	2.126	-0.383
540.8	55.874	-0.122	25.476	0	-6.87	0	1.743	2.126	-0.383
540.9	55.88	-0.12	27.411	0	-7.63	0	1.742	2.126	-0.383
541	55.886	-0.095	28.951	0	-9.87	0	1.742	2.126	-0.384
541.1	55.886	-0.087	29.103	0	-10.57	0	1.742	2.126	-0.384
541.2	55.892	-0.087	30.261	0	-10.64	0	1.742	2.126	-0.384
541.3	55.892	-0.087	31.003	0	-10.72	0	1.741	2.126	-0.385
541.4	55.899	-0.087	31.038	0	-10.7	0	1.741	2.126	-0.385
541.5	55.899	-0.08	31.222	0	-10.7	0	1.741	2.126	-0.385
541.6	55.905	-0.077	32.126	0	-10.71	0	1.74	2.126	-0.385
541.7	55.911	-0.072	32.306	0	-10.7	0	1.74	2.126	-0.386
541.8	55.911	-0.08	32.115	0	-10.69	0	1.74	2.126	-0.386
541.9	55.917	-0.085	32.267	0	-10.71	0	1.739	2.126	-0.386
542	55.923	-0.067	32.415	0	-10.71	0	1.739	2.126	-0.387
542.1	55.93	-0.067	32.334	0	-10.69	0	1.739	2.126	-0.387
542.2	55.936	-0.065	31.939	0	-10.73	0	1.739	2.126	-0.387
542.3	55.936	-0.06	32.281	0	-10.72	0	1.738	2.126	-0.388
542.4	55.936	-0.055	31.917	0	-10.69	0	1.738	2.126	-0.388
542.5	55.942	-0.075	31.836	0	-10.72	0	1.738	2.126	-0.388
542.6	55.948	-0.082	32.345	0	-10.73	0	1.737	2.126	-0.388
542.7	55.948	-0.082	32.158	0	-11.11	0	1.737	2.126	-0.389
542.8	55.954	-0.07	31.437	0	-11.61	0	1.737	2.126	-0.389
542.9	55.954	-0.077	31.847	0	-12.01	0	1.736	2.126	-0.389
543	55.961	-0.08	32.172	0	-12.35	0	1.736	2.126	-0.39
543.1	55.961	-0.08	32.535	0	-13.7	0	1.736	2.126	-0.39
543.2	55.961	-0.06	31.804	0	-15.43	0	1.735	2.126	-0.391
543.3	55.961	-0.067	32.271	0	-15.56	0	1.735	2.126	-0.391
543.4	55.954	-0.062	32.186	0	-15.59	0	1.734	2.126	-0.391
543.5	55.948	-0.075	32.189	0	-15.63	0	1.734	2.126	-0.392
543.6	55.948	-0.09	32.433	0	-15.57	0	1.733	2.126	-0.392
543.7	55.942	-0.082	32.2	0	-15.58	0	1.733	2.126	-0.393
543.8	55.936	-0.08	32.02	0	-15.57	0	1.733	2.126	-0.393
543.9	55.93	-0.065	32.02	0	-15.56	0	1.732	2.126	-0.394
544	55.923	-0.06	32.338	0	-15.59	0	1.732	2.126	-0.394
544.1	55.917	-0.082	31.593	0	-15.57	0	1.731	2.126	-0.394
544.2	55.911	-0.082	32.401	0	-15.57	0	1.731	2.126	-0.395
544.3	55.911	-0.08	32.362	0	-15.56	0	1.73	2.126	-0.395
544.4	55.905	-0.08	31.737	0	-15.58	0	1.73	2.126	-0.396
544.5	55.899	-0.092	31.808	0	-15.55	0	1.73	2.126	-0.396
544.6	55.892	-0.087	32.405	0	-15.55	0	1.729	2.126	-0.397
544.7	55.886	-0.07	32.334	0	-15.57	0	1.729	2.126	-0.397
544.8	55.88	-0.065	31.614	0	-15.57	0	1.728	2.126	-0.397
544.9	55.874	-0.067	31.543	0	-15.57	0	1.728	2.126	-0.398
545	55.867	-0.075	32.161	0	-15.56	0	1.727	2.126	-0.398
545.1	55.861	-0.075	32.334	0	-15.57	0	1.727	2.126	-0.399

545.2	55.855	-0.085	31.967	0	-15.56	0	1.727	2.126	-0.399
545.3	55.855	-0.11	32.108	0	-15.57	0	1.726	2.126	-0.4
545.4	55.849	-0.105	32.126	0	-15.87	0	1.726	2.126	-0.4
545.5	55.843	-0.097	32.295	0	-16.23	0	1.725	2.126	-0.401
545.6	55.843	-0.1	31.684	0	-16.25	0	1.725	2.126	-0.401
545.7	55.83	-0.095	32.472	0	-16.25	0	1.724	2.126	-0.401
545.8	55.824	-0.1	32.083	0	-15.58	0	1.724	2.126	-0.402
545.9	55.824	-0.092	31.589	0	-15.55	0	1.723	2.126	-0.402
546	55.818	-0.077	32.179	0	-15.56	0	1.723	2.126	-0.403
546.1	55.812	-0.077	31.97	0	-15.55	0	1.723	2.126	-0.403
546.2	55.812	-0.07	31.914	0	-15.55	0	1.722	2.126	-0.404
546.3	55.805	-0.09	32.2	0	-15.56	0	1.722	2.126	-0.404
546.4	55.799	-0.067	31.688	0	-15.56	0	1.721	2.126	-0.404
546.5	55.793	-0.067	31.688	0	-15.54	0	1.721	2.126	-0.405
546.6	55.793	-0.082	31.688	0	-15.56	0	1.72	2.126	-0.405
546.7	55.787	-0.07	32.412	0	-15.55	0	1.72	2.126	-0.406
546.8	55.78	-0.06	31.674	0	-15.56	0	1.72	2.126	-0.406
546.9	55.774	-0.067	30.897	0	-15.56	0	1.719	2.126	-0.407
547	55.774	-0.087	32.09	0	-14.93	0	1.719	2.126	-0.407
547.1	55.768	-0.09	32.253	0	-14.9	0	1.718	2.126	-0.407
547.2	55.762	-0.09	32.253	0	-14.91	0	1.718	2.126	-0.408
547.3	55.762	-0.052	30.967	0	-14.91	0	1.717	2.126	-0.408
547.4	55.756	-0.052	31.285	0	-14.88	0	1.717	2.126	-0.409
547.5	55.749	-0.08	32.433	0	-14.9	0	1.717	2.126	-0.409
547.6	55.749	-0.07	32.578	0	-14.9	0	1.716	2.126	-0.41
547.7	55.743	-0.075	31.822	0	-14.9	0	1.716	2.126	-0.41
547.8	55.737	-0.082	31.766	0	-14.87	0	1.715	2.126	-0.41
547.9	55.737	-0.092	32.2	0	-14.89	0	1.715	2.126	-0.411
548	55.731	-0.092	31.794	0	-14.88	0	1.715	2.126	-0.411
548.1	55.725	-0.065	32.281	0	-14.88	0	1.714	2.126	-0.412
548.2	55.718	-0.065	31.974	0	-14.9	0	1.714	2.126	-0.412
548.3	55.712	-0.08	31.674	0	-14.9	0	1.713	2.126	-0.412
548.4	55.706	-0.08	32.394	0	-14.89	0	1.713	2.126	-0.413
548.5	55.706	-0.07	32.419	0	-14.88	0	1.713	2.126	-0.413
548.6	55.7	-0.08	31.575	0	-14.89	0	1.712	2.126	-0.414
548.7	55.694	-0.1	32.143	0	-14.8	0	1.712	2.126	-0.414
548.8	55.694	-0.087	32.624	0	-14.75	0	1.711	2.126	-0.414
548.9	55.694	-0.072	31.85	0	-14.76	0	1.711	2.126	-0.415
549	55.687	-0.075	31.158	0	-14.73	0	1.71	2.126	-0.415
549.1	55.681	-0.075	32.016	0	-14.74	0	1.71	2.126	-0.416
549.2	55.681	-0.077	32.115	0	-14.73	0	1.71	2.126	-0.416
549.3	55.675	-0.075	32.228	0	-15.24	0	1.709	2.126	-0.417
549.4	55.669	-0.057	31.946	0	-15.3	0	1.709	2.126	-0.417
549.5	55.662	-0.047	31.861	0	-15.34	0	1.708	2.126	-0.417
549.6	55.662	-0.067	31.702	0	-15.34	0	1.708	2.126	-0.418
549.7	55.65	-0.072	32.186	0	-15.31	0	1.708	2.126	-0.418
549.8	55.65	-0.08	32.105	0	-15.28	0	1.707	2.126	-0.419

549.9	55.644	-0.08	31.97	0	-15.28	0	1.707	2.126	-0.419
550	55.638	-0.077	31.85	0	-15.29	0	1.706	2.126	-0.42
550.1	55.631	-0.095	31.593	0	-15.26	0	1.706	2.126	-0.42
550.2	55.631	-0.095	32.366	0	-15.52	0	1.705	2.126	-0.42
550.3	55.625	-0.095	32.006	0	-16.05	0	1.705	2.126	-0.421
550.4	55.619	-0.095	31.826	0	-16.57	0	1.705	2.126	-0.421
550.5	55.613	-0.087	31.455	0	-17.25	0	1.704	2.126	-0.422
550.6	55.607	-0.087	31.578	0	-17.35	0	1.704	2.126	-0.422
550.7	55.594	-0.095	31.734	0	-18.04	0	1.703	2.126	-0.423
550.8	55.588	-0.087	32.037	0	-18.1	0	1.703	2.126	-0.423
550.9	55.575	-0.067	32.048	0	-18.09	0	1.702	2.126	-0.424
551	55.569	-0.075	31.271	0	-18.07	0	1.702	2.126	-0.424
551.1	55.557	-0.08	31.458	0	-18.3	0	1.701	2.126	-0.425
551.2	55.551	-0.08	32.285	0	-18.72	0	1.701	2.126	-0.425
551.3	55.538	-0.06	31.758	0	-19.48	0	1.7	2.126	-0.426
551.4	55.532	-0.055	31.868	0	-19.95	0	1.699	2.126	-0.426
551.5	55.52	-0.052	31.758	0	-20.41	0	1.699	2.126	-0.427
551.6	55.507	-0.055	32.221	0	-20.57	0	1.698	2.126	-0.428
551.7	55.488	-0.077	31.653	0	-20.55	0	1.698	2.126	-0.428
551.8	55.476	-0.092	31.797	0	-20.44	0	1.697	2.126	-0.429
551.9	55.464	-0.087	32.115	0	-20.36	0	1.697	2.126	-0.429
552	55.445	-0.095	31.596	0	-20.64	0	1.696	2.126	-0.43
552.1	55.433	-0.095	31.607	0	-20.96	0	1.695	2.126	-0.43
552.2	55.42	-0.092	31.893	0	-21.55	0	1.695	2.126	-0.431
552.3	55.408	-0.065	31.645	0	-22.53	0	1.694	2.126	-0.432
552.4	55.389	-0.077	31.706	0	-23.04	0	1.694	2.126	-0.432
552.5	55.37	-0.1	31.621	0	-23.69	0	1.693	2.126	-0.433
552.6	55.352	-0.092	32.341	0	-23.83	0	1.692	2.126	-0.434
552.7	55.333	-0.09	31.797	0	-23.81	0	1.692	2.126	-0.434
552.8	55.308	-0.09	31.066	0	-23.62	0	1.691	2.126	-0.435
552.9	55.29	-0.08	31.674	0	-23.52	0	1.69	2.126	-0.436
553	55.271	-0.075	31.391	0	-22.8	0	1.69	2.126	-0.436
553.1	55.252	-0.082	31.331	0	-21.73	0	1.689	2.126	-0.437
553.2	55.234	-0.082	31.713	0	-19.91	0	1.688	2.126	-0.437
553.3	55.215	-0.105	31.893	0	-17.58	0	1.688	2.126	-0.438
553.4	55.196	-0.105	31.345	0	-15.08	0	1.688	2.126	-0.438
553.5	55.178	-0.155	30.982	0	-12.31	0	1.687	2.126	-0.439
553.6	55.159	-0.182	29.883	0	-9.49	0	1.687	2.126	-0.439
553.7	55.14	-0.215	28.644	0	-7.18	0	1.687	2.126	-0.439
553.8	55.122	-0.247	27.312	0	-4.45	0	1.687	2.126	-0.439
553.9	55.109	-0.252	25.847	0	-2.84	0	1.687	2.126	-0.439
554	55.097	-0.282	23.661	0	-1.96	0	1.686	2.126	-0.439
554.1	55.078	-0.282	22.34	0	-1.11	0	1.686	2.126	-0.439
554.2	55.066	-0.315	21.817	0	-0.61	0	1.686	2.126	-0.439
554.3	55.047	-0.322	19.628	0	0	0	1.686	2.126	-0.439
554.4	55.035	-0.322	18.12	0	0.53	0	1.686	2.126	-0.439
554.5	55.022	-0.317	18.01	0	0.58	0	1.686	2.126	-0.439

554.6	55.004	-0.312	17.989	0	0	0	1.686	2.126	-0.439
554.7	54.998	-0.302	17.788	0	0	0	1.686	2.126	-0.439
554.8	54.979	-0.305	17.428	0	0	0	1.687	2.126	-0.439
554.9	54.96	-0.302	17.866	0	0	0	1.687	2.126	-0.439
555	54.948	-0.297	18.388	0	0	0	1.687	2.126	-0.439
555.1	54.935	-0.297	18.487	0	0	0	1.687	2.126	-0.439
555.2	54.917	-0.302	18.777	0	0	0	1.687	2.126	-0.439
555.3	54.904	-0.297	18.936	0	0	0	1.687	2.126	-0.439
555.4	54.892	-0.3	19.201	0	0	0	1.687	2.126	-0.439
555.5	54.88	-0.305	19.201	0	-0.61	0	1.686	2.126	-0.439
555.6	54.861	-0.315	19.465	0	-0.64	0	1.686	2.126	-0.439
555.7	54.848	-0.307	19.409	0	-0.97	0	1.686	2.126	-0.439
555.8	54.836	-0.287	19.264	0	-1.2	0	1.686	2.126	-0.439
555.9	54.817	-0.292	18.696	0	-1.63	0	1.686	2.126	-0.439
556	54.799	-0.315	18.773	0	-2.6	0	1.686	2.126	-0.44
556.1	54.786	-0.327	19.748	0	-2.44	0	1.686	2.126	-0.44
556.2	54.761	-0.327	19.239	0	-2.78	0	1.686	2.126	-0.44
556.3	54.737	-0.312	18.318	0	-3.12	0	1.686	2.126	-0.44
556.4	54.718	-0.312	17.721	0	-2.23	0	1.686	2.126	-0.44
556.5	54.687	-0.352	18.438	0	-1.71	0	1.686	2.126	-0.44
556.6	54.662	-0.337	17.502	0	-1.28	0	1.686	2.126	-0.44
556.7	54.631	-0.347	15.899	0	-0.89	0	1.686	2.126	-0.44
556.8	54.606	-0.367	15.846	0	0	0	1.686	2.126	-0.44
556.9	54.587	-0.372	16.192	0	0	0	1.686	2.126	-0.44
557	54.556	-0.377	15.072	0	0	0	1.686	2.126	-0.44
557.1	54.532	-0.393	14.807	0	0	0	1.686	2.126	-0.44
557.2	54.507	-0.393	14.733	0	0	0	1.686	2.126	-0.44
557.3	54.476	-0.4	14.793	0	0	0	1.686	2.126	-0.44
557.4	54.451	-0.4	14.26	0	1.04	0	1.686	2.126	-0.44
557.5	54.426	-0.375	14.341	0	3.32	0	1.686	2.126	-0.44
557.6	54.407	-0.355	13.822	0	0	0	1.686	2.126	-0.44
557.7	54.389	-0.342	14.196	0	0	0	1.686	2.126	-0.44
557.8	54.37	-0.327	15.75	0	0	0	1.686	2.126	-0.44
557.9	54.351	-0.332	15.927	0	0	0	1.686	2.126	-0.44
558	54.333	-0.337	16.1	0	0	0	1.686	2.126	-0.44
558.1	54.314	-0.325	17.679	0	0	0	1.686	2.126	-0.44
558.2	54.302	-0.325	17.022	0	0	0	1.686	2.126	-0.44
558.3	54.283	-0.337	17.347	0	0	0	1.686	2.126	-0.44
558.4	54.264	-0.34	17.583	0	0	0	1.686	2.126	-0.44
558.5	54.246	-0.352	17.693	0	0	0	1.686	2.126	-0.44
558.6	54.227	-0.352	17.477	0	0	0	1.686	2.126	-0.44
558.7	54.208	-0.345	17.58	0	0	0	1.686	2.126	-0.44
558.8	54.196	-0.347	17.008	0	0	0	1.686	2.126	-0.44
558.9	54.177	-0.342	17.544	0	0	0	1.686	2.126	-0.44
559	54.159	-0.337	17.258	0	0	0	1.686	2.126	-0.44
559.1	54.146	-0.335	17.248	0	0	0	1.686	2.126	-0.44
559.2	54.128	-0.335	17.53	0	0	0	1.686	2.126	-0.44

559.3	54.109	-0.347	17.41	0	0	0	1.686	2.126	-0.44
559.4	54.097	-0.347	17.41	0	0	0	1.686	2.126	-0.44
559.5	54.084	-0.312	16.898	0	0	0	1.686	2.126	-0.44
559.6	54.066	-0.312	17.103	0	0	0	1.686	2.126	-0.44
559.7	54.053	-0.317	17.657	0	0	0	1.686	2.126	-0.44
559.8	54.041	-0.325	18.572	0	0	0	1.686	2.126	-0.44
559.9	54.028	-0.347	18.537	0	-0.52	0	1.686	2.126	-0.44
560	54.016	-0.352	18.844	0	-0.64	0	1.686	2.126	-0.44
560.1	53.997	-0.35	18.844	0	-1.15	0	1.686	2.126	-0.44
560.2	53.985	-0.35	18.71	0	-2.7	0	1.686	2.126	-0.44
560.3	53.966	-0.335	18.738	0	-5.06	0	1.686	2.126	-0.44
560.4	53.947	-0.342	18.434	0	-4.82	0	1.686	2.126	-0.44
560.5	53.923	-0.355	18.434	0	-4.78	0	1.686	2.126	-0.441
560.6	53.892	-0.365	18.65	0	-3.24	0	1.686	2.126	-0.441
560.7	53.86	-0.37	17.739	0	-1.9	0	1.686	2.126	-0.441
560.8	53.836	-0.398	17.795	0	-1.38	0	1.685	2.126	-0.441
560.9	53.798	-0.425	17.241	0	-1.29	0	1.685	2.126	-0.441
561	53.773	-0.43	16.601	0	-0.84	0	1.685	2.126	-0.441
561.1	53.736	-0.43	14.133	0	0	0	1.685	2.126	-0.441
561.2	53.705	-0.44	13.028	0	0	0	1.685	2.126	-0.441
561.3	53.674	-0.453	12.756	0	0	0	1.685	2.126	-0.441
561.4	53.637	-0.455	12.138	0	0	0	1.685	2.126	-0.441
561.5	53.612	-0.448	12.078	0	0	0	1.685	2.126	-0.441
561.6	53.575	-0.445	11.933	0	0	0	1.685	2.126	-0.441
561.7	53.537	-0.45	11.594	0	0	0	1.685	2.126	-0.441
561.8	53.512	-0.45	11.876	0	0.96	0	1.686	2.126	-0.441
561.9	53.475	-0.448	11.604	0	5.06	0	1.686	2.126	-0.441
562	53.444	-0.443	11.407	0	6.82	0	1.686	2.127	-0.441
562.1	53.419	-0.433	11.777	0	7.23	0	1.686	2.127	-0.441
562.2	53.401	-0.433	11.693	0	6.21	0	1.686	2.127	-0.441
562.3	53.388	-0.435	11.947	0	5.54	0	1.686	2.127	-0.441
562.4	53.376	-0.435	11.929	0	5.54	0	1.687	2.127	-0.441
562.5	53.363	-0.345	12.611	0	5.23	0	1.687	2.127	-0.441
562.6	53.357	-0.332	13.833	0	3.78	0	1.687	2.128	-0.441
562.7	53.351	-0.322	16.224	0	2.87	0	1.687	2.128	-0.441
562.8	53.345	-0.307	18.222	0	0	0	1.687	2.128	-0.441
562.9	53.345	-0.297	18.625	0	0	0	1.687	2.128	-0.441
563	53.339	-0.295	19.215	0	0	0	1.687	2.128	-0.441
563.1	53.326	-0.295	19.78	0	0	0	1.687	2.128	-0.441
563.2	53.314	-0.31	20.309	0	0	0	1.687	2.128	-0.441
563.3	53.307	-0.317	20.963	0	0	0	1.687	2.128	-0.441
563.4	53.295	-0.297	19.762	0	0	0	1.687	2.128	-0.441
563.5	53.289	-0.305	19.593	0	0	0	1.687	2.128	-0.441
563.6	53.276	-0.317	20.073	0	0	0	1.687	2.128	-0.441
563.7	53.264	-0.31	20.811	0	0	0	1.687	2.128	-0.441
563.8	53.258	-0.31	19.593	0	-0.62	0	1.687	2.128	-0.441
563.9	53.245	-0.327	19.102	0	-0.71	0	1.687	2.128	-0.441

564	53.233	-0.337	19.352	0	0	0	1.687	2.128	-0.441
564.1	53.227	-0.337	19.416	0	0	0	1.687	2.128	-0.441
564.2	53.214	-0.33	19.176	0	0	0	1.687	2.128	-0.441
564.3	53.202	-0.337	18.692	0	0	0	1.687	2.128	-0.441
564.4	53.189	-0.332	18.784	0	0	0	1.687	2.128	-0.441
564.5	53.183	-0.332	18.699	0	0	0	1.687	2.128	-0.441
564.6	53.171	-0.34	18.487	0	-3.46	0	1.687	2.128	-0.441
564.7	53.158	-0.335	19.063	0	-8.22	0	1.686	2.128	-0.441
564.8	53.14	-0.335	18.713	0	-6.73	0	1.686	2.128	-0.441
564.9	53.109	-0.34	18.625	0	-4.83	0	1.686	2.128	-0.442
565	53.084	-0.322	18.883	0	-3.29	0	1.686	2.128	-0.442
565.1	53.053	-0.347	18.342	0	-2.12	0	1.686	2.128	-0.442
565.2	53.022	-0.347	18.3	0	-1.27	0	1.686	2.128	-0.442
565.3	52.991	-0.453	18.671	0	-0.82	0	1.686	2.128	-0.442
565.4	52.959	-0.453	15.849	0	0	0	1.686	2.128	-0.442
565.5	52.928	-0.438	12.424	0	0	0	1.686	2.128	-0.442
565.6	52.897	-0.455	12.109	0	0	0	1.686	2.128	-0.442
565.7	52.866	-0.45	12.523	0	0	0	1.686	2.128	-0.442
565.8	52.835	-0.43	11.898	0	0	0	1.686	2.128	-0.442
565.9	52.81	-0.43	11.174	0	0	0	1.686	2.128	-0.442
566	52.779	-0.44	11.301	0	0	0	1.686	2.128	-0.442
566.1	52.748	-0.44	12	0	0	0	1.686	2.128	-0.442
566.2	52.717	-0.43	12.18	0	0	0	1.686	2.128	-0.442
566.3	52.686	-0.435	12.109	0	0	0	1.686	2.128	-0.442
566.4	52.655	-0.44	12.992	0	0	0	1.686	2.128	-0.442
566.5	52.624	-0.415	12.883	0	0	0	1.686	2.128	-0.442
566.6	52.599	-0.413	12.124	0	1.9	0	1.686	2.128	-0.442
566.7	52.568	-0.418	12.427	0	3.71	0	1.686	2.128	-0.442
566.8	52.549	-0.415	13.635	0	4.15	0	1.686	2.128	-0.442
566.9	52.525	-0.41	13.356	0	2.69	0	1.686	2.128	-0.442
567	52.506	-0.41	13.473	0	0	0	1.686	2.128	-0.442
567.1	52.493	-0.41	13.631	0	0	0	1.686	2.128	-0.442
567.2	52.469	-0.393	13.843	0	0	0	1.686	2.128	-0.442
567.3	52.45	-0.36	13.511	0	0	0	1.686	2.128	-0.442
567.4	52.431	-0.365	16.566	0	0	0	1.686	2.128	-0.442
567.5	52.406	-0.367	16.566	0	0	0	1.686	2.128	-0.442
567.6	52.388	-0.365	16.651	0	0	0	1.686	2.128	-0.442
567.7	52.369	-0.367	16.149	0	-0.5	0	1.686	2.128	-0.442
567.8	52.351	-0.36	16.481	0	-0.5	0	1.686	2.128	-0.442
567.9	52.332	-0.367	15.8	0	-0.51	0	1.686	2.128	-0.442
568	52.313	-0.372	16.492	0	-0.51	0	1.686	2.128	-0.442
568.1	52.301	-0.375	16.845	0	-0.52	0	1.686	2.128	-0.442
568.2	52.282	-0.375	16.287	0	-0.53	0	1.686	2.128	-0.442
568.3	52.264	-0.355	16.764	0	-0.56	0	1.686	2.128	-0.442
568.4	52.251	-0.355	16.764	0	-0.56	0	1.686	2.128	-0.442
568.5	52.239	-0.347	16.806	0	-0.55	0	1.686	2.128	-0.442
568.6	52.226	-0.347	17.809	0	-0.55	0	1.686	2.128	-0.442

568.7	52.214	-0.335	17.809	0	-0.55	0	1.686	2.128	-0.442
568.8	52.201	-0.327	17.163	0	-0.57	0	1.686	2.128	-0.442
568.9	52.195	-0.335	17.626	0	-0.59	0	1.686	2.128	-0.442
569	52.183	-0.335	18.385	0	-0.59	0	1.686	2.128	-0.442
569.1	52.17	-0.33	18.724	0	-0.6	0	1.686	2.128	-0.442
569.2	52.158	-0.33	18.625	0	-0.6	0	1.686	2.128	-0.442
569.3	52.145	-0.327	18.448	0	-0.6	0	1.686	2.128	-0.442
569.4	52.133	-0.337	18.286	0	-0.6	0	1.686	2.128	-0.442
569.5	52.121	-0.342	18.371	0	-0.64	0	1.686	2.128	-0.442
569.6	52.108	-0.33	19.204	0	-0.65	0	1.686	2.128	-0.442
569.7	52.096	-0.327	18.233	0	-0.64	0	1.686	2.128	-0.442
569.8	52.09	-0.33	18.576	0	-0.64	0	1.686	2.128	-0.442
569.9	52.083	-0.34	18.505	0	-0.64	0	1.686	2.128	-0.442
570	52.071	-0.322	18.862	0	-0.64	0	1.686	2.128	-0.442
570.1	52.058	-0.322	19.028	0	-0.63	0	1.686	2.128	-0.442
570.2	52.052	-0.307	18.59	0	-0.64	0	1.686	2.128	-0.442
570.3	52.04	-0.312	18.805	0	-0.71	0	1.686	2.128	-0.442
570.4	52.04	-0.322	19.158	0	-0.71	0	1.686	2.128	-0.442
570.5	52.027	-0.322	19.155	0	-0.7	0	1.686	2.128	-0.442
570.6	52.021	-0.317	18.985	0	-0.7	0	1.686	2.128	-0.442
570.7	52.015	-0.312	19.377	0	-0.69	0	1.686	2.128	-0.442
570.8	52.009	-0.317	19.635	0	-0.7	0	1.686	2.128	-0.442
570.9	52.003	-0.32	19.391	0	-0.71	0	1.686	2.128	-0.442
571	51.996	-0.312	19.691	0	-0.7	0	1.686	2.128	-0.442
571.1	51.99	-0.3	19.525	0	-0.7	0	1.686	2.128	-0.443
571.2	51.984	-0.3	19.716	0	-0.72	0	1.685	2.128	-0.443
571.3	51.978	-0.297	19.536	0	-0.73	0	1.685	2.128	-0.443
571.4	51.971	-0.307	19.536	0	-0.73	0	1.685	2.128	-0.443
571.5	51.971	-0.32	20.405	0	-0.72	0	1.685	2.128	-0.443
571.6	51.965	-0.325	20.334	0	-0.72	0	1.685	2.128	-0.443
571.7	51.959	-0.307	20.581	0	-0.71	0	1.685	2.128	-0.443
571.8	51.959	-0.287	19.928	0	-0.71	0	1.685	2.128	-0.443
571.9	51.953	-0.297	19.483	0	-0.72	0	1.685	2.128	-0.443
572	51.953	-0.305	19.985	0	-0.72	0	1.685	2.128	-0.443
572.1	51.947	-0.295	20.253	0	-0.73	0	1.685	2.128	-0.443
572.2	51.947	-0.295	20.112	0	-0.73	0	1.685	2.128	-0.443
572.3	51.94	-0.302	19.631	0	-0.73	0	1.685	2.128	-0.443
572.4	51.94	-0.302	20.292	0	-0.77	0	1.685	2.128	-0.443
572.5	51.934	-0.3	20.348	0	-0.75	0	1.685	2.128	-0.443
572.6	51.928	-0.292	20.348	0	-0.75	0	1.685	2.128	-0.443
572.7	51.928	-0.302	20.253	0	-0.76	0	1.685	2.128	-0.443
572.8	51.928	-0.31	20.878	0	-0.77	0	1.685	2.128	-0.443
572.9	51.922	-0.302	20.903	0	-0.77	0	1.685	2.128	-0.443
573	51.916	-0.292	20.2	0	-0.76	0	1.685	2.128	-0.443
573.1	51.916	-0.292	20.055	0	-0.77	0	1.685	2.128	-0.443
573.2	51.916	-0.29	20.348	0	-0.69	0	1.685	2.128	-0.443
573.3	51.909	-0.28	20.874	0	-0.62	0	1.685	2.128	-0.443

573.4	51.909	-0.277	20.903	0	-0.61	0	1.685	2.128	-0.443
573.5	51.903	-0.277	20.988	0	-0.62	0	1.685	2.128	-0.443
573.6	51.903	-0.285	20.892	0	-0.61	0	1.685	2.128	-0.443
573.7	51.903	-0.287	20.567	0	-0.61	0	1.685	2.128	-0.443
573.8	51.897	-0.292	21.214	0	-0.62	0	1.685	2.128	-0.443
573.9	51.897	-0.295	21.132	0	-0.61	0	1.685	2.128	-0.443
574	51.897	-0.285	21.023	0	-0.64	0	1.685	2.128	-0.443
574.1	51.897	-0.29	20.189	0	-0.64	0	1.685	2.128	-0.443
574.2	51.891	-0.29	20.451	0	-0.63	0	1.685	2.128	-0.443
574.3	51.891	-0.3	21.009	0	-0.62	0	1.685	2.128	-0.443
574.4	51.891	-0.27	20.935	0	-0.62	0	1.685	2.128	-0.443
574.5	51.891	-0.26	20.408	0	-0.64	0	1.685	2.128	-0.443
574.6	51.891	-0.277	20.493	0	-0.61	0	1.685	2.128	-0.443
574.7	51.884	-0.267	21.63	0	-0.61	0	1.685	2.128	-0.443
574.8	51.884	-0.272	21.108	0	-0.61	0	1.685	2.128	-0.443
574.9	51.884	-0.297	20.634	0	-0.72	0	1.685	2.128	-0.443
575	51.884	-0.31	21.945	0	-0.96	0	1.685	2.128	-0.443
575.1	51.884	-0.31	21.563	0	-0.64	0	1.685	2.128	-0.443
575.2	51.884	-0.292	20.892	0	-0.83	0	1.685	2.128	-0.443
575.3	51.878	-0.257	20.281	0	-0.8	0	1.685	2.128	-0.443
575.4	51.878	-0.267	21.288	0	-0.81	0	1.685	2.128	-0.443
575.5	51.878	-0.275	21.288	0	-0.96	0	1.685	2.128	-0.443
575.6	51.878	-0.275	21.39	0	-1.49	0	1.685	2.128	-0.443
575.7	51.878	-0.285	20.98	0	-1.48	0	1.685	2.128	-0.443
575.8	51.872	-0.28	21.249	0	-1.54	0	1.685	2.128	-0.443
575.9	51.872	-0.265	21.175	0	-1.79	0	1.684	2.128	-0.444
576	51.872	-0.277	20.468	0	-1.89	0	1.684	2.128	-0.444
576.1	51.872	-0.277	20.899	0	-1.95	0	1.684	2.128	-0.444
576.2	51.866	-0.292	21.634	0	-1.84	0	1.684	2.128	-0.444
576.3	51.853	-0.295	20.645	0	-1.89	0	1.684	2.128	-0.444
576.4	51.847	-0.297	20.744	0	-1.65	0	1.684	2.128	-0.444
576.5	51.841	-0.3	20.687	0	-1.44	0	1.684	2.128	-0.444
576.6	51.829	-0.315	19.865	0	-1.31	0	1.684	2.128	-0.444
576.7	51.822	-0.32	19.946	0	-1.17	0	1.684	2.128	-0.444
576.8	51.81	-0.332	19.734	0	-1.25	0	1.684	2.128	-0.444
576.9	51.804	-0.34	19.243	0	-1.6	0	1.684	2.128	-0.444
577	51.798	-0.327	19.497	0	-1.24	0	1.684	2.128	-0.444
577.1	51.791	-0.317	18.851	0	-1.11	0	1.684	2.128	-0.444
577.2	51.785	-0.317	18.477	0	-1.09	0	1.684	2.128	-0.444
577.3	51.773	-0.332	19.081	0	-1.06	0	1.684	2.128	-0.444
577.4	51.76	-0.337	19.271	0	-1.05	0	1.684	2.128	-0.444
577.5	51.754	-0.317	19.081	0	-1.38	0	1.684	2.128	-0.444
577.6	51.742	-0.312	18.194	0	-3.22	0	1.684	2.128	-0.444
577.7	51.729	-0.327	18.141	0	-3.44	0	1.684	2.128	-0.444
577.8	51.723	-0.342	18.703	0	-3.29	0	1.684	2.128	-0.444
577.9	51.698	-0.342	18.968	0	-3.74	0	1.683	2.128	-0.445
578	51.686	-0.342	18.388	0	-3.32	0	1.683	2.128	-0.445

578.1	51.661	-0.365	17.954	0	-3.1	0	1.683	2.128	-0.445
578.2	51.636	-0.365	17.693	0	-2.73	0	1.683	2.128	-0.445
578.3	51.611	-0.36	16.82	0	-2.74	0	1.683	2.128	-0.445
578.4	51.592	-0.372	15.365	0	-2.18	0	1.683	2.128	-0.445
578.5	51.568	-0.395	15.365	0	-1.58	0	1.683	2.128	-0.445
578.6	51.543	-0.403	15.39	0	-1.18	0	1.683	2.128	-0.445
578.7	51.518	-0.408	15.231	0	-0.84	0	1.683	2.128	-0.445
578.8	51.487	-0.413	14.144	0	-0.92	0	1.683	2.128	-0.445
578.9	51.462	-0.428	13.896	0	-2.36	0	1.683	2.128	-0.445
579	51.437	-0.428	13.501	0	-3.24	0	1.683	2.128	-0.445
579.1	51.412	-0.413	13.564	0	-3.04	0	1.683	2.128	-0.445
579.2	51.381	-0.413	12.576	0	-1.9	0	1.683	2.128	-0.445
579.3	51.344	-0.418	12.463	0	-0.97	0	1.683	2.128	-0.445
579.4	51.307	-0.45	13.646	0	-0.51	0	1.683	2.128	-0.445
579.5	51.276	-0.485	13.646	0	0	0	1.683	2.128	-0.445
579.6	51.238	-0.498	13.61	0	0	0	1.683	2.128	-0.445
579.7	51.207	-0.493	11.219	0	0	0	1.683	2.128	-0.445
579.8	51.17	-0.49	9.878	0	0	0	1.683	2.128	-0.445
579.9	51.133	-0.488	9.577	0	-0.77	0	1.683	2.128	-0.445
580	51.095	-0.493	9.538	0	-1.38	0	1.683	2.128	-0.445
580.1	51.058	-0.49	9.365	0	-1.1	0	1.682	2.128	-0.446
580.2	51.021	-0.49	9.563	0	-0.69	0	1.682	2.128	-0.446
580.3	50.977	-0.473	9.072	0	0	0	1.682	2.128	-0.446
580.4	50.94	-0.49	9.097	0	0	0	1.682	2.128	-0.446
580.5	50.903	-0.518	10.351	0	0	0	1.682	2.128	-0.446
580.6	50.859	-0.528	10.139	0	0	0	1.682	2.128	-0.446
580.7	50.822	-0.503	8.928	0	0	0	1.682	2.128	-0.446
580.8	50.778	-0.48	8.013	0	0	0	1.682	2.128	-0.446
580.9	50.741	-0.508	7.734	0	0	0	1.682	2.128	-0.446
581	50.704	-0.515	8.913	0	0	0	1.682	2.128	-0.446
581.1	50.66	-0.51	8.868	0	7.29	0	1.683	2.128	-0.446
581.2	50.623	-0.51	8.514	0	8.57	0	1.683	2.128	-0.446
581.3	50.586	-0.513	8.613	0	8.31	0	1.683	2.129	-0.446
581.4	50.549	-0.513	8.938	0	7.89	0	1.683	2.129	-0.446
581.5	50.511	-0.623	8.772	0	7.05	0	1.684	2.129	-0.446
581.6	50.474	-0.695	9.867	0	6.7	0	1.684	2.129	-0.446
581.7	50.437	-0.625	4.729	0	6.69	0	1.684	2.129	-0.446
581.8	50.393	-0.618	-1.501	0	6.7	0	1.684	2.13	-0.446
581.9	50.35	-0.668	0.004	0	6.67	0	1.684	2.13	-0.446
582	50.312	-0.665	1.847	0	6.79	0	1.684	2.13	-0.446
582.1	50.269	-0.665	0.466	0	7.21	0	1.685	2.13	-0.446
582.2	50.232	-0.653	-0.611	0	7.19	0	1.685	2.13	-0.446
582.3	50.188	-0.685	0.205	0	7.18	0	1.685	2.131	-0.446
582.4	50.151	-0.693	-0.081	0	7.19	0	1.685	2.131	-0.446
582.5	50.114	-0.705	-0.081	0	7.09	0	1.685	2.131	-0.446
582.6	50.07	-0.683	-1.232	0	6.97	0	1.686	2.131	-0.446
582.7	50.033	-0.68	-2.348	0	6.61	0	1.686	2.131	-0.446

582.8	49.996	-0.68	-2.345	0	6.05	0	1.686	2.132	-0.446
582.9	49.958	-0.695	-1.222	0	4.64	0	1.686	2.132	-0.446
583	49.915	-0.72	-0.795	0	3.36	0	1.686	2.132	-0.446
583.1	49.871	-0.705	-0.057	0	1.88	0	1.686	2.132	-0.446
583.2	49.822	-0.705	-2.147	0	0.65	0	1.686	2.132	-0.446
583.3	49.778	-0.708	-2.235	0	0	0	1.686	2.132	-0.446
583.4	49.722	-0.708	-2.295	0	0	0	1.686	2.132	-0.446
583.5	49.672	-0.695	-1.685	0	0	0	1.686	2.132	-0.446
583.6	49.623	-0.718	-1.197	0	0	0	1.686	2.132	-0.446
583.7	49.573	-0.733	-0.784	0	0	0	1.686	2.132	-0.446
583.8	49.523	-0.708	-0.113	0	0	0	1.686	2.132	-0.446
583.9	49.474	-0.685	-1.042	0	0	0	1.686	2.132	-0.446
584	49.424	-0.688	-1.374	0	0	0	1.686	2.132	-0.446
584.1	49.374	-0.688	-0.357	0	0	0	1.686	2.132	-0.446
584.2	49.318	-0.675	-0.689	0	0	0	1.686	2.132	-0.446
584.3	49.269	-0.673	-1.293	0	0	0	1.686	2.132	-0.446
584.4	49.219	-0.678	-0.102	0	0	0	1.686	2.132	-0.446
584.5	49.169	-0.668	-0.018	0	0	0	1.686	2.132	-0.446
584.6	49.119	-0.673	-0.692	0	0	0	1.686	2.132	-0.446
584.7	49.07	-0.675	-0.473	0	0	0	1.686	2.132	-0.446
584.8	49.02	-0.675	-0.004	0	0	0	1.686	2.132	-0.446
584.9	48.964	-0.68	-0.325	0	0	0	1.686	2.132	-0.446
585	48.921	-0.673	-0.17	0	0	0	1.686	2.132	-0.446
585.1	48.871	-0.673	-0.438	0	0	0	1.686	2.132	-0.446
585.2	48.821	-0.66	-0.456	0	0	0	1.686	2.132	-0.446
585.3	48.771	-0.665	-0.424	0	0	0	1.686	2.132	-0.446
585.4	48.722	-0.673	-0.155	0	0	0	1.686	2.132	-0.446
585.5	48.672	-0.683	-0.155	0	0	0	1.686	2.132	-0.446
585.6	48.622	-0.695	-0.141	0	0	0	1.687	2.132	-0.446
585.7	48.573	-0.683	-0.099	0	1.52	0	1.687	2.132	-0.446
585.8	48.523	-0.675	-0.24	0	5.88	0	1.687	2.132	-0.446
585.9	48.473	-0.673	-0.809	0	11.12	0	1.687	2.133	-0.446
586	48.436	-0.665	-0.367	0	11.86	0	1.687	2.133	-0.446
586.1	48.405	-0.66	-0.212	0	12.51	0	1.688	2.133	-0.446
586.2	48.38	-0.66	-0.745	0	12.74	0	1.688	2.134	-0.446
586.3	48.349	-0.683	-0.088	0	12.97	0	1.688	2.134	-0.446
586.4	48.324	-0.675	-0.088	0	12.97	0	1.689	2.134	-0.446
586.5	48.293	-0.66	-0.3	0	13	0	1.689	2.135	-0.446
586.6	48.268	-0.653	-0.501	0	12.98	0	1.689	2.135	-0.446
586.7	48.243	-0.67	-0.332	0	14.65	0	1.69	2.135	-0.446
586.8	48.218	-0.68	0.074	0	15.76	0	1.69	2.136	-0.446
586.9	48.194	-0.69	-0.021	0	17.08	0	1.691	2.136	-0.446
587	48.169	-0.69	-0.268	0	17.35	0	1.691	2.137	-0.446
587.1	48.156	-0.69	0.321	0	17.33	0	1.692	2.137	-0.446
587.2	48.138	-0.675	-0.268	0	17.32	0	1.692	2.138	-0.446
587.3	48.119	-0.693	-0.632	0	17.31	0	1.693	2.138	-0.446
587.4	48.1	-0.69	0.021	0	17.3	0	1.693	2.139	-0.446

587.5	48.082	-0.67	0.021	0	17.31	0	1.694	2.139	-0.446
587.6	48.063	-0.675	-0.445	0	17.98	0	1.694	2.14	-0.446
587.7	48.044	-0.683	-0.547	0	20.37	0	1.695	2.14	-0.446
587.8	48.032	-0.685	0.251	0	20.83	0	1.695	2.141	-0.446
587.9	48.02	-0.683	-0.205	0	21.42	0	1.696	2.142	-0.446
588	48.007	-0.683	-0.23	0	21.4	0	1.697	2.142	-0.446
588.1	47.995	-0.683	-0.473	0	21.41	0	1.697	2.143	-0.446
588.2	47.982	-0.68	-0.307	0	22.06	0	1.698	2.143	-0.446
588.3	47.97	-0.663	-0.117	0	24.11	0	1.698	2.144	-0.446
588.4	47.964	-0.658	-0.65	0	26.09	0	1.699	2.145	-0.446
588.5	47.957	-0.67	-0.735	0	27.35	0	1.7	2.145	-0.446
588.6	47.957	-0.673	-0.117	0	28.57	0	1.701	2.146	-0.446
588.7	47.957	-0.67	-0.092	0	29.97	0	1.702	2.147	-0.446
588.8	47.951	-0.683	-0.477	0	31.49	0	1.702	2.148	-0.446
588.9	47.957	-0.715	-0.448	0	32.69	0	1.703	2.149	-0.446
589	47.964	-0.693	0.35	0	33.88	0	1.704	2.15	-0.446
589.1	47.97	-0.66	-0.035	0	34.78	0	1.705	2.151	-0.446
589.2	47.982	-0.66	-1.158	0	35.71	0	1.706	2.152	-0.446
589.3	47.995	-0.703	-0.466	0	36.61	0	1.707	2.153	-0.446
589.4	48.007	-0.683	-0.466	0	38.2	0	1.708	2.154	-0.446
589.5	48.02	-0.67	-0.251	0	38.27	0	1.709	2.155	-0.446
589.6	48.038	-0.678	-0.848	0	39.55	0	1.71	2.156	-0.446
589.7	48.057	-0.68	-0.152	0	40.89	0	1.712	2.157	-0.446
589.8	48.082	-0.685	-0.092	0	41.45	0	1.713	2.158	-0.446
589.9	48.1	-0.678	-0.579	0	52.45	0	1.714	2.16	-0.446
590	48.125	-0.663	0.074	0	68.27	0	1.716	2.162	-0.446
590.1	48.15	-0.668	-0.537	0	55.09	0	1.718	2.163	-0.446
590.2	48.187	-0.668	-0.551	0	57.6	0	1.719	2.165	-0.446
590.3	48.225	-0.688	0.385	0	58.42	0	1.721	2.166	-0.446
590.4	48.262	-0.685	-0.42	0	60.29	0	1.723	2.168	-0.446
590.5	48.299	-0.678	-0.42	0	64.63	0	1.724	2.17	-0.446
590.6	48.336	-0.668	-0.438	0	65.78	0	1.726	2.172	-0.446
590.7	48.38	-0.653	-0.166	0	66.55	0	1.728	2.174	-0.446
590.8	48.417	-0.663	-0.597	0	70.22	0	1.73	2.176	-0.446
590.9	48.455	-0.683	-0.095	0	103.88	0	1.733	2.178	-0.446
591	48.486	-0.68	0.102	0	114.08	0	1.736	2.182	-0.446
591.1	48.517	-0.68	-0.067	0	109.69	0	1.739	2.185	-0.446
591.2	48.548	-0.675	-0.102	0	64.64	0	1.741	2.186	-0.446
591.3	48.579	-0.197	1.345	0	21.29	0	1.741	2.187	-0.446
591.4	48.61	0.048	15.945	0	11.14	0	1.742	2.187	-0.446
591.5	48.629	-0.03	16.28	0	16.77	0	1.742	2.188	-0.446
591.6	48.647	-0.245	36.632	0	18.5	0	1.743	2.188	-0.446
591.7	48.66	-0.51	36.378	0	17.4	0	1.743	2.189	-0.446
591.8	48.672	-0.473	31.578	0	14.16	0	1.744	2.189	-0.446
591.9	48.684	-0.39	14.412	0	12.25	0	1.744	2.189	-0.446
592	48.691	-0.375	9.588	0	11.33	0	1.744	2.19	-0.446
592.1	48.703	-0.34	15.341	0	9.65	0	1.745	2.19	-0.446

592.2	48.709	-0.34	16.393	0	9.21	0	1.745	2.19	-0.446
592.3	48.722	-0.3	16.94	0	7.65	0	1.745	2.191	-0.446
592.4	48.734	-0.322	16.856	0	6.55	0	1.745	2.191	-0.446
592.5	48.74	-0.325	20.422	0	5.68	0	1.745	2.191	-0.446
592.6	48.753	-0.292	19.861	0	5	0	1.745	2.191	-0.446
592.7	48.765	-0.28	19.345	0	5.87	0	1.746	2.191	-0.446
592.8	48.778	-0.28	20.408	0	3.87	0	1.746	2.191	-0.446
592.9	48.784	-0.3	21.355	0	0.84	0	1.746	2.191	-0.446
593	48.796	-0.32	21.355	0	-4.11	0	1.746	2.191	-0.446
593.1	48.802	-0.32	20.945	0	-6.26	0	1.745	2.191	-0.446
593.2	48.796	-0.32	20.412	0	-6.07	0	1.745	2.191	-0.446
593.3	48.79	-0.29	21.545	0	-5.97	0	1.745	2.191	-0.446
593.4	48.784	-0.237	20.564	0	-5.21	0	1.745	2.191	-0.446
593.5	48.778	-0.255	20.454	0	-3.87	0	1.745	2.191	-0.446
593.6	48.771	-0.29	21.584	0	-2.55	0	1.745	2.191	-0.447
593.7	48.765	-0.32	22.538	0	-0.79	0	1.745	2.191	-0.447
593.8	48.759	-0.34	20.949	0	3.52	0	1.745	2.191	-0.447
593.9	48.759	-0.35	19.769	0	5.21	0	1.745	2.192	-0.447
594	48.759	-0.355	19.038	0	5.5	0	1.745	2.192	-0.447
594.1	48.765	-0.355	18.205	0	6.48	0	1.745	2.192	-0.447
594.2	48.771	-0.34	17.65	0	5.83	0	1.746	2.192	-0.447
594.3	48.784	-0.327	17.043	0	5.09	0	1.746	2.192	-0.447
594.4	48.796	-0.322	18.321	0	4.19	0	1.746	2.192	-0.447
594.5	48.809	-0.302	18.321	0	3.3	0	1.746	2.192	-0.447
594.6	48.821	-0.297	18.307	0	2.27	0	1.746	2.192	-0.447
594.7	48.834	-0.277	19.116	0	0.67	0	1.746	2.193	-0.447
594.8	48.84	-0.26	19.942	0	0	0	1.746	2.193	-0.447
594.9	48.852	-0.262	19.9	0	0	0	1.746	2.193	-0.447
595	48.858	-0.267	20.437	0	0	0	1.746	2.193	-0.447
595.1	48.865	-0.275	20.935	0	0	0	1.746	2.193	-0.447
595.2	48.871	-0.275	21.591	0	0	0	1.746	2.193	-0.447
595.3	48.883	-0.27	21.676	0	0	0	1.746	2.193	-0.447
595.4	48.883	-0.27	21.549	0	-0.7	0	1.746	2.193	-0.447
595.5	48.896	-0.265	21.471	0	-0.98	0	1.746	2.193	-0.447
595.6	48.902	-0.267	21.284	0	-0.91	0	1.746	2.193	-0.447
595.7	48.908	-0.272	21.471	0	-0.73	0	1.746	2.193	-0.447
595.8	48.914	-0.27	21.62	0	-0.66	0	1.746	2.193	-0.447
595.9	48.921	-0.292	21.344	0	-0.55	0	1.746	2.193	-0.447
596	48.927	-0.292	21.344	0	-0.52	0	1.746	2.193	-0.447
596.1	48.933	-0.292	21.874	0	-0.52	0	1.746	2.193	-0.447
596.2	48.939	-0.302	20.896	0	-0.53	0	1.746	2.193	-0.447
596.3	48.945	-0.32	22.019	0	-0.54	0	1.746	2.193	-0.447
596.4	48.952	-0.277	19.402	0	-0.53	0	1.746	2.193	-0.447
596.5	48.958	-0.28	19.511	0	-0.82	0	1.746	2.193	-0.447
596.6	48.964	-0.27	21.023	0	-0.76	0	1.746	2.193	-0.447
596.7	48.97	-0.275	20.938	0	-2.74	0	1.746	2.193	-0.447
596.8	48.976	-0.28	20.807	0	-5.43	0	1.745	2.193	-0.447

596.9	48.976	-0.27	21.39	0	-4.06	0	1.745	2.193	-0.447
597	48.97	-0.267	20.924	0	-3.74	0	1.745	2.193	-0.447
597.1	48.958	-0.267	20.733	0	-3.2	0	1.745	2.193	-0.447
597.2	48.958	-0.292	21.09	0	-2.61	0	1.745	2.193	-0.447
597.3	48.952	-0.325	21.602	0	-2.38	0	1.745	2.193	-0.448
597.4	48.945	-0.35	19.444	0	-5.05	0	1.745	2.193	-0.448
597.5	48.933	-0.362	19.529	0	-6.82	0	1.745	2.193	-0.448
597.6	48.921	-0.355	18.526	0	-6.89	0	1.744	2.193	-0.448
597.7	48.896	-0.36	17.622	0	-5.28	0	1.744	2.193	-0.448
597.8	48.871	-0.357	16.972	0	-4	0	1.744	2.193	-0.448
597.9	48.846	-0.35	17.311	0	-2.95	0	1.744	2.193	-0.448
598	48.821	-0.393	16.111	0	-1.89	0	1.744	2.193	-0.448
598.1	48.802	-0.425	16.619	0	-0.98	0	1.744	2.193	-0.448
598.2	48.771	-0.425	15.422	0	0	0	1.744	2.193	-0.449
598.3	48.747	-0.458	13.01	0	0	0	1.744	2.193	-0.449
598.4	48.728	-0.49	13.006	0	0	0	1.744	2.193	-0.449
598.5	48.703	-0.475	11.859	0	-1.04	0	1.744	2.193	-0.449
598.6	48.678	-0.443	11.188	0	-2.37	0	1.744	2.193	-0.449
598.7	48.653	-0.44	10.467	0	-2.78	0	1.744	2.193	-0.449
598.8	48.629	-0.455	11.025	0	-3.28	0	1.744	2.193	-0.449
598.9	48.597	-0.455	11.82	0	-3.47	0	1.744	2.193	-0.449
599	48.56	-0.445	11.834	0	-2.74	0	1.744	2.193	-0.449
599.1	48.529	-0.445	11.834	0	-1.84	0	1.743	2.193	-0.449
599.2	48.492	-0.435	11.7	0	-1.05	0	1.743	2.193	-0.449
599.3	48.455	-0.478	11.763	0	6.43	0	1.744	2.193	-0.449
599.4	48.417	-0.513	10.481	0	8.26	0	1.744	2.193	-0.449
599.5	48.38	-0.523	10.397	0	8.3	0	1.744	2.193	-0.449
599.6	48.349	-0.538	8.596	0	8.42	0	1.744	2.193	-0.449
599.7	48.318	-0.69	7.413	0	9.32	0	1.745	2.194	-0.449
599.8	48.281	-0.745	8.257	0	10.79	0	1.745	2.194	-0.449
599.9	48.243	-0.643	2.634	0	12.47	0	1.745	2.194	-0.449
600	48.212	-0.643	-4.626	0	13.97	0	1.746	2.195	-0.449
600.1	48.187	-0.643	-1.61	0	15.01	0	1.746	2.195	-0.449
600.2	48.162	-0.68	1.268	0	17.35	0	1.747	2.196	-0.449
600.3	48.144	-0.668	-0.441	0	21.5	0	1.747	2.196	-0.449
600.4	48.125	-0.685	-0.18	0	22.89	0	1.748	2.197	-0.449
600.5	48.113	-0.695	-0.014	0	23.75	0	1.748	2.197	-0.449
600.6	48.107	-0.685	0.028	0	25.44	0	1.749	2.198	-0.449
600.7	48.1	-0.675	-1.296	0	26.44	0	1.75	2.199	-0.449
600.8	48.094	-0.665	-2.468	0	27.85	0	1.751	2.2	-0.449
600.9	48.088	-0.685	-2.839	0	28.21	0	1.751	2.2	-0.449
601	48.088	-0.65	-1.96	0	28.17	0	1.752	2.201	-0.449
601.1	48.088	-0.685	-1.826	0	28.13	0	1.753	2.202	-0.449
601.2	48.094	-0.685	-0.798	0	28.07	0	1.754	2.203	-0.449
601.3	48.088	-0.69	-0.59	0	28	0	1.755	2.204	-0.449
601.4	48.088	-0.69	-0.756	0	28	0	1.755	2.204	-0.449
601.5	48.088	-0.685	-2.122	0	27.99	0	1.756	2.205	-0.449

601.6	48.088	-0.668	-1.229	0	27.99	0	1.757	2.206	-0.449
601.7	48.088	-0.663	-1.42	0	28.01	0	1.758	2.207	-0.449
601.8	48.088	-0.668	-1.285	0	26.94	0	1.758	2.207	-0.449
601.9	48.094	-0.685	-1.271	0	25.56	0	1.759	2.208	-0.449
602	48.088	-0.683	-0.335	0	22.79	0	1.76	2.209	-0.449
602.1	48.082	-0.668	-0.66	0	19.82	0	1.76	2.209	-0.449
602.2	48.075	-0.668	-1.081	0	19.31	0	1.761	2.21	-0.449
602.3	48.063	-0.68	-0.795	0	19.22	0	1.761	2.21	-0.449
602.4	48.044	-0.678	-0.297	0	19.22	0	1.762	2.211	-0.449
602.5	48.032	-0.675	-0.297	0	19.2	0	1.762	2.211	-0.449
602.6	48.013	-0.67	-1.098	0	19.21	0	1.763	2.212	-0.449
602.7	48.001	-0.66	-0.766	0	18.33	0	1.763	2.213	-0.449
602.8	47.988	-0.658	-0.551	0	15.69	0	1.764	2.213	-0.449
602.9	47.97	-0.658	-0.897	0	14.16	0	1.764	2.213	-0.449
603	47.945	-0.663	-0.244	0	14.42	0	1.765	2.214	-0.449
603.1	47.92	-0.663	-0.667	0	14.38	0	1.765	2.214	-0.449
603.2	47.902	-0.663	-0.258	0	14.38	0	1.765	2.215	-0.449
603.3	47.877	-0.673	-0.869	0	15.05	0	1.766	2.215	-0.449
603.4	47.852	-0.673	-0.127	0	16.09	0	1.766	2.215	-0.449
603.5	47.827	-0.66	-0.127	0	16.78	0	1.767	2.216	-0.449
603.6	47.808	-0.675	-0.869	0	17.62	0	1.767	2.216	-0.449
603.7	47.796	-0.7	-0.893	0	18.49	0	1.768	2.217	-0.449
603.8	47.771	-0.715	0.159	0	20.72	0	1.768	2.217	-0.449
603.9	47.759	-0.703	-0.159	0	24.01	0	1.769	2.218	-0.449
604	47.746	-0.693	-0.23	0	25.92	0	1.77	2.219	-0.449
604.1	47.74	-0.69	-1.127	0	28.65	0	1.771	2.22	-0.449
604.2	47.74	-0.69	-0.304	0	31.2	0	1.771	2.221	-0.449
604.3	47.74	-0.673	-0.304	0	32	0	1.772	2.221	-0.449
604.4	47.746	-0.66	-0.304	0	32.34	0	1.773	2.222	-0.449
604.5	47.752	-0.663	-0.961	0	33.58	0	1.774	2.223	-0.449
604.6	47.765	-0.675	-0.731	0	36.5	0	1.775	2.224	-0.449
604.7	47.771	-0.683	-0.247	0	42.37	0	1.776	2.225	-0.449
604.8	47.783	-0.678	-0.078	0	42.54	0	1.778	2.227	-0.449
604.9	47.815	-0.663	-0.646	0	44.06	0	1.779	2.228	-0.449
605	47.839	-0.663	-0.632	0	44.32	0	1.78	2.229	-0.449
605.1	47.864	-0.668	-0.692	0	47.83	0	1.781	2.23	-0.449
605.2	47.889	-0.668	-0.459	0	61.77	0	1.783	2.232	-0.449
605.3	47.926	-0.668	-0.261	0	70.9	0	1.785	2.234	-0.449
605.4	47.957	-0.663	-0.745	0	67.03	0	1.787	2.236	-0.449
605.5	48.001	-0.68	-0.745	0	87.68	0	1.789	2.238	-0.449
605.6	48.038	-0.68	-0.473	0	132.52	0	1.793	2.242	-0.449
605.7	48.082	-0.675	-0.392	0	107.57	0	1.796	2.245	-0.449
605.8	48.119	-0.643	-0.59	0	52.81	0	1.797	2.247	-0.449
605.9	48.169	-0.362	0.283	0	25.2	0	1.798	2.247	-0.449
606	48.212	0.223	1.183	0	23.69	0	1.799	2.248	-0.449
606.1	48.256	0.223	7.564	0	29.24	0	1.8	2.249	-0.449
606.2	48.299	0.073	37.635	0	26.61	0	1.8	2.249	-0.449

606.3	48.336	-0.438	50.546	0	22.21	0	1.801	2.25	-0.449
606.4	48.374	-0.32	13.112	0	18.26	0	1.801	2.251	-0.449
606.5	48.411	-0.295	13.197	0	14.85	0	1.802	2.251	-0.449
606.6	48.442	-0.25	17.329	0	12.08	0	1.802	2.251	-0.449
606.7	48.473	-0.197	19.561	0	10.14	0	1.803	2.252	-0.449
606.8	48.51	-0.18	21.817	0	8.38	0	1.803	2.252	-0.449
606.9	48.548	-0.17	24.438	0	7.42	0	1.803	2.252	-0.449
607	48.585	-0.157	26.514	0	7.36	0	1.803	2.252	-0.449
607.1	48.616	-0.14	27.549	0	6.51	0	1.803	2.252	-0.449
607.2	48.66	-0.14	28.46	0	5.33	0	1.803	2.253	-0.449
607.3	48.697	-0.135	28.866	0	4.97	0	1.804	2.253	-0.449
607.4	48.734	-0.162	28.838	0	3.96	0	1.804	2.253	-0.449
607.5	48.771	-0.155	29.615	0	2.94	0	1.804	2.253	-0.449
607.6	48.809	-0.137	28.435	0	1.95	0	1.804	2.253	-0.449
607.7	48.852	-0.14	27.98	0	0	0	1.804	2.253	-0.449
607.8	48.889	-0.132	29.89	0	-2.98	0	1.804	2.253	-0.449
607.9	48.927	-0.105	30.851	0	-7.13	0	1.804	2.253	-0.449
608	48.964	-0.085	30.551	0	-10.25	0	1.803	2.253	-0.45
608.1	48.989	-0.075	30.734	0	-12.23	0	1.803	2.253	-0.45
608.2	49.008	-0.075	31.995	0	-12.75	0	1.803	2.253	-0.45
608.3	49.026	-0.065	32.143	0	-11.59	0	1.802	2.253	-0.451
608.4	49.039	-0.095	32.931	0	-10.43	0	1.802	2.253	-0.451
608.5	49.057	-0.117	32.903	0	-9.65	0	1.802	2.253	-0.451
608.6	49.07	-0.14	32.295	0	-9.16	0	1.801	2.253	-0.451
608.7	49.088	-0.155	30.943	0	-9.08	0	1.801	2.253	-0.452
608.8	49.101	-0.15	30.441	0	-9.98	0	1.801	2.253	-0.452
608.9	49.119	-0.137	29.516	0	-14.66	0	1.801	2.253	-0.452
609	49.126	-0.135	28.792	0	-21.26	0	1.8	2.253	-0.453
609.1	49.132	-0.135	28.902	0	-25.37	0	1.799	2.253	-0.454
609.2	49.113	-0.13	28.294	0	-25.13	0	1.799	2.253	-0.454
609.3	49.088	-0.197	27.796	0	-23.57	0	1.798	2.253	-0.455
609.4	49.057	-0.225	27.228	0	-24.28	0	1.797	2.253	-0.456
609.5	49.026	-0.23	27.203	0	-24.65	0	1.797	2.253	-0.456
609.6	48.989	-0.237	24.833	0	-25.8	0	1.796	2.253	-0.457
609.7	48.952	-0.26	23.724	0	-26.17	0	1.795	2.253	-0.458
609.8	48.914	-0.28	22.637	0	-26.92	0	1.794	2.253	-0.459
609.9	48.865	-0.282	21.902	0	-25.59	0	1.794	2.253	-0.459
610	48.809	-0.27	21.108	0	-22.94	0	1.793	2.253	-0.46
610.1	48.759	-0.267	20.818	0	-21.06	0	1.792	2.253	-0.461
610.2	48.709	-0.267	21.613	0	-19.5	0	1.792	2.253	-0.461
610.3	48.653	-0.365	22.273	0	-17.49	0	1.791	2.253	-0.462
610.4	48.604	-0.395	22.248	0	-7.83	0	1.791	2.253	-0.462
610.5	48.548	-0.408	17.866	0	0	0	1.791	2.253	-0.462
610.6	48.51	-0.42	15.39	0	0.5	0	1.791	2.253	-0.462
610.7	48.467	-0.445	14.101	0	0	0	1.791	2.253	-0.462
610.8	48.417	-0.56	13.469	0	0	0	1.791	2.253	-0.462
610.9	48.361	-0.665	12.802	0	-2.56	0	1.791	2.253	-0.462

611	48.299	-0.703	5.88	0	-4.93	0	1.791	2.253	-0.462
611.1	48.225	-0.655	0.657	0	-5.09	0	1.791	2.253	-0.462
611.2	48.156	-0.655	-3.772	0	-5.08	0	1.791	2.253	-0.462
611.3	48.094	-0.688	-1.621	0	-5.07	0	1.791	2.253	-0.462
611.4	48.026	-0.688	-0.106	0	-5.05	0	1.79	2.253	-0.463
611.5	47.964	-0.658	-0.049	0	-5.06	0	1.79	2.253	-0.463
611.6	47.902	-0.658	-1.769	0	-6.87	0	1.79	2.253	-0.463
611.7	47.833	-0.688	-1.088	0	-12.12	0	1.79	2.253	-0.463
611.8	47.752	-0.685	-0.357	0	-17.63	0	1.789	2.253	-0.464
611.9	47.659	-0.658	-0.516	0	-19.12	0	1.789	2.253	-0.464
612	47.547	-0.655	-2.617	0	-19.69	0	1.788	2.253	-0.465
612.1	47.454	-0.655	-3.087	0	-20.17	0	1.788	2.253	-0.465
612.2	47.355	-0.67	-1.448	0	-20.42	0	1.787	2.253	-0.466
612.3	47.255	-0.72	-0.929	0	-20.41	0	1.787	2.253	-0.466
612.4	47.156	-0.67	-3.913	0	-20.54	0	1.786	2.253	-0.467
612.5	47.063	-0.688	-3.969	0	-21.02	0	1.785	2.253	-0.468
612.6	46.963	-0.695	-2.235	0	-22	0	1.785	2.253	-0.468
612.7	46.858	-0.703	-1.151	0	-22.07	0	1.784	2.253	-0.469
612.8	46.752	-0.693	-1.18	0	-21.98	0	1.784	2.253	-0.469
612.9	46.653	-0.683	-1.406	0	-19.42	0	1.783	2.253	-0.47
613	46.547	-0.68	-1.568	0	-14.5	0	1.783	2.253	-0.47
613.1	46.46	-0.665	-0.826	0	-2.37	0	1.783	2.253	-0.47
613.2	46.385	-0.665	-1.095	0	0	0	1.783	2.253	-0.47
613.3	46.329	-0.693	-1.056	0	0	0	1.783	2.253	-0.47
613.4	46.28	-0.693	-1.056	0	0	0	1.783	2.253	-0.47
613.5	46.236	-0.668	-0.117	0	0	0	1.783	2.253	-0.47
613.6	46.187	-0.66	-1.455	0	0	0	1.783	2.253	-0.47
613.7	46.137	-0.68	-1.409	0	0.69	0	1.783	2.253	-0.47
613.8	46.093	-0.68	-0.127	0	3.55	0	1.783	2.253	-0.47
613.9	46.05	-0.675	-0.434	0	11.39	0	1.783	2.253	-0.47
614	46.006	-0.67	-1.176	0	17.76	0	1.783	2.254	-0.47
614.1	45.988	-0.673	-0.731	0	20.47	0	1.784	2.255	-0.47
614.2	45.969	-0.673	-0.848	0	23.87	0	1.785	2.255	-0.47
614.3	45.963	-0.675	-0.54	0	26.26	0	1.785	2.256	-0.47
614.4	45.963	-0.655	-0.978	0	27.68	0	1.786	2.257	-0.47
614.5	45.963	-0.665	-0.975	0	30.34	0	1.787	2.258	-0.47
614.6	45.969	-0.685	-1.006	0	33.68	0	1.788	2.258	-0.47
614.7	45.975	-0.685	-0.138	0	34.39	0	1.789	2.259	-0.47
614.8	45.988	-0.698	-0.48	0	37.37	0	1.79	2.26	-0.47
614.9	46.006	-0.688	-0.268	0	38.76	0	1.791	2.262	-0.47
615	46.025	-0.675	-0.512	0	38.79	0	1.792	2.263	-0.47
615.1	46.05	-0.675	-1.014	0	38.81	0	1.793	2.264	-0.47
615.2	46.068	-0.675	-0.403	0	39.92	0	1.794	2.265	-0.47
615.3	46.093	-0.665	-0.523	0	41.82	0	1.795	2.266	-0.47
615.4	46.118	-0.655	-0.809	0	43.02	0	1.797	2.267	-0.47
615.5	46.143	-0.678	-0.699	0	46.12	0	1.798	2.268	-0.47
615.6	46.174	-0.7	-0.583	0	57.78	0	1.8	2.27	-0.47

615.7	46.205	-0.688	0.325	0	70.4	0	1.802	2.272	-0.47
615.8	46.242	-0.675	-0.184	0	69.87	0	1.803	2.274	-0.47
615.9	46.286	-0.678	-1.172	0	104.27	0	1.806	2.277	-0.47
616	46.329	-0.69	-0.611	0	134.17	0	1.81	2.281	-0.47
616.1	46.379	-0.688	-0.155	0	104.04	0	1.813	2.283	-0.47
616.2	46.435	-0.688	-0.17	0	43.64	0	1.814	2.285	-0.47
616.3	46.491	-0.245	0.357	0	29.12	0	1.815	2.285	-0.47
616.4	46.547	0.246	0.106	0	27.81	0	1.816	2.286	-0.47
616.5	46.603	-0.067	11.417	0	32.64	0	1.817	2.287	-0.47
616.6	46.659	-0.495	42.233	0	29.99	0	1.818	2.288	-0.47
616.7	46.702	-0.423	45.492	0	26.65	0	1.818	2.289	-0.47
616.8	46.752	-0.317	19.232	0	24.07	0	1.819	2.289	-0.47
616.9	46.795	-0.297	12.381	0	22.02	0	1.82	2.29	-0.47
617	46.851	-0.24	18.346	0	20.04	0	1.82	2.291	-0.47
617.1	46.901	-0.2	19.893	0	19.34	0	1.821	2.291	-0.47
617.2	46.957	-0.2	22.008	0	19.5	0	1.821	2.292	-0.47
617.3	47.013	-0.16	25.088	0	23.39	0	1.822	2.292	-0.47
617.4	47.069	-0.155	27.715	0	23.82	0	1.822	2.293	-0.47
617.5	47.137	-0.15	27.574	0	24.56	0	1.823	2.294	-0.47
617.6	47.218	-0.132	28.841	0	26.14	0	1.824	2.294	-0.47
617.7	47.299	-0.115	28.965	0	26.52	0	1.825	2.295	-0.47
617.8	47.386	-0.125	29.851	0	24.11	0	1.825	2.296	-0.47
617.9	47.467	-0.122	30.032	0	21.45	0	1.826	2.296	-0.47
618	47.566	-0.085	29.968	0	19.88	0	1.826	2.297	-0.47
618.1	47.653	-0.085	30.664	0	19.67	0	1.827	2.297	-0.47
618.2	47.752	-0.005	31.306	0	19.1	0	1.828	2.298	-0.47
618.3	47.852	0.048	33.796	0	19.07	0	1.828	2.299	-0.47
618.4	47.951	0.05	39.591	0	19.38	0	1.829	2.299	-0.47
618.5	48.051	0.075	39.648	0	17.91	0	1.829	2.3	-0.47
618.6	48.162	0.09	39.842	0	16.31	0	1.83	2.3	-0.47
618.7	48.268	0.11	40.831	0	15.34	0	1.83	2.3	-0.47
618.8	48.374	0.131	41.368	0	14.78	0	1.83	2.301	-0.47
618.9	48.479	0.133	42.752	0	13.24	0	1.831	2.301	-0.47
619	48.591	0.148	44.278	0	11.55	0	1.831	2.302	-0.47
619.1	48.703	0.178	45.15	0	9.07	0	1.831	2.302	-0.47
619.2	48.809	0.178	45.404	0	5.05	0	1.831	2.302	-0.47
619.3	48.921	0.196	46.34	0	3.58	0	1.832	2.302	-0.47
619.4	49.02	0.211	46.396	0	3.22	0	1.832	2.302	-0.47
619.5	49.126	0.238	48.865	0	2.72	0	1.832	2.302	-0.47
619.6	49.231	0.263	49.85	0	-0.56	0	1.832	2.302	-0.47
619.7	49.343	0.256	50.006	0	-0.62	0	1.832	2.302	-0.471
619.8	49.449	0.251	52.001	0	-0.63	0	1.832	2.302	-0.471
619.9	49.548	0.261	54.13	0	-0.65	0	1.832	2.302	-0.471
620	49.648	0.268	54.021	0	0	0	1.832	2.302	-0.471
620.1	49.747	0.261	53.671	0	-0.5	0	1.832	2.302	-0.471
620.2	49.846	0.261	53.795	0	-0.62	0	1.832	2.302	-0.471
620.3	49.94	0.223	54.152	0	-0.95	0	1.832	2.302	-0.471

620.4	50.039	0.206	53.138	0	-0.97	0	1.832	2.302	-0.471
620.5	50.132	0.208	53	0	-0.98	0	1.832	2.302	-0.471
620.6	50.225	0.218	51.842	0	-0.97	0	1.831	2.302	-0.471
620.7	50.319	0.231	50.722	0	-0.98	0	1.831	2.302	-0.471
620.8	50.418	0.248	51.189	0	-0.99	0	1.831	2.302	-0.471
620.9	50.505	0.261	51.037	0	-1.09	0	1.831	2.302	-0.471
621	50.611	0.261	51.072	0	-2.56	0	1.831	2.302	-0.471
621.1	50.691	0.261	51.114	0	-7.05	0	1.831	2.302	-0.471
621.2	50.778	0.258	51.111	0	-12.63	0	1.831	2.302	-0.471
621.3	50.859	0.203	50.966	0	-15.17	0	1.83	2.302	-0.472
621.4	50.921	0.213	50.705	0	-12.84	0	1.83	2.302	-0.472
621.5	50.971	0.238	50.68	0	-11.99	0	1.83	2.302	-0.473
621.6	51.021	0.173	49.349	0	-9.68	0	1.829	2.302	-0.473
621.7	51.064	0.048	49.836	0	-7.69	0	1.829	2.302	-0.473
621.8	51.108	-0.01	48.279	0	-5.49	0	1.829	2.302	-0.473
621.9	51.157	-0.012	43.448	0	-4.48	0	1.829	2.302	-0.473
622	51.201	-0.005	39.874	0	-1.75	0	1.829	2.302	-0.473
622.1	51.251	0.015	38.172	0	-1.26	0	1.829	2.302	-0.473
622.2	51.307	0.015	37.585	0	-0.8	0	1.829	2.302	-0.473
622.3	51.363	0.05	36.529	0	-0.81	0	1.829	2.302	-0.473
622.4	51.425	0.098	36.505	0	-0.8	0	1.829	2.302	-0.473
622.5	51.493	0.108	37.992	0	-0.81	0	1.829	2.302	-0.473
622.6	51.555	0.085	39.987	0	-0.82	0	1.829	2.302	-0.473
622.7	51.617	0.095	42.077	0	-0.86	0	1.829	2.302	-0.473
622.8	51.686	0.113	41.512	0	-1.1	0	1.829	2.302	-0.474
622.9	51.754	0.125	41.555	0	-1.24	0	1.829	2.302	-0.474
623	51.822	0.131	42.205	0	-1.28	0	1.829	2.302	-0.474
623.1	51.884	0.138	42.745	0	-1.54	0	1.829	2.302	-0.474
623.2	51.953	0.138	42.939	0	-1.5	0	1.829	2.302	-0.474
623.3	52.015	0.131	43.13	0	-1.65	0	1.828	2.302	-0.474
623.4	52.083	0.12	43.426	0	-1.65	0	1.828	2.302	-0.474
623.5	52.145	0.128	43.426	0	-1.6	0	1.828	2.302	-0.474
623.6	52.208	0.128	43.207	0	-1.79	0	1.828	2.302	-0.474
623.7	52.276	0.115	43.292	0	-2.19	0	1.828	2.302	-0.474
623.8	52.332	0.108	43.878	0	-2.71	0	1.828	2.302	-0.474
623.9	52.4	0.105	43.434	0	-2.68	0	1.828	2.302	-0.474
624	52.456	0.1	42.335	0	-2.67	0	1.828	2.302	-0.474
624.1	52.512	0.11	42.801	0	-2.7	0	1.828	2.302	-0.474
624.2	52.58	0.11	42.508	0	-2.57	0	1.828	2.302	-0.474
624.3	52.636	0.11	42.325	0	-2.6	0	1.828	2.302	-0.474
624.4	52.698	0.115	42.48	0	-2.66	0	1.828	2.302	-0.474
624.5	52.754	0.108	42.48	0	-2.61	0	1.828	2.302	-0.475
624.6	52.81	0.095	42.579	0	-2.65	0	1.828	2.302	-0.475
624.7	52.872	0.103	43.049	0	-2.76	0	1.828	2.302	-0.475
624.8	52.928	0.113	42.568	0	-2.7	0	1.827	2.302	-0.475
624.9	52.991	0.105	42.738	0	-2.62	0	1.827	2.302	-0.475
625	53.053	0.105	43.066	0	-2.81	0	1.827	2.302	-0.475

625.1	53.109	0.098	42.914	0	-2.74	0	1.827	2.302	-0.475
625.2	53.171	0.098	42.808	0	-3.56	0	1.827	2.302	-0.475
625.3	53.233	0.123	42.999	0	-3.72	0	1.827	2.302	-0.475
625.4	53.289	0.138	42.999	0	-3.74	0	1.827	2.302	-0.475
625.5	53.345	0.131	42.724	0	-3.71	0	1.827	2.302	-0.475
625.6	53.401	0.113	43.225	0	-4.66	0	1.827	2.302	-0.476
625.7	53.457	0.103	43.797	0	-6.1	0	1.827	2.302	-0.476
625.8	53.512	0.078	43.497	0	-7.36	0	1.826	2.302	-0.476
625.9	53.568	0.065	43.444	0	-7.48	0	1.826	2.302	-0.476
626	53.618	0.105	43.857	0	-6.78	0	1.826	2.302	-0.476
626.1	53.662	0.128	42.628	0	-6.26	0	1.826	2.302	-0.476
626.2	53.705	0.128	41.371	0	-6.14	0	1.826	2.302	-0.477
626.3	53.749	0.105	42.303	0	-8.56	0	1.825	2.302	-0.477
626.4	53.798	0.095	41.774	0	-12.44	0	1.825	2.302	-0.477
626.5	53.842	0.095	41.689	0	-10.57	0	1.825	2.302	-0.477
626.6	53.873	0.098	41.248	0	-9.75	0	1.824	2.302	-0.478
626.7	53.904	0.08	40.834	0	-9.41	0	1.824	2.302	-0.478
626.8	53.935	0.04	40.979	0	-9.07	0	1.824	2.302	-0.478
626.9	53.966	0.023	40.223	0	-9.07	0	1.824	2.302	-0.479
627	53.997	0.025	38.874	0	-9.15	0	1.823	2.302	-0.479
627.1	54.028	0.01	37.19	0	-9.09	0	1.823	2.302	-0.479
627.2	54.053	0.01	37.479	0	-8.73	0	1.823	2.302	-0.479
627.3	54.084	0.013	37.621	0	-8.87	0	1.823	2.302	-0.48
627.4	54.109	0.018	36.738	0	-9.12	0	1.822	2.302	-0.48
627.5	54.134	0.013	36.798	0	-9.41	0	1.822	2.302	-0.48
627.6	54.165	0.018	37.162	0	-9.73	0	1.822	2.302	-0.48
627.7	54.196	0.03	36.967	0	-10.61	0	1.822	2.302	-0.481
627.8	54.221	0.043	37.123	0	-10.45	0	1.821	2.302	-0.481
627.9	54.252	0.055	38.097	0	-10.32	0	1.821	2.302	-0.481
628	54.277	0.038	38.606	0	-11.59	0	1.821	2.302	-0.482
628.1	54.302	0.025	39.461	0	-13.83	0	1.82	2.302	-0.482
628.2	54.326	0.025	39.379	0	-14.37	0	1.82	2.302	-0.482
628.3	54.351	0.018	38.747	0	-13.86	0	1.82	2.302	-0.483
628.4	54.364	0.023	38.638	0	-13.45	0	1.819	2.302	-0.483
628.5	54.382	-0.012	37.829	0	-12.96	0	1.819	2.302	-0.483
628.6	54.395	-0.027	37.755	0	-12.54	0	1.818	2.302	-0.484
628.7	54.413	-0.012	37.727	0	-11.91	0	1.818	2.302	-0.484
628.8	54.42	-0.005	36.053	0	-11.74	0	1.818	2.302	-0.484
628.9	54.438	-0.017	35.209	0	-11.49	0	1.817	2.302	-0.485
629	54.457	-0.022	35.484	0	-11.47	0	1.817	2.302	-0.485
629.1	54.476	-0.01	35.293	0	-11.32	0	1.817	2.302	-0.485
629.2	54.488	-0.01	34.824	0	-11.13	0	1.817	2.302	-0.486
629.3	54.507	-0.017	34.753	0	-10.76	0	1.816	2.302	-0.486
629.4	54.525	-0.027	35.7	0	-10.84	0	1.816	2.302	-0.486
629.5	54.544	-0.022	35.675	0	-11.49	0	1.816	2.302	-0.487
629.6	54.569	0.01	35.724	0	-11.13	0	1.815	2.302	-0.487
629.7	54.594	0.048	35.675	0	-10.82	0	1.815	2.302	-0.487

629.8	54.619	0.05	36.399	0	-9.22	0	1.815	2.302	-0.487
629.9	54.643	0.038	38.059	0	-8.56	0	1.814	2.302	-0.488
630	54.668	0.053	39.263	0	-8.11	0	1.814	2.302	-0.488
630.1	54.699	0.05	39.002	0	-7.78	0	1.814	2.302	-0.488
630.2	54.73	0.05	39.037	0	-7.96	0	1.814	2.302	-0.488
630.3	54.761	0.09	39.365	0	-8.38	0	1.814	2.302	-0.489
630.4	54.799	0.09	40.206	0	-8.88	0	1.813	2.302	-0.489
630.5	54.836	0.088	40.181	0	-8.94	0	1.813	2.302	-0.489
630.6	54.873	0.103	40.94	0	-8.96	0	1.813	2.302	-0.489
630.7	54.911	0.115	40.972	0	-8.9	0	1.813	2.302	-0.49
630.8	54.948	0.093	40.661	0	-8.68	0	1.812	2.302	-0.49
630.9	54.979	0.085	41.915	0	-8.65	0	1.812	2.302	-0.49
631	55.022	0.1	42.258	0	-8.77	0	1.812	2.302	-0.49
631.1	55.053	0.105	41.311	0	-8.84	0	1.812	2.302	-0.491
631.2	55.091	0.105	40.788	0	-8.7	0	1.811	2.302	-0.491
631.3	55.122	0.09	41.311	0	-8.72	0	1.811	2.302	-0.491
631.4	55.153	0.088	41.251	0	-8.65	0	1.811	2.302	-0.491
631.5	55.19	0.063	41.495	0	-9.23	0	1.811	2.302	-0.492
631.6	55.227	0.025	41.043	0	-10.53	0	1.81	2.302	-0.492
631.7	55.259	0.005	41.809	0	-14.26	0	1.81	2.302	-0.492
631.8	55.29	0.01	41.258	0	-16.28	0	1.81	2.302	-0.493
631.9	55.314	0.043	41.103	0	-16.23	0	1.809	2.302	-0.493
632	55.327	0.063	39.662	0	-15.67	0	1.809	2.302	-0.494
632.1	55.339	0.045	39.983	0	-16.03	0	1.808	2.302	-0.494
632.2	55.352	0.045	39.846	0	-17	0	1.808	2.302	-0.494
632.3	55.358	-0.007	39.189	0	-17.57	0	1.807	2.302	-0.495
632.4	55.364	0.003	36.54	0	-18.44	0	1.807	2.302	-0.495
632.5	55.37	-0.015	36.54	0	-18.72	0	1.806	2.302	-0.496
632.6	55.37	-0.042	35.541	0	-19.39	0	1.806	2.302	-0.497
632.7	55.364	-0.055	35.58	0	-19.9	0	1.805	2.302	-0.497
632.8	55.364	-0.052	35.382	0	-19.91	0	1.805	2.302	-0.498
632.9	55.358	-0.052	33.775	0	-19.52	0	1.804	2.302	-0.498
633	55.346	-0.062	32.723	0	-18.56	0	1.803	2.302	-0.499
633.1	55.333	-0.08	32.525	0	-18.32	0	1.803	2.302	-0.499
633.2	55.314	-0.08	31.949	0	-18.41	0	1.802	2.302	-0.5
633.3	55.296	-0.142	30.752	0	-19.85	0	1.802	2.302	-0.5
633.4	55.283	-0.16	28.937	0	-22.11	0	1.801	2.302	-0.501
633.5	55.265	-0.17	28.856	0	-23.93	0	1.801	2.302	-0.502
633.6	55.234	-0.175	28.029	0	-24.82	0	1.8	2.302	-0.502
633.7	55.196	-0.19	27.221	0	-25.88	0	1.799	2.302	-0.503
633.8	55.159	-0.215	26.595	0	-26.32	0	1.799	2.302	-0.504
633.9	55.122	-0.235	26.281	0	-25.73	0	1.798	2.302	-0.504
634	55.072	-0.225	26.161	0	-25.08	0	1.797	2.302	-0.505
634.1	55.035	-0.217	25.268	0	-24.72	0	1.796	2.302	-0.506
634.2	54.998	-0.217	24.042	0	-24.85	0	1.796	2.302	-0.506
634.3	54.96	-0.237	24.155	0	-27.37	0	1.795	2.302	-0.507
634.4	54.917	-0.242	24.24	0	-28.51	0	1.794	2.302	-0.508

634.5	54.867	-0.222	23.993	0	-29.17	0	1.793	2.302	-0.509
634.6	54.817	-0.217	23.375	0	-27.19	0	1.793	2.302	-0.51
634.7	54.761	-0.215	23.205	0	-24.37	0	1.792	2.302	-0.51
634.8	54.706	-0.21	24.138	0	-22.55	0	1.791	2.302	-0.511
634.9	54.643	-0.257	24.526	0	-21.17	0	1.791	2.302	-0.511
635	54.587	-0.332	24.558	0	-19.82	0	1.79	2.302	-0.512
635.1	54.525	-0.357	22.774	0	-18.85	0	1.79	2.302	-0.513
635.2	54.463	-0.357	19.028	0	-17.98	0	1.789	2.302	-0.513
635.3	54.407	-0.375	16.058	0	-17.53	0	1.789	2.302	-0.514
635.4	54.345	-0.413	15.408	0	-17.23	0	1.788	2.302	-0.514
635.5	54.289	-0.418	15.517	0	-16.81	0	1.788	2.302	-0.514
635.6	54.227	-0.4	14.656	0	-7.28	0	1.787	2.302	-0.515
635.7	54.171	-0.403	13.031	0	0	0	1.787	2.302	-0.515
635.8	54.115	-0.39	13.819	0	-8.49	0	1.787	2.302	-0.515
635.9	54.047	-0.42	13.533	0	-18.02	0	1.787	2.302	-0.515
636	53.947	-0.58	13.345	0	-21.37	0	1.786	2.302	-0.516
636.1	53.842	-0.703	13.691	0	-22.08	0	1.786	2.302	-0.517
636.2	53.718	-0.703	6.953	0	-22.6	0	1.785	2.302	-0.517
636.3	53.624	-0.62	-0.516	0	-22.52	0	1.784	2.302	-0.518
636.4	53.519	-0.655	0.727	0	-22.9	0	1.784	2.302	-0.519
636.5	53.413	-0.68	1.006	0	-23.36	0	1.783	2.302	-0.519
636.6	53.307	-0.67	0.618	0	-24.06	0	1.782	2.302	-0.52
636.7	53.202	-0.655	-0.212	0	-27.45	0	1.782	2.302	-0.521
636.8	53.09	-0.663	-1.444	0	-34.08	0	1.781	2.302	-0.522
636.9	52.959	-0.643	-0.374	0	-40.77	0	1.779	2.302	-0.523
637	52.817	-0.64	-0.388	0	-44.58	0	1.778	2.302	-0.524
637.1	52.667	-0.668	-0.795	0	-50.12	0	1.777	2.302	-0.525
637.2	52.5	-0.668	-0.473	0	-57.78	0	1.775	2.302	-0.527
637.3	52.344	-0.665	-1.169	0	-64.38	0	1.773	2.302	-0.529
637.4	52.158	-0.678	-1.395	0	-68.08	0	1.772	2.302	-0.531
637.5	51.959	-0.633	-1.727	0	-67.86	0	1.77	2.302	-0.533
637.6	51.76	-0.65	-1.155	0	-67.54	0	1.768	2.302	-0.534
637.7	51.549	-0.718	-0.438	0	-67.22	0	1.766	2.302	-0.536
637.8	51.35	-0.718	-0.039	0	-67.3	0	1.764	2.302	-0.538
637.9	51.145	-0.703	-2.041	0	-68.86	0	1.762	2.302	-0.54
638	50.946	-0.683	-1.988	0	-71.29	0	1.76	2.302	-0.542
638.1	50.729	-0.67	-1.165	0	-74.46	0	1.758	2.302	-0.544
638.2	50.493	-0.67	-1.434	0	-77.12	0	1.756	2.302	-0.546
638.3	50.288	-0.668	-0.795	0	-79.56	0	1.754	2.302	-0.548
638.4	50.058	-0.675	-0.396	0	-80.36	0	1.752	2.302	-0.551
638.5	49.822	-0.688	-0.286	0	-79.97	0	1.749	2.302	-0.553
638.6	49.579	-0.68	-0.381	0	-79.43	0	1.747	2.302	-0.555
638.7	49.343	-0.668	-0.085	0	-78.94	0	1.745	2.302	-0.557
638.8	49.101	-0.665	-0.862	0	-78.45	0	1.743	2.302	-0.559
638.9	48.858	-0.67	-0.494	0	-78.02	0	1.741	2.302	-0.562
639	48.622	-0.668	-0.551	0	-77.61	0	1.738	2.302	-0.564
639.1	48.374	-0.668	0.297	0	-76.97	0	1.736	2.302	-0.566

639.2	48.138	-0.668	-0.537	0	-69.63	0	1.734	2.302	-0.568
639.3	47.902	-0.65	0.092	0	-60.66	0	1.733	2.302	-0.57
639.4	47.69	-0.66	-0.29	0	-52.25	0	1.731	2.302	-0.571
639.5	47.498	-0.663	-0.29	0	-46.22	0	1.73	2.302	-0.572
639.6	47.33	-0.648	0.371	0	-40.96	0	1.729	2.302	-0.573
639.7	47.175	-0.658	-0.53	0	-34.72	0	1.728	2.302	-0.574
639.8	47.013	-0.673	-0.279	0	-21.56	0	1.727	2.302	-0.575
639.9	46.901	-0.68	0.198	0	-7.87	0	1.727	2.302	-0.575
640	46.814	-0.688	-0.06	0	0	0	1.727	2.302	-0.575
640.1	46.752	-0.68	0.131	0	0	0	1.727	2.302	-0.575
640.2	46.702	-0.68	-0.24	0	0	0	1.727	2.302	-0.575
640.3	46.653	-0.678	-0.448	0	0	0	1.727	2.302	-0.575
640.4	46.609	-0.673	-0.364	0	0	0	1.727	2.302	-0.575
640.5	46.559	-0.663	0.148	0	0	0	1.727	2.302	-0.575
640.6	46.51	-0.663	-0.445	0	0	0	1.727	2.302	-0.575
640.7	46.466	-0.658	-0.039	0	0.71	0	1.727	2.302	-0.575
640.8	46.416	-0.668	-0.145	0	4.03	0	1.727	2.302	-0.575
640.9	46.373	-0.703	-0.53	0	14.9	0	1.728	2.303	-0.575
641	46.329	-0.718	0.318	0	20.85	0	1.728	2.303	-0.575
641.1	46.317	-0.683	0.675	0	20.83	0	1.729	2.304	-0.575
641.2	46.311	-0.683	-0.59	0	20.84	0	1.729	2.305	-0.575
641.3	46.298	-0.668	-1.067	0	20.85	0	1.73	2.305	-0.575
641.4	46.292	-0.68	0.643	0	20.86	0	1.731	2.306	-0.575
641.5	46.28	-0.678	0.643	0	21.6	0	1.731	2.306	-0.575
641.6	46.274	-0.678	-0.261	0	23.99	0	1.732	2.307	-0.575
641.7	46.267	-0.675	-0.219	0	27.43	0	1.733	2.308	-0.575
641.8	46.261	-0.678	-0.233	0	29.54	0	1.733	2.309	-0.575
641.9	46.267	-0.688	-0.152	0	32.41	0	1.734	2.309	-0.575
642	46.274	-0.688	0.049	0	35.77	0	1.735	2.31	-0.575
642.1	46.286	-0.685	-0.124	0	38.63	0	1.736	2.312	-0.575
642.2	46.305	-0.685	-0.042	0	42.8	0	1.738	2.313	-0.575
642.3	46.323	-0.665	-0.328	0	45.2	0	1.739	2.314	-0.575
642.4	46.354	-0.675	-0.18	0	47.28	0	1.74	2.315	-0.575
642.5	46.385	-0.688	-0.095	0	54.12	0	1.742	2.317	-0.575
642.6	46.423	-0.68	0.364	0	73.4	0	1.744	2.319	-0.575
642.7	46.466	-0.678	-0.222	0	75.92	0	1.746	2.321	-0.575
642.8	46.516	-0.67	-0.516	0	80.36	0	1.748	2.323	-0.575
642.9	46.578	-0.663	-0.085	0	113.84	0	1.751	2.326	-0.575
643	46.64	-0.668	-0.526	0	135.52	0	1.755	2.33	-0.575
643.1	46.702	-0.678	0.244	0	115.95	0	1.758	2.333	-0.575
643.2	46.771	-0.678	0.138	0	43.63	0	1.759	2.335	-0.575
643.3	46.839	-0.312	0.625	0	3.41	0	1.759	2.335	-0.575
643.4	46.889	0.206	0.795	0	1.03	0	1.759	2.335	-0.575
643.5	46.901	-0.007	10.347	0	6.16	0	1.76	2.335	-0.575
643.6	46.907	-0.49	38.719	0	6.47	0	1.76	2.335	-0.575
643.7	46.901	-0.465	47.738	0	3.63	0	1.76	2.335	-0.575
643.8	46.895	-0.365	22.036	0	-0.81	0	1.76	2.335	-0.575

643.9	46.882	-0.405	11.94	0	-4.2	0	1.76	2.335	-0.575
644	46.864	-0.415	16.128	0	-4.49	0	1.76	2.335	-0.575
644.1	46.839	-0.36	16.51	0	-2.32	0	1.76	2.335	-0.576
644.2	46.82	-0.36	15.217	0	-0.62	0	1.76	2.335	-0.576
644.3	46.802	-0.33	16.058	0	6.06	0	1.76	2.335	-0.576
644.4	46.795	-0.347	18.833	0	10.18	0	1.76	2.336	-0.576
644.5	46.814	-0.33	18.946	0	12.35	0	1.76	2.336	-0.576
644.6	46.839	-0.29	18.282	0	11.7	0	1.761	2.336	-0.576
644.7	46.87	-0.26	19.073	0	9.97	0	1.761	2.337	-0.576
644.8	46.901	-0.272	20.391	0	7.78	0	1.761	2.337	-0.576
644.9	46.932	-0.257	22.118	0	6.31	0	1.761	2.337	-0.576
645	46.969	-0.227	22.266	0	5.09	0	1.761	2.337	-0.576
645.1	46.994	-0.21	22.492	0	4.36	0	1.762	2.337	-0.576
645.2	47.032	-0.21	24.039	0	5.92	0	1.762	2.337	-0.576
645.3	47.063	-0.19	24.816	0	9.46	0	1.762	2.338	-0.576
645.4	47.106	-0.177	26.606	0	10.03	0	1.762	2.338	-0.576
645.5	47.156	-0.162	26.581	0	9.35	0	1.763	2.338	-0.576
645.6	47.212	-0.132	27.365	0	8.4	0	1.763	2.338	-0.576
645.7	47.261	-0.135	27.888	0	7.52	0	1.763	2.339	-0.576
645.8	47.317	-0.145	29.251	0	6.73	0	1.763	2.339	-0.576
645.9	47.373	-0.137	30.159	0	5.71	0	1.763	2.339	-0.576
646	47.429	-0.13	29.89	0	6.1	0	1.764	2.339	-0.576
646.1	47.485	-0.112	30.392	0	2.91	0	1.764	2.339	-0.576
646.2	47.541	-0.112	31.066	0	-2.14	0	1.764	2.339	-0.576
646.3	47.597	-0.085	31.042	0	-2.91	0	1.763	2.339	-0.576
646.4	47.659	-0.022	31.186	0	-2.01	0	1.763	2.339	-0.576
646.5	47.721	0.05	34.188	0	-0.62	0	1.763	2.339	-0.576
646.6	47.783	0.07	35.428	0	0	0	1.763	2.339	-0.576
646.7	47.858	0.055	39.182	0	0	0	1.763	2.339	-0.576
646.8	47.92	0.06	41.244	0	3.77	0	1.764	2.339	-0.576
646.9	47.995	0.065	41.428	0	5.51	0	1.764	2.339	-0.576
647	48.063	0.068	41.237	0	6.62	0	1.764	2.34	-0.576
647.1	48.15	0.068	41.05	0	6.42	0	1.764	2.34	-0.576
647.2	48.231	0.068	40.796	0	5.59	0	1.764	2.34	-0.576
647.3	48.318	0.07	40.979	0	4.5	0	1.764	2.34	-0.576
647.4	48.405	0.08	41.724	0	3.66	0	1.764	2.34	-0.576
647.5	48.479	0.08	41.724	0	2.79	0	1.764	2.34	-0.576
647.6	48.566	0.095	41.883	0	1.97	0	1.765	2.34	-0.576
647.7	48.647	0.118	42.476	0	0	0	1.765	2.34	-0.576
647.8	48.734	0.128	42.607	0	-0.67	0	1.765	2.34	-0.576
647.9	48.809	0.128	43.232	0	-0.69	0	1.765	2.34	-0.576
648	48.889	0.128	44.465	0	-0.68	0	1.764	2.34	-0.576
648.1	48.97	0.131	44.888	0	-0.69	0	1.764	2.34	-0.576
648.2	49.051	0.131	44.754	0	-0.69	0	1.764	2.34	-0.576
648.3	49.132	0.143	45.245	0	-0.57	0	1.764	2.34	-0.576
648.4	49.213	0.153	45.803	0	-0.57	0	1.764	2.34	-0.576
648.5	49.293	0.148	45.669	0	-0.67	0	1.764	2.34	-0.576

648.6	49.38	0.12	46.312	0	-1.2	0	1.764	2.34	-0.576
648.7	49.455	0.128	47.071	0	-1.79	0	1.764	2.34	-0.576
648.8	49.536	0.151	47.262	0	-1.87	0	1.764	2.34	-0.576
648.9	49.616	0.151	45.012	0	-1.71	0	1.764	2.34	-0.576
649	49.697	0.141	45.386	0	-1.63	0	1.764	2.34	-0.576
649.1	49.766	0.141	45.86	0	-1.33	0	1.764	2.34	-0.576
649.2	49.846	0.141	45.906	0	-1.3	0	1.764	2.34	-0.576
649.3	49.927	0.141	45.785	0	-1.18	0	1.764	2.34	-0.576
649.4	50.002	0.161	45.676	0	-1.62	0	1.764	2.34	-0.576
649.5	50.083	0.148	45.492	0	-1.98	0	1.764	2.34	-0.576
649.6	50.163	0.128	45.648	0	-1.8	0	1.764	2.34	-0.576
649.7	50.238	0.146	46.237	0	-3.16	0	1.764	2.34	-0.577
649.8	50.306	0.143	45.401	0	-3.43	0	1.764	2.34	-0.577
649.9	50.375	0.128	45.185	0	-4.6	0	1.764	2.34	-0.577
650	50.449	0.115	45.429	0	-6.1	0	1.763	2.34	-0.577
650.1	50.511	0.118	45.054	0	-6.06	0	1.763	2.34	-0.577
650.2	50.58	0.118	44.514	0	-5.61	0	1.763	2.34	-0.577
650.3	50.636	0.146	43.999	0	-5.26	0	1.763	2.34	-0.577
650.4	50.691	0.141	43.917	0	-4.79	0	1.763	2.34	-0.578
650.5	50.754	0.123	43.917	0	-4.35	0	1.763	2.34	-0.578
650.6	50.822	0.098	43.868	0	-5.65	0	1.763	2.34	-0.578
650.7	50.878	0.07	43.67	0	-8.78	0	1.762	2.34	-0.578
650.8	50.934	0.07	43.698	0	-7.55	0	1.762	2.34	-0.578
650.9	50.984	0.08	42.498	0	-6.13	0	1.762	2.34	-0.578
651	51.027	0.065	41.502	0	-7.57	0	1.762	2.34	-0.579
651.1	51.077	0.033	41.576	0	-7.53	0	1.762	2.34	-0.579
651.2	51.12	0.033	41.569	0	-7.14	0	1.761	2.34	-0.579
651.3	51.17	0.063	39.803	0	-6.75	0	1.761	2.34	-0.579
651.4	51.213	0.045	39.171	0	-7.36	0	1.761	2.34	-0.579
651.5	51.263	0.025	39.171	0	-7.35	0	1.761	2.34	-0.58
651.6	51.307	0.028	40.513	0	-6.77	0	1.761	2.34	-0.58
651.7	51.35	0.023	39.185	0	-6.27	0	1.76	2.34	-0.58
651.8	51.394	0.023	38.578	0	-5.85	0	1.76	2.34	-0.58
651.9	51.437	0.033	39.348	0	-5.78	0	1.76	2.34	-0.58
652	51.487	0.028	38.687	0	-6.14	0	1.76	2.34	-0.581
652.1	51.53	0.04	38.843	0	-6.41	0	1.76	2.34	-0.581
652.2	51.58	0.04	38.232	0	-6.3	0	1.76	2.34	-0.581
652.3	51.624	0.065	37.79	0	-6.29	0	1.759	2.34	-0.581
652.4	51.673	0.065	37.815	0	-6.15	0	1.759	2.34	-0.581
652.5	51.723	0.06	39.927	0	-6.28	0	1.759	2.34	-0.581
652.6	51.766	0.065	40.117	0	-6.39	0	1.759	2.34	-0.582
652.7	51.816	0.068	39.846	0	-6.14	0	1.759	2.34	-0.582
652.8	51.86	0.065	39.648	0	-6.06	0	1.758	2.34	-0.582
652.9	51.909	0.063	39.577	0	-6.09	0	1.758	2.34	-0.582
653	51.959	0.053	39.863	0	-6.27	0	1.758	2.34	-0.582
653.1	52.003	0.055	40.093	0	-6.28	0	1.758	2.34	-0.582
653.2	52.052	0.055	39.715	0	-6.61	0	1.758	2.34	-0.583

653.3	52.096	0.063	39.888	0	-6.88	0	1.758	2.34	-0.583
653.4	52.139	0.065	39.662	0	-6.77	0	1.757	2.34	-0.583
653.5	52.183	0.06	39.577	0	-7.27	0	1.757	2.34	-0.583
653.6	52.22	0.05	40.209	0	-6.92	0	1.757	2.34	-0.583
653.7	52.264	0.048	39.793	0	-6.75	0	1.757	2.34	-0.584
653.8	52.301	0.028	38.595	0	-7.65	0	1.757	2.34	-0.584
653.9	52.338	-0.012	38.666	0	-9.57	0	1.756	2.34	-0.584
654	52.382	0.003	40.142	0	-9.95	0	1.756	2.34	-0.584
654.1	52.413	0.035	38.532	0	-11.22	0	1.756	2.34	-0.585
654.2	52.438	0.035	37.056	0	-12.95	0	1.755	2.34	-0.585
654.3	52.469	0.013	37.9	0	-14.43	0	1.755	2.34	-0.585
654.4	52.487	0.003	37.066	0	-16.15	0	1.755	2.34	-0.586
654.5	52.5	-0.002	37.066	0	-16.78	0	1.754	2.34	-0.586
654.6	52.512	-0.015	35.95	0	-17.27	0	1.754	2.34	-0.587
654.7	52.518	-0.037	35.742	0	-18.45	0	1.753	2.34	-0.587
654.8	52.518	-0.062	35.036	0	-19.2	0	1.753	2.34	-0.588
654.9	52.518	-0.07	34.555	0	-19.35	0	1.752	2.34	-0.588
655	52.512	-0.08	33.002	0	-19.56	0	1.751	2.34	-0.589
655.1	52.5	-0.102	31.942	0	-20.64	0	1.751	2.34	-0.589
655.2	52.493	-0.102	31.656	0	-21.97	0	1.75	2.34	-0.59
655.3	52.481	-0.16	30.706	0	-23.14	0	1.75	2.34	-0.591
655.4	52.45	-0.175	30.681	0	-23.97	0	1.749	2.34	-0.591
655.5	52.419	-0.192	27.726	0	-24.37	0	1.748	2.34	-0.592
655.6	52.388	-0.202	26.666	0	-26.14	0	1.748	2.34	-0.593
655.7	52.351	-0.225	25.494	0	-26.36	0	1.747	2.34	-0.594
655.8	52.313	-0.265	24.014	0	-26.1	0	1.746	2.34	-0.594
655.9	52.264	-0.275	24.01	0	-24.92	0	1.745	2.34	-0.595
656	52.22	-0.285	23.032	0	-23.76	0	1.745	2.34	-0.596
656.1	52.17	-0.295	22.026	0	-22.8	0	1.744	2.34	-0.596
656.2	52.127	-0.295	21.796	0	-22.87	0	1.743	2.34	-0.597
656.3	52.077	-0.305	20.857	0	-21.85	0	1.743	2.34	-0.597
656.4	52.027	-0.322	19.49	0	-21.49	0	1.742	2.34	-0.598
656.5	51.971	-0.342	19.405	0	-20.96	0	1.742	2.34	-0.599
656.6	51.916	-0.355	18.046	0	-20.81	0	1.741	2.34	-0.599
656.7	51.86	-0.355	17.615	0	-19.97	0	1.741	2.34	-0.6
656.8	51.804	-0.352	16.407	0	-19.05	0	1.74	2.34	-0.6
656.9	51.748	-0.357	16.252	0	-18.35	0	1.74	2.34	-0.601
657	51.686	-0.383	17.039	0	-17.2	0	1.739	2.34	-0.601
657.1	51.63	-0.393	16.962	0	-7.8	0	1.739	2.34	-0.602
657.2	51.574	-0.393	15.584	0	0	0	1.739	2.34	-0.602
657.3	51.53	-0.393	14.112	0	0	0	1.739	2.34	-0.602
657.4	51.487	-0.418	13.533	0	0.58	0	1.739	2.34	-0.602
657.5	51.431	-0.57	13.363	0	1.45	0	1.739	2.34	-0.602
657.6	51.381	-0.655	13.639	0	3.08	0	1.739	2.341	-0.602
657.7	51.325	-0.658	6.784	0	5.11	0	1.739	2.341	-0.602
657.8	51.282	-0.633	1.194	0	9.18	0	1.739	2.341	-0.602
657.9	51.232	-0.63	-1.162	0	13.73	0	1.74	2.341	-0.602

658	51.201	-0.665	-0.18	0	15.23	0	1.74	2.342	-0.602
658.1	51.17	-0.68	0.83	0	16.05	0	1.741	2.342	-0.602
658.2	51.145	-0.68	0.551	0	16.05	0	1.741	2.343	-0.602
658.3	51.12	-0.675	-0.494	0	16.78	0	1.742	2.343	-0.602
658.4	51.095	-0.678	-0.579	0	19.61	0	1.742	2.344	-0.602
658.5	51.07	-0.665	-0.237	0	20.77	0	1.743	2.344	-0.602
658.6	51.052	-0.67	-0.526	0	23.79	0	1.743	2.345	-0.602
658.7	51.033	-0.675	-1.307	0	25.92	0	1.744	2.346	-0.602
658.8	51.021	-0.648	-1.826	0	27.03	0	1.745	2.346	-0.602
658.9	51.015	-0.635	-2.338	0	27.64	0	1.746	2.347	-0.602
659	51.008	-0.703	-2.098	0	28.33	0	1.746	2.348	-0.602
659.1	51.002	-0.718	-0.279	0	28.62	0	1.747	2.349	-0.602
659.2	50.996	-0.718	-2.009	0	29.53	0	1.748	2.35	-0.602
659.3	50.99	-0.693	-2.041	0	29.95	0	1.749	2.35	-0.602
659.4	50.99	-0.695	-1.218	0	29.93	0	1.75	2.351	-0.602
659.5	50.984	-0.69	-1.218	0	29.91	0	1.75	2.352	-0.602
659.6	50.984	-0.668	-1.006	0	29.89	0	1.751	2.353	-0.602
659.7	50.977	-0.67	-1.144	0	29.89	0	1.752	2.354	-0.602
659.8	50.977	-0.685	-1.462	0	29.89	0	1.753	2.355	-0.602
659.9	50.977	-0.683	-0.011	0	30.53	0	1.754	2.355	-0.602
660	50.971	-0.675	-0.586	0	31.48	0	1.755	2.356	-0.602
660.1	50.971	-0.673	-0.682	0	32.03	0	1.756	2.357	-0.602
660.2	50.971	-0.673	-0.516	0	32.48	0	1.756	2.358	-0.602
660.3	50.977	-0.678	-0.18	0	33	0	1.757	2.359	-0.602
660.4	50.977	-0.678	-0.42	0	33.24	0	1.758	2.36	-0.602
660.5	50.977	-0.663	-0.396	0	34.82	0	1.759	2.361	-0.602
660.6	50.984	-0.653	-0.071	0	35.95	0	1.76	2.362	-0.602
660.7	50.984	-0.683	-0.738	0	36.09	0	1.761	2.363	-0.602
660.8	50.996	-0.693	0.106	0	36.82	0	1.762	2.364	-0.602
660.9	51.002	-0.685	0.6	0	41.84	0	1.763	2.365	-0.602
661	51.008	-0.685	-0.48	0	56.47	0	1.765	2.367	-0.602
661.1	51.021	-0.683	-0.29	0	61.16	0	1.767	2.368	-0.602
661.2	51.033	-0.683	-0.307	0	60.01	0	1.768	2.37	-0.602
661.3	51.058	-0.728	-0.184	0	93.74	0	1.771	2.373	-0.602
661.4	51.077	-0.688	-0.099	0	121.83	0	1.774	2.376	-0.602
661.5	51.102	-0.648	-0.477	0	94.35	0	1.777	2.379	-0.602
661.6	51.12	-0.57	-1.031	0	55.53	0	1.779	2.38	-0.602
661.7	51.145	-0.28	0.212	0	12.82	0	1.779	2.38	-0.602
661.8	51.17	0.216	2.702	0	14.93	0	1.779	2.381	-0.602
661.9	51.195	0.04	11.269	0	19.53	0	1.78	2.381	-0.602
662	51.22	-0.425	39.235	0	20.29	0	1.78	2.382	-0.602
662.1	51.232	-0.45	47.587	0	17.95	0	1.781	2.382	-0.602
662.2	51.244	-0.45	23.76	0	14.06	0	1.781	2.383	-0.602
662.3	51.263	-0.35	13.413	0	9.98	0	1.782	2.383	-0.602
662.4	51.276	-0.29	17.823	0	7.18	0	1.782	2.383	-0.602
662.5	51.288	-0.205	17.993	0	4.94	0	1.782	2.383	-0.602
662.6	51.3	-0.2	18.84	0	3.1	0	1.782	2.384	-0.602

662.7	51.313	-0.205	23.244	0	1.94	0	1.782	2.384	-0.602
662.8	51.331	-0.17	25.981	0	1.08	0	1.782	2.384	-0.602
662.9	51.344	-0.167	25.942	0	0.76	0	1.782	2.384	-0.602
663	51.363	-0.16	27.217	0	1.55	0	1.782	2.384	-0.602
663.1	51.375	-0.15	28.241	0	1.22	0	1.782	2.384	-0.602
663.2	51.394	-0.15	27.733	0	0	0	1.782	2.384	-0.602
663.3	51.412	-0.187	28.043	0	-0.97	0	1.782	2.384	-0.602
663.4	51.431	-0.15	26.67	0	-2.12	0	1.782	2.384	-0.602
663.5	51.45	-0.132	26.751	0	-2.43	0	1.782	2.384	-0.602
663.6	51.468	-0.122	28.068	0	-1.45	0	1.782	2.384	-0.602
663.7	51.493	-0.13	29.149	0	-1.85	0	1.782	2.384	-0.602
663.8	51.518	-0.122	29.678	0	-2.54	0	1.782	2.384	-0.602
663.9	51.543	-0.097	30.169	0	-3.13	0	1.782	2.384	-0.602
664	51.568	-0.1	30.208	0	-3.15	0	1.782	2.384	-0.602
664.1	51.592	-0.102	30.752	0	-2.46	0	1.782	2.384	-0.602
664.2	51.624	-0.102	31.73	0	-2.3	0	1.782	2.384	-0.602
664.3	51.655	-0.087	31.186	0	-2.1	0	1.782	2.384	-0.602
664.4	51.679	-0.072	31.102	0	-2.84	0	1.781	2.384	-0.602
664.5	51.717	-0.06	32.468	0	-3.06	0	1.781	2.384	-0.602
664.6	51.748	-0.06	32.489	0	-2.49	0	1.781	2.384	-0.602
664.7	51.779	-0.055	33.065	0	-2.8	0	1.781	2.384	-0.603
664.8	51.822	-0.035	33.683	0	-3.29	0	1.781	2.384	-0.603
664.9	51.853	-0.025	33.334	0	-3.67	0	1.781	2.384	-0.603
665	51.891	-0.02	34.17	0	-3.51	0	1.781	2.384	-0.603
665.1	51.928	-0.022	34.993	0	-4.01	0	1.781	2.384	-0.603
665.2	51.959	-0.022	35.149	0	-4.4	0	1.781	2.384	-0.603
665.3	51.996	-0.017	35.495	0	-4.77	0	1.781	2.384	-0.603
665.4	52.034	-0.002	35.495	0	-6.45	0	1.78	2.384	-0.603
665.5	52.065	-0.01	35.385	0	-7.21	0	1.78	2.384	-0.604
665.6	52.102	-0.025	36.236	0	-7.22	0	1.78	2.384	-0.604
665.7	52.133	-0.017	37.321	0	-7.22	0	1.78	2.384	-0.604
665.8	52.164	-0.002	36.282	0	-7.33	0	1.78	2.384	-0.604
665.9	52.201	0.01	35.993	0	-7.38	0	1.779	2.384	-0.604
666	52.226	0.015	36.24	0	-7.36	0	1.779	2.384	-0.605
666.1	52.257	0.018	36.515	0	-7.36	0	1.779	2.384	-0.605
666.2	52.295	0.018	37.278	0	-7.38	0	1.779	2.384	-0.605
666.3	52.326	0.01	37.172	0	-7.38	0	1.779	2.384	-0.605
666.4	52.357	0.018	36.759	0	-7.38	0	1.778	2.384	-0.605
666.5	52.394	0.028	36.816	0	-7.44	0	1.778	2.384	-0.606
666.6	52.425	0.02	37.2	0	-7.43	0	1.778	2.384	-0.606
666.7	52.462	0.018	37.536	0	-7.51	0	1.778	2.384	-0.606
666.8	52.493	0.02	37.691	0	-7.87	0	1.778	2.384	-0.606
666.9	52.531	0.015	37.893	0	-9.27	0	1.777	2.384	-0.606
667	52.562	0.015	37.882	0	-10.16	0	1.777	2.384	-0.607
667.1	52.593	0.023	38.041	0	-10.9	0	1.777	2.384	-0.607
667.2	52.618	0.023	37.748	0	-13.08	0	1.776	2.384	-0.607
667.3	52.643	0.013	37.271	0	-15.39	0	1.776	2.384	-0.608

667.4	52.661	0.003	37.243	0	-19.32	0	1.775	2.384	-0.608
667.5	52.674	-0.017	37.222	0	-20.45	0	1.775	2.384	-0.609
667.6	52.68	-0.032	37.077	0	-20.64	0	1.774	2.384	-0.61
667.7	52.674	-0.065	36.053	0	-19.35	0	1.774	2.384	-0.61
667.8	52.674	-0.097	35.498	0	-19.03	0	1.773	2.384	-0.611
667.9	52.667	-0.115	34.276	0	-18.51	0	1.773	2.384	-0.611
668	52.655	-0.132	32.482	0	-17.13	0	1.772	2.384	-0.612
668.1	52.643	-0.155	30.847	0	-15.79	0	1.772	2.384	-0.612
668.2	52.63	-0.155	29.901	0	-14.72	0	1.771	2.384	-0.612
668.3	52.618	-0.177	28.206	0	-14.03	0	1.771	2.384	-0.613
668.4	52.605	-0.205	26.232	0	-13.62	0	1.771	2.384	-0.613
668.5	52.593	-0.225	26.235	0	-13.25	0	1.77	2.384	-0.614
668.6	52.58	-0.212	26.073	0	-13.21	0	1.77	2.384	-0.614
668.7	52.574	-0.195	24.279	0	-13.18	0	1.769	2.384	-0.614
668.8	52.562	-0.195	23.883	0	-13.19	0	1.769	2.384	-0.615
668.9	52.556	-0.21	24.406	0	-13.21	0	1.769	2.384	-0.615
669	52.543	-0.212	24.904	0	-13.17	0	1.768	2.384	-0.615
669.1	52.531	-0.187	25.303	0	-13.2	0	1.768	2.384	-0.616
669.2	52.525	-0.187	24.77	0	-13.26	0	1.768	2.384	-0.616
669.3	52.512	-0.197	24.946	0	-13.37	0	1.767	2.384	-0.617
669.4	52.5	-0.197	25.663	0	-13.91	0	1.767	2.384	-0.617
669.5	52.487	-0.187	25.663	0	-13.69	0	1.766	2.384	-0.617
669.6	52.475	-0.195	25.151	0	-13.33	0	1.766	2.384	-0.618
669.7	52.462	-0.197	25.289	0	-13.19	0	1.766	2.384	-0.618
669.8	52.456	-0.187	25.833	0	-13	0	1.765	2.384	-0.618
669.9	52.444	-0.19	25.031	0	-12.85	0	1.765	2.384	-0.619
670	52.431	-0.197	24.904	0	-12.77	0	1.765	2.384	-0.619
670.1	52.419	-0.205	25.504	0	-12.77	0	1.764	2.384	-0.619
670.2	52.413	-0.205	25.201	0	-12.78	0	1.764	2.384	-0.62
670.3	52.406	-0.19	25.303	0	-12.76	0	1.764	2.384	-0.62
670.4	52.394	-0.19	25.303	0	-12.68	0	1.763	2.384	-0.621
670.5	52.388	-0.177	25.698	0	-12.45	0	1.763	2.384	-0.621
670.6	52.388	-0.175	25.674	0	-12.27	0	1.763	2.384	-0.621
670.7	52.382	-0.192	26.129	0	-12.27	0	1.762	2.384	-0.622
670.8	52.369	-0.182	26.387	0	-12.27	0	1.762	2.384	-0.622
670.9	52.369	-0.17	26.666	0	-11.98	0	1.762	2.384	-0.622
671	52.363	-0.15	26.624	0	-9.03	0	1.761	2.384	-0.622
671.1	52.363	-0.145	27.012	0	-8.77	0	1.761	2.384	-0.623
671.2	52.363	-0.145	27.401	0	-11.11	0	1.761	2.384	-0.623
671.3	52.363	-0.14	27.538	0	-11.25	0	1.76	2.384	-0.623
671.4	52.363	-0.132	27.538	0	-11.27	0	1.76	2.384	-0.624
671.5	52.369	-0.137	27.457	0	-11.27	0	1.76	2.384	-0.624
671.6	52.369	-0.135	28.817	0	-11.26	0	1.759	2.384	-0.624
671.7	52.369	-0.115	29.276	0	-11.15	0	1.759	2.384	-0.625
671.8	52.375	-0.105	29.301	0	-11.13	0	1.759	2.384	-0.625
671.9	52.375	-0.12	29.177	0	-11.12	0	1.759	2.384	-0.625
672	52.382	-0.117	29.601	0	-11.1	0	1.758	2.384	-0.626

672.1	52.388	-0.107	29.724	0	-11.11	0	1.758	2.384	-0.626
672.2	52.388	-0.107	29.301	0	-11.13	0	1.758	2.384	-0.626
672.3	52.394	-0.125	29.887	0	-11.15	0	1.757	2.384	-0.626
672.4	52.4	-0.107	29.551	0	-11.16	0	1.757	2.384	-0.627
672.5	52.406	-0.11	29.467	0	-11.15	0	1.757	2.384	-0.627
672.6	52.406	-0.117	29.442	0	-11.16	0	1.756	2.384	-0.627
672.7	52.413	-0.117	29.912	0	-11.17	0	1.756	2.384	-0.628
672.8	52.419	-0.107	29.873	0	-11.16	0	1.756	2.384	-0.628
672.9	52.425	-0.112	29.682	0	-11.18	0	1.755	2.384	-0.628
673	52.425	-0.122	29.707	0	-11.33	0	1.755	2.384	-0.629
673.1	52.431	-0.12	30.07	0	-11.34	0	1.755	2.384	-0.629
673.2	52.431	-0.12	29.625	0	-11.35	0	1.755	2.384	-0.629
673.3	52.444	-0.137	29.233	0	-11.24	0	1.754	2.384	-0.63
673.4	52.444	-0.122	29.378	0	-8.42	0	1.754	2.384	-0.63
673.5	52.45	-0.112	29.332	0	-7.92	0	1.754	2.384	-0.63
673.6	52.462	-0.12	28.806	0	-7.84	0	1.754	2.384	-0.63
673.7	52.469	-0.105	29.795	0	-8.63	0	1.753	2.384	-0.63
673.8	52.487	-0.092	29.403	0	-10.6	0	1.753	2.384	-0.631
673.9	52.5	-0.1	28.884	0	-10.62	0	1.753	2.384	-0.631
674	52.506	-0.1	30.145	0	-10.65	0	1.752	2.384	-0.631
674.1	52.512	-0.095	30.604	0	-10.74	0	1.752	2.384	-0.632
674.2	52.525	-0.095	30.438	0	-11.2	0	1.752	2.384	-0.632
674.3	52.537	-0.092	30.198	0	-11.9	0	1.751	2.384	-0.632
674.4	52.543	-0.097	31.525	0	-12.15	0	1.751	2.384	-0.633
674.5	52.549	-0.095	31.416	0	-12.57	0	1.751	2.384	-0.633
674.6	52.562	-0.09	31.465	0	-12.88	0	1.75	2.384	-0.633
674.7	52.568	-0.095	31.416	0	-13.43	0	1.75	2.384	-0.634
674.8	52.568	-0.117	30.967	0	-15.85	0	1.75	2.384	-0.634
674.9	52.574	-0.117	31.095	0	-19.95	0	1.749	2.384	-0.635
675	52.568	-0.115	30.575	0	-21.22	0	1.748	2.384	-0.635
675.1	52.556	-0.11	29.933	0	-20.69	0	1.748	2.384	-0.636
675.2	52.537	-0.11	29.848	0	-19.46	0	1.747	2.384	-0.636
675.3	52.518	-0.162	29.7	0	-18.87	0	1.747	2.384	-0.637
675.4	52.5	-0.177	27.831	0	-19.35	0	1.746	2.384	-0.637
675.5	52.475	-0.202	27.718	0	-20.02	0	1.746	2.384	-0.638
675.6	52.456	-0.227	26.168	0	-19.67	0	1.745	2.384	-0.639
675.7	52.425	-0.23	25.797	0	-19.15	0	1.745	2.384	-0.639
675.8	52.4	-0.222	24.554	0	-18.97	0	1.744	2.384	-0.64
675.9	52.363	-0.225	23.954	0	-18.74	0	1.744	2.384	-0.64
676	52.338	-0.23	23.509	0	-18.64	0	1.743	2.384	-0.641
676.1	52.307	-0.232	23.509	0	-18.42	0	1.743	2.384	-0.641
676.2	52.282	-0.232	23.138	0	-18.44	0	1.742	2.384	-0.642
676.3	52.257	-0.255	23.11	0	-18.37	0	1.742	2.384	-0.642
676.4	52.232	-0.235	23.195	0	-19.21	0	1.741	2.384	-0.643
676.5	52.195	-0.235	21.874	0	-20.59	0	1.74	2.384	-0.643
676.6	52.17	-0.232	22.771	0	-21.36	0	1.74	2.384	-0.644
676.7	52.139	-0.22	23.301	0	-21.53	0	1.739	2.384	-0.645

676.8	52.102	-0.225	22.418	0	-21.44	0	1.739	2.384	-0.645
676.9	52.065	-0.237	22.933	0	-21.34	0	1.738	2.384	-0.646
677	52.034	-0.252	23.311	0	-21.33	0	1.737	2.384	-0.646
677.1	51.996	-0.252	22.859	0	-21.29	0	1.737	2.384	-0.647
677.2	51.959	-0.252	22.926	0	-21.25	0	1.736	2.384	-0.647
677.3	51.928	-0.247	22.125	0	-21.46	0	1.736	2.384	-0.648
677.4	51.891	-0.252	22.368	0	-21.87	0	1.735	2.384	-0.649
677.5	51.853	-0.26	22.453	0	-21.85	0	1.734	2.384	-0.649
677.6	51.816	-0.257	22.739	0	-21.83	0	1.734	2.384	-0.65
677.7	51.779	-0.24	22.252	0	-21.84	0	1.733	2.384	-0.65
677.8	51.742	-0.232	21.796	0	-21.83	0	1.733	2.384	-0.651
677.9	51.704	-0.245	21.937	0	-16.37	0	1.732	2.384	-0.652
678	51.667	-0.26	22.372	0	-2.95	0	1.732	2.384	-0.652
678.1	51.63	-0.252	22.803	0	9.63	0	1.732	2.384	-0.652
678.2	51.592	-0.252	22.294	0	9.75	0	1.733	2.384	-0.652
678.3	51.561	-0.26	22.054	0	8.86	0	1.733	2.385	-0.652
678.4	51.53	-0.413	23.569	0	8.38	0	1.733	2.385	-0.652
678.5	51.487	-0.49	23.569	0	8.17	0	1.733	2.385	-0.652
678.6	51.443	-0.568	15.673	0	8.17	0	1.734	2.385	-0.652
678.7	51.406	-0.618	8.829	0	8.16	0	1.734	2.385	-0.652
678.8	51.369	-0.653	4.75	0	8.16	0	1.734	2.386	-0.652
678.9	51.325	-0.685	2.68	0	8.15	0	1.734	2.386	-0.652
679	51.288	-0.688	1.331	0	8.14	0	1.734	2.386	-0.652
679.1	51.251	-0.683	-1.522	0	7.98	0	1.735	2.386	-0.652
679.2	51.207	-0.683	-1.748	0	6.76	0	1.735	2.387	-0.652
679.3	51.164	-0.683	-1.67	0	4.76	0	1.735	2.387	-0.652
679.4	51.126	-0.69	-1.642	0	2.72	0	1.735	2.387	-0.652
679.5	51.083	-0.69	-1.317	0	1.22	0	1.735	2.387	-0.652
679.6	51.033	-0.683	-1.677	0	0	0	1.735	2.387	-0.652
679.7	50.977	-0.693	-2.253	0	0	0	1.735	2.387	-0.652
679.8	50.928	-0.685	-2.511	0	0	0	1.735	2.387	-0.652
679.9	50.872	-0.653	-2.719	0	0	0	1.735	2.387	-0.652
680	50.822	-0.703	-2.723	0	0	0	1.735	2.387	-0.652
680.1	50.772	-0.733	-2.041	0	0	0	1.735	2.387	-0.652
680.2	50.716	-0.733	-2.055	0	0	0	1.735	2.387	-0.652
680.3	50.66	-0.698	-4.255	0	0.8	0	1.735	2.387	-0.652
680.4	50.617	-0.69	-1.031	0	2.14	0	1.735	2.387	-0.652
680.5	50.561	-0.673	-1.006	0	3.77	0	1.735	2.387	-0.652
680.6	50.511	-0.675	-1.79	0	5.26	0	1.736	2.387	-0.652
680.7	50.468	-0.683	-1.282	0	7.69	0	1.736	2.387	-0.652
680.8	50.43	-0.685	-1.01	0	10.13	0	1.736	2.388	-0.652
680.9	50.387	-0.68	-0.374	0	12.73	0	1.736	2.388	-0.652
681	50.356	-0.695	-0.985	0	14.32	0	1.737	2.388	-0.652
681.1	50.325	-0.708	-0.544	0	14.87	0	1.737	2.389	-0.652
681.2	50.3	-0.708	0.113	0	15.38	0	1.738	2.389	-0.652
681.3	50.275	-0.663	-0.678	0	15.38	0	1.738	2.39	-0.652
681.4	50.244	-0.678	-0.085	0	15.79	0	1.739	2.39	-0.652

681.5	50.225	-0.678	0	0	16.2	0	1.739	2.391	-0.652
681.6	50.201	-0.663	-0.222	0	16.63	0	1.739	2.391	-0.652
681.7	50.176	-0.67	-0.625	0	16.6	0	1.74	2.392	-0.652
681.8	50.151	-0.688	-0.682	0	16.59	0	1.74	2.392	-0.652
681.9	50.132	-0.693	0.201	0	16.29	0	1.741	2.392	-0.652
682	50.107	-0.688	-0.085	0	15.81	0	1.741	2.393	-0.652
682.1	50.089	-0.665	-0.385	0	15.78	0	1.742	2.393	-0.652
682.2	50.064	-0.665	-0.763	0	15.32	0	1.742	2.394	-0.652
682.3	50.039	-0.675	-0.731	0	15.34	0	1.743	2.394	-0.652
682.4	50.014	-0.68	-0.731	0	15.32	0	1.743	2.395	-0.652
682.5	49.989	-0.668	-0.074	0	15.3	0	1.743	2.395	-0.652
682.6	49.964	-0.673	-0.576	0	15.77	0	1.744	2.395	-0.652
682.7	49.94	-0.688	-0.547	0	15.82	0	1.744	2.396	-0.652
682.8	49.915	-0.675	0.025	0	16.99	0	1.745	2.396	-0.652
682.9	49.89	-0.668	-0.254	0	18.69	0	1.745	2.397	-0.652
683	49.865	-0.668	-1.18	0	19.48	0	1.746	2.397	-0.652
683.1	49.853	-0.673	-0.279	0	19.53	0	1.746	2.398	-0.652
683.2	49.834	-0.673	-0.42	0	19.53	0	1.747	2.399	-0.652
683.3	49.815	-0.685	-0.113	0	20.48	0	1.747	2.399	-0.652
683.4	49.797	-0.69	-0.085	0	20.45	0	1.748	2.4	-0.652
683.5	49.784	-0.69	-0.141	0	20.49	0	1.749	2.4	-0.652
683.6	49.766	-0.698	-0.343	0	20.45	0	1.749	2.401	-0.652
683.7	49.753	-0.683	0.307	0	20.47	0	1.75	2.401	-0.652
683.8	49.735	-0.673	-0.427	0	20.46	0	1.75	2.402	-0.652
683.9	49.722	-0.703	-0.858	0	20.46	0	1.751	2.403	-0.652
684	49.703	-0.69	0.095	0	20.46	0	1.751	2.403	-0.652
684.1	49.691	-0.665	0.247	0	20.45	0	1.752	2.404	-0.652
684.2	49.672	-0.665	-1.444	0	20.45	0	1.753	2.404	-0.652
684.3	49.66	-0.673	0.053	0	20.44	0	1.753	2.405	-0.652
684.4	49.641	-0.668	-0.858	0	20.44	0	1.754	2.405	-0.652
684.5	49.629	-0.665	-0.862	0	20.5	0	1.754	2.406	-0.652
684.6	49.616	-0.665	-0.339	0	22.12	0	1.755	2.407	-0.652
684.7	49.598	-0.68	-0.48	0	23.66	0	1.756	2.407	-0.652
684.8	49.579	-0.688	-0.48	0	24.83	0	1.756	2.408	-0.652
684.9	49.573	-0.678	0.032	0	24.79	0	1.757	2.409	-0.652
685	49.567	-0.68	-0.819	0	25.99	0	1.758	2.409	-0.652
685.1	49.561	-0.675	-0.406	0	27.58	0	1.758	2.41	-0.652
685.2	49.554	-0.675	-0.081	0	27.78	0	1.759	2.411	-0.652
685.3	49.554	-0.665	-0.939	0	27.79	0	1.76	2.412	-0.652
685.4	49.548	-0.66	-0.911	0	28.31	0	1.761	2.412	-0.652
685.5	49.542	-0.665	-0.427	0	30.14	0	1.762	2.413	-0.652
685.6	49.542	-0.68	-0.173	0	31.36	0	1.762	2.414	-0.652
685.7	49.542	-0.683	0.233	0	32.71	0	1.763	2.415	-0.652
685.8	49.548	-0.683	-0.124	0	34.19	0	1.764	2.416	-0.652
685.9	49.548	-0.69	-0.569	0	35.81	0	1.765	2.417	-0.652
686	49.554	-0.7	-0.314	0	37.37	0	1.766	2.418	-0.652
686.1	49.567	-0.693	-0.184	0	38.61	0	1.767	2.419	-0.652

686.2	49.579	-0.693	-0.23	0	40.08	0	1.769	2.42	-0.652
686.3	49.598	-0.665	-0.897	0	41.41	0	1.77	2.421	-0.652
686.4	49.61	-0.668	-0.614	0	42.33	0	1.771	2.422	-0.652
686.5	49.635	-0.67	-0.533	0	52.58	0	1.772	2.424	-0.652
686.6	49.648	-0.665	0	0	70.09	0	1.774	2.426	-0.652
686.7	49.679	-0.67	-0.742	0	59.55	0	1.776	2.428	-0.652
686.8	49.703	-0.683	-0.487	0	69.79	0	1.778	2.429	-0.652
686.9	49.728	-0.688	0.039	0	124.86	0	1.781	2.433	-0.652
687	49.753	-0.675	-0.23	0	111.53	0	1.784	2.436	-0.652
687.1	49.784	-0.615	-0.205	0	74.99	0	1.786	2.438	-0.652
687.2	49.809	-0.615	-0.689	0	21.9	0	1.787	2.439	-0.652
687.3	49.834	0.053	1.187	0	13.38	0	1.787	2.439	-0.652
687.4	49.865	0.278	24.035	0	17.53	0	1.788	2.44	-0.652
687.5	49.89	-0.26	23.894	0	20.61	0	1.789	2.44	-0.652
687.6	49.909	-0.473	51.662	0	18.48	0	1.789	2.441	-0.652
687.7	49.927	-0.327	36.974	0	16.24	0	1.789	2.441	-0.652
687.8	49.946	-0.295	14.119	0	13	0	1.79	2.442	-0.652
687.9	49.964	-0.3	14.631	0	9.49	0	1.79	2.442	-0.652
688	49.977	-0.26	19.861	0	7.18	0	1.79	2.442	-0.652
688.1	50.002	-0.215	19.72	0	5.28	0	1.79	2.442	-0.652
688.2	50.014	-0.215	21.658	0	3.78	0	1.791	2.442	-0.652
688.3	50.045	-0.182	24.381	0	2.76	0	1.791	2.442	-0.652
688.4	50.064	-0.165	24.296	0	1.82	0	1.791	2.442	-0.652
688.5	50.083	-0.15	26.807	0	1.73	0	1.791	2.442	-0.652
688.6	50.101	-0.152	27.302	0	1.59	0	1.791	2.442	-0.652
688.7	50.12	-0.19	28.008	0	0.86	0	1.791	2.442	-0.652
688.8	50.138	-0.22	28.174	0	0	0	1.791	2.442	-0.652
688.9	50.163	-0.192	27.662	0	-1.16	0	1.791	2.442	-0.652
689	50.182	-0.16	26.207	0	-2.04	0	1.791	2.442	-0.652
689.1	50.207	-0.14	26.394	0	-2.93	0	1.791	2.442	-0.652
689.2	50.225	-0.14	27.39	0	-3.45	0	1.791	2.442	-0.652
689.3	50.25	-0.13	28.711	0	-3.69	0	1.79	2.442	-0.652
689.4	50.269	-0.11	29.735	0	-3.47	0	1.79	2.442	-0.652
689.5	50.3	-0.102	29.795	0	-2.83	0	1.79	2.442	-0.652
689.6	50.325	-0.102	29.89	0	-3.25	0	1.79	2.442	-0.652
689.7	50.35	-0.107	30.367	0	-3.66	0	1.79	2.442	-0.652
689.8	50.375	-0.105	30.307	0	-3.14	0	1.79	2.442	-0.652
689.9	50.399	-0.105	30.293	0	-2.76	0	1.79	2.442	-0.653
690	50.43	-0.107	30.847	0	-1.61	0	1.79	2.442	-0.653
690.1	50.462	-0.097	30.996	0	-1.95	0	1.79	2.442	-0.653
690.2	50.493	-0.097	31.183	0	-2.61	0	1.79	2.442	-0.653
690.3	50.536	-0.102	31.889	0	-3.27	0	1.79	2.442	-0.653
690.4	50.567	-0.102	32.203	0	-3.57	0	1.79	2.442	-0.653
690.5	50.598	-0.092	32.119	0	-3.73	0	1.789	2.442	-0.653
690.6	50.636	-0.072	32.401	0	-2.62	0	1.789	2.442	-0.653
690.7	50.667	-0.05	32.518	0	-2.8	0	1.789	2.442	-0.653
690.8	50.71	-0.047	33.266	0	-3.15	0	1.789	2.442	-0.653

690.9	50.747	-0.047	33.764	0	-3.29	0	1.789	2.442	-0.653
691	50.785	-0.037	34.336	0	-1.13	0	1.789	2.442	-0.653
691.1	50.822	-0.03	34.407	0	0	0	1.789	2.442	-0.653
691.2	50.865	-0.03	34.538	0	-1.78	0	1.789	2.442	-0.653
691.3	50.909	-0.012	34.909	0	-5.35	0	1.789	2.442	-0.654
691.4	50.959	-0.002	34.884	0	-6.27	0	1.789	2.442	-0.654
691.5	51.002	0.03	35.414	0	-6.28	0	1.789	2.442	-0.654
691.6	51.052	0.07	35.961	0	-6.21	0	1.788	2.442	-0.654
691.7	51.102	0.083	37.688	0	-6.17	0	1.788	2.442	-0.654
691.8	51.145	0.073	40.354	0	-5.94	0	1.788	2.442	-0.654
691.9	51.195	0.06	41.477	0	-5.92	0	1.788	2.442	-0.655
692	51.244	0.068	41.692	0	-5.88	0	1.788	2.442	-0.655
692.1	51.288	0.073	40.859	0	-6.11	0	1.788	2.442	-0.655
692.2	51.331	0.073	40.1	0	-6.14	0	1.787	2.442	-0.655
692.3	51.375	0.078	40.16	0	-6.08	0	1.787	2.442	-0.655
692.4	51.425	0.08	40.577	0	-6.02	0	1.787	2.442	-0.655
692.5	51.468	0.088	40.548	0	-6.08	0	1.787	2.442	-0.656
692.6	51.512	0.07	40.022	0	-6.28	0	1.787	2.442	-0.656
692.7	51.568	0.055	40.524	0	-6.23	0	1.787	2.442	-0.656
692.8	51.605	0.055	39.959	0	-6.12	0	1.786	2.442	-0.656
692.9	51.655	0.073	40.1	0	-6.1	0	1.786	2.442	-0.656
693	51.704	0.078	39.909	0	-6.07	0	1.786	2.442	-0.656
693.1	51.742	0.068	39.425	0	-6.5	0	1.786	2.442	-0.657
693.2	51.791	0.068	39.997	0	-7.77	0	1.786	2.442	-0.657
693.3	51.835	0.075	39.951	0	-9.73	0	1.785	2.442	-0.657
693.4	51.878	0.05	40.132	0	-10.87	0	1.785	2.442	-0.657
693.5	51.922	0.05	40.107	0	-9.48	0	1.785	2.442	-0.658
693.6	51.959	0.068	40.089	0	-9.27	0	1.785	2.442	-0.658
693.7	51.984	0.05	39.139	0	-8.91	0	1.784	2.442	-0.658
693.8	52.015	-0.002	38.836	0	-8.55	0	1.784	2.442	-0.658
693.9	52.046	-0.02	38.532	0	-8.31	0	1.784	2.442	-0.659
694	52.083	0.008	37.465	0	-8.17	0	1.784	2.442	-0.659
694.1	52.108	0.008	35.834	0	-7.89	0	1.783	2.442	-0.659
694.2	52.139	-0.012	36.056	0	-7.89	0	1.783	2.442	-0.659
694.3	52.177	-0.015	36.318	0	-7.89	0	1.783	2.442	-0.66
694.4	52.201	-0.007	35.632	0	-7.89	0	1.783	2.442	-0.66
694.5	52.239	0.013	35.647	0	-7.91	0	1.782	2.442	-0.66
694.6	52.27	0.018	35.714	0	-7.68	0	1.782	2.442	-0.66
694.7	52.301	-0.017	35.562	0	-7.64	0	1.782	2.442	-0.66
694.8	52.332	-0.015	36.738	0	-7.66	0	1.782	2.442	-0.661
694.9	52.363	0.008	36.537	0	-7.67	0	1.782	2.442	-0.661
695	52.406	0.018	36.049	0	-7.74	0	1.781	2.442	-0.661
695.1	52.431	0.02	35.964	0	-7.75	0	1.781	2.442	-0.661
695.2	52.469	0.02	37.045	0	-7.83	0	1.781	2.442	-0.661
695.3	52.5	0.023	37.773	0	-7.9	0	1.781	2.442	-0.662
695.4	52.537	0.015	37.218	0	-8.01	0	1.781	2.442	-0.662
695.5	52.574	0.015	37.218	0	-8.74	0	1.78	2.442	-0.662

695.6	52.605	0.023	37.578	0	-9.61	0	1.78	2.442	-0.662
695.7	52.643	0.043	38.309	0	-9.4	0	1.78	2.442	-0.663
695.8	52.68	0.04	38.338	0	-8.67	0	1.78	2.442	-0.663
695.9	52.705	0.03	38.122	0	-8.47	0	1.779	2.442	-0.663
696	52.736	0.028	38.486	0	-8.48	0	1.779	2.442	-0.663
696.1	52.773	0.025	37.674	0	-8.56	0	1.779	2.442	-0.664
696.2	52.798	0.025	37.017	0	-8.58	0	1.779	2.442	-0.664
696.3	52.823	0	36.777	0	-8.59	0	1.778	2.442	-0.664
696.4	52.854	0.005	35.459	0	-8.57	0	1.778	2.442	-0.664
696.5	52.885	-0.007	35.459	0	-8.5	0	1.778	2.442	-0.665
696.6	52.91	-0.022	35.735	0	-8.51	0	1.778	2.442	-0.665
696.7	52.935	-0.037	36.498	0	-8.54	0	1.777	2.442	-0.665
696.8	52.966	-0.057	36.095	0	-8.68	0	1.777	2.442	-0.665
696.9	52.997	-0.052	35.795	0	-8.95	0	1.777	2.442	-0.666
697	53.028	-0.01	36.021	0	-9.17	0	1.777	2.442	-0.666
697.1	53.059	-0.01	35.901	0	-9.12	0	1.776	2.442	-0.666
697.2	53.09	0.035	36.374	0	-8.96	0	1.776	2.442	-0.666
697.3	53.115	0.035	37.398	0	-8.8	0	1.776	2.442	-0.667
697.4	53.146	0.028	38.38	0	-8.75	0	1.776	2.442	-0.667
697.5	53.177	0.033	38.398	0	-8.8	0	1.775	2.442	-0.667
697.6	53.208	0.038	38.175	0	-8.89	0	1.775	2.442	-0.667
697.7	53.239	0.033	37.575	0	-9.02	0	1.775	2.442	-0.668
697.8	53.27	0.043	37.787	0	-9.14	0	1.775	2.442	-0.668
697.9	53.301	0.058	37.748	0	-8.78	0	1.774	2.442	-0.668
698	53.326	0.048	37.359	0	-8.24	0	1.774	2.442	-0.668
698.1	53.363	0.033	38.133	0	-8.39	0	1.774	2.442	-0.669
698.2	53.394	0.033	38.525	0	-8.72	0	1.774	2.442	-0.669
698.3	53.425	0.023	38.052	0	-8.89	0	1.773	2.442	-0.669
698.4	53.457	0.03	37.377	0	-8.86	0	1.773	2.442	-0.669
698.5	53.481	0.048	37.462	0	-8.73	0	1.773	2.442	-0.669
698.6	53.519	0.053	37.702	0	-8.63	0	1.773	2.442	-0.67
698.7	53.544	0.038	38.023	0	-8.59	0	1.772	2.442	-0.67
698.8	53.581	0.035	38.638	0	-8.93	0	1.772	2.442	-0.67
698.9	53.612	0.05	38.747	0	-9.07	0	1.772	2.442	-0.67
699	53.643	0.058	38.165	0	-9.06	0	1.772	2.442	-0.671
699.1	53.674	0.045	37.695	0	-9.03	0	1.771	2.442	-0.671
699.2	53.699	0.045	38.334	0	-9.08	0	1.771	2.442	-0.671
699.3	53.736	0.04	38.218	0	-9.01	0	1.771	2.442	-0.671
699.4	53.767	0.048	38.207	0	-8.94	0	1.771	2.442	-0.672
699.5	53.798	0.04	38.207	0	-8.92	0	1.77	2.442	-0.672
699.6	53.829	0.033	39.097	0	-9.25	0	1.77	2.442	-0.672
699.7	53.86	0.038	38.779	0	-9.22	0	1.77	2.442	-0.672
699.8	53.892	0.043	38.041	0	-9.15	0	1.77	2.442	-0.673
699.9	53.923	0.055	38.189	0	-9.1	0	1.769	2.442	-0.673
700	53.954	0.06	38.864	0	-8.82	0	1.769	2.442	-0.673
700.1	53.985	0.06	38.68	0	-8.37	0	1.769	2.442	-0.673
700.2	54.016	0.06	38.652	0	-8.46	0	1.769	2.442	-0.674

700.3	54.053	0.06	38.489	0	-8.84	0	1.769	2.442	-0.674
700.4	54.078	0.055	38.016	0	-9.19	0	1.768	2.442	-0.674
700.5	54.115	0.068	38.613	0	-9.16	0	1.768	2.442	-0.674
700.6	54.152	0.08	38.295	0	-9.2	0	1.768	2.442	-0.675
700.7	54.177	0.083	38.811	0	-9.16	0	1.767	2.442	-0.675
700.8	54.221	0.078	38.973	0	-9.12	0	1.767	2.442	-0.675
700.9	54.246	0.07	39.333	0	-9.26	0	1.767	2.442	-0.675
701	54.283	0.06	39.266	0	-9.59	0	1.767	2.442	-0.676
701.1	54.314	0.06	39.588	0	-9.74	0	1.766	2.442	-0.676
701.2	54.345	0.06	39.27	0	-9.61	0	1.766	2.442	-0.676
701.3	54.389	0.053	39.192	0	-9.44	0	1.766	2.442	-0.677
701.4	54.407	0.06	39.326	0	-9.33	0	1.766	2.442	-0.677
701.5	54.438	0.065	39.326	0	-9.29	0	1.765	2.442	-0.677
701.6	54.469	0.06	39.595	0	-9.31	0	1.765	2.442	-0.677
701.7	54.507	0.063	39.754	0	-9.41	0	1.765	2.442	-0.678
701.8	54.538	0.06	39.037	0	-9.66	0	1.765	2.442	-0.678
701.9	54.569	0.055	39.319	0	-9.62	0	1.764	2.442	-0.678
702	54.6	0.075	39.595	0	-9.55	0	1.764	2.442	-0.678
702.1	54.631	0.093	38.92	0	-9.19	0	1.764	2.442	-0.679
702.2	54.656	0.093	39.012	0	-8.61	0	1.764	2.442	-0.679
702.3	54.687	0.045	39.62	0	-8.79	0	1.763	2.442	-0.679
702.4	54.718	0.05	38.687	0	-9.13	0	1.763	2.442	-0.679
702.5	54.749	0.063	38.659	0	-9.37	0	1.763	2.442	-0.68
702.6	54.78	0.073	38.105	0	-9.55	0	1.763	2.442	-0.68
702.7	54.805	0.08	38.465	0	-9.53	0	1.762	2.442	-0.68
702.8	54.836	0.08	38.465	0	-9.43	0	1.762	2.442	-0.68
702.9	54.873	0.075	39.224	0	-9.28	0	1.762	2.442	-0.681
703	54.892	0.06	39.591	0	-9.22	0	1.762	2.442	-0.681
703.1	54.923	0.035	39.379	0	-9.26	0	1.761	2.442	-0.681
703.2	54.954	0.035	39.376	0	-9.26	0	1.761	2.442	-0.681
703.3	54.985	0.035	39.376	0	-9.31	0	1.761	2.442	-0.682
703.4	55.016	0.028	39.351	0	-9.58	0	1.76	2.442	-0.682
703.5	55.041	0.045	39.351	0	-9.6	0	1.76	2.442	-0.682
703.6	55.072	0.065	38.412	0	-9.52	0	1.76	2.442	-0.683
703.7	55.103	0.08	38.412	0	-9.51	0	1.76	2.442	-0.683
703.8	55.134	0.08	39.588	0	-9.51	0	1.759	2.442	-0.683
703.9	55.159	0.063	39.598	0	-9.48	0	1.759	2.442	-0.683
704	55.19	0.058	40.17	0	-9.51	0	1.759	2.442	-0.684
704.1	55.221	0.078	39.969	0	-9.44	0	1.759	2.442	-0.684
704.2	55.246	0.078	39.213	0	-9.61	0	1.758	2.442	-0.684
704.3	55.277	0.085	38.617	0	-9.72	0	1.758	2.442	-0.684
704.4	55.302	0.065	40.351	0	-9.74	0	1.758	2.442	-0.685
704.5	55.339	0.05	40.266	0	-9.71	0	1.758	2.442	-0.685
704.6	55.364	0.058	39.969	0	-9.74	0	1.757	2.442	-0.685
704.7	55.389	0.07	39.443	0	-9.93	0	1.757	2.442	-0.685
704.8	55.42	0.075	39.27	0	-9.94	0	1.757	2.442	-0.686
704.9	55.445	0.08	39.916	0	-10.03	0	1.756	2.442	-0.686

705	55.476	0.073	39.383	0	-10.11	0	1.756	2.442	-0.686
705.1	55.507	0.075	39.761	0	-10.02	0	1.756	2.442	-0.687
705.2	55.532	0.075	39.761	0	-10.06	0	1.756	2.442	-0.687
705.3	55.569	0.078	39.902	0	-10.06	0	1.755	2.442	-0.687
705.4	55.594	0.085	39.934	0	-10.18	0	1.755	2.442	-0.687
705.5	55.625	0.095	39.906	0	-10.15	0	1.755	2.442	-0.688
705.6	55.65	0.105	40.086	0	-10.16	0	1.754	2.442	-0.688
705.7	55.681	0.103	39.877	0	-10.16	0	1.754	2.442	-0.688
705.8	55.718	0.088	40.269	0	-10.17	0	1.754	2.442	-0.689
705.9	55.743	0.095	40.213	0	-10.14	0	1.754	2.442	-0.689
706	55.774	0.105	40.439	0	-10.42	0	1.753	2.442	-0.689
706.1	55.805	0.105	40.269	0	-10.39	0	1.753	2.442	-0.689
706.2	55.836	0.083	40.711	0	-10.3	0	1.753	2.442	-0.69
706.3	55.867	0.075	41.346	0	-10.27	0	1.752	2.442	-0.69
706.4	55.892	0.093	41.067	0	-10.2	0	1.752	2.442	-0.69
706.5	55.917	0.093	39.994	0	-10.26	0	1.752	2.442	-0.691
706.6	55.948	0.093	39.708	0	-10.19	0	1.752	2.442	-0.691
706.7	55.973	0.105	40.598	0	-10.21	0	1.751	2.442	-0.691
706.8	56.004	0.095	40.185	0	-10.22	0	1.751	2.442	-0.691
706.9	56.029	0.088	39.962	0	-10.23	0	1.751	2.442	-0.692
707	56.066	0.078	40.435	0	-10.52	0	1.75	2.442	-0.692
707.1	56.091	0.083	40.686	0	-10.46	0	1.75	2.442	-0.692
707.2	56.116	0.083	40.824	0	-10.33	0	1.75	2.442	-0.693
707.3	56.141	0.1	39.782	0	-10.23	0	1.75	2.442	-0.693
707.4	56.172	0.075	39.937	0	-10.22	0	1.749	2.442	-0.693
707.5	56.197	0.075	39.994	0	-10.24	0	1.749	2.442	-0.693
707.6	56.222	0.085	40.329	0	-10.3	0	1.749	2.442	-0.694
707.7	56.253	0.093	39.715	0	-10.23	0	1.748	2.442	-0.694
707.8	56.278	0.093	40.372	0	-10.28	0	1.748	2.442	-0.694
707.9	56.309	0.1	40.743	0	-10.22	0	1.748	2.442	-0.695
708	56.334	0.118	40.474	0	-10.2	0	1.748	2.442	-0.695
708.1	56.365	0.11	40.177	0	-10.32	0	1.747	2.442	-0.695
708.2	56.389	0.11	40.707	0	-10.35	0	1.747	2.442	-0.695
708.3	56.414	0.09	41.096	0	-10.45	0	1.747	2.442	-0.696
708.4	56.445	0.09	39.969	0	-10.38	0	1.746	2.442	-0.696
708.5	56.464	0.083	39.884	0	-10.34	0	1.746	2.442	-0.696
708.6	56.489	0.083	40.153	0	-10.93	0	1.746	2.442	-0.697
708.7	56.52	0.088	39.676	0	-12.78	0	1.746	2.442	-0.697
708.8	56.539	0.078	39.687	0	-13.24	0	1.745	2.442	-0.697
708.9	56.557	0.073	40.128	0	-13.61	0	1.745	2.442	-0.698
709	56.582	0.078	40.238	0	-14.06	0	1.744	2.442	-0.698
709.1	56.601	0.078	39.959	0	-14	0	1.744	2.442	-0.698
709.2	56.607	0.048	39.733	0	-13.84	0	1.744	2.442	-0.699
709.3	56.626	0.033	39.394	0	-13.5	0	1.743	2.442	-0.699
709.4	56.638	0.035	38.535	0	-13.36	0	1.743	2.442	-0.7
709.5	56.644	0.033	37.624	0	-13.39	0	1.743	2.442	-0.7
709.6	56.663	0.033	37.331	0	-13.4	0	1.742	2.442	-0.7

709.7	56.675	0.045	37.077	0	-13.4	0	1.742	2.442	-0.701
709.8	56.688	0.055	36.808	0	-13.42	0	1.741	2.442	-0.701
709.9	56.706	0.05	36.674	0	-13.41	0	1.741	2.442	-0.701
710	56.719	0.028	37.232	0	-13.42	0	1.741	2.442	-0.702
710.1	56.731	0.02	37.607	0	-13.3	0	1.74	2.442	-0.702
710.2	56.744	0.02	37.801	0	-13.25	0	1.74	2.442	-0.703
710.3	56.756	0.043	37.232	0	-13.31	0	1.74	2.442	-0.703
710.4	56.768	0.033	37.984	0	-13.65	0	1.739	2.442	-0.703
710.5	56.787	0.03	37.984	0	-13.95	0	1.739	2.442	-0.704
710.6	56.806	0.05	38.345	0	-13.83	0	1.738	2.442	-0.704
710.7	56.818	0.058	37.384	0	-13.65	0	1.738	2.442	-0.704
710.8	56.837	0.055	38.624	0	-13.56	0	1.738	2.442	-0.705
710.9	56.849	0.048	39.115	0	-13.78	0	1.737	2.442	-0.705
711	56.862	0.025	39.072	0	-13.3	0	1.737	2.442	-0.706
711.1	56.88	0.02	39.302	0	-13.18	0	1.737	2.442	-0.706
711.2	56.893	0.02	39.288	0	-13.22	0	1.736	2.442	-0.706
711.3	56.911	0.055	39.005	0	-13.06	0	1.736	2.442	-0.707
711.4	56.93	0.055	38.874	0	-13.43	0	1.735	2.442	-0.707
711.5	56.955	0.06	38.959	0	-13.61	0	1.735	2.442	-0.707
711.6	56.974	0.065	39.817	0	-13.86	0	1.735	2.442	-0.708
711.7	56.992	0.083	40.139	0	-13.68	0	1.734	2.442	-0.708
711.8	57.017	0.09	40.054	0	-13.29	0	1.734	2.442	-0.709
711.9	57.036	0.08	40.28	0	-13.54	0	1.734	2.442	-0.709
712	57.061	0.088	40.785	0	-13.67	0	1.733	2.442	-0.709
712.1	57.079	0.088	40.651	0	-11.68	0	1.733	2.442	-0.71
712.2	57.098	0.088	40.464	0	-10.16	0	1.733	2.442	-0.71
712.3	57.123	0.085	40.81	0	-9.18	0	1.732	2.442	-0.71
712.4	57.141	0.048	41.428	0	-7.69	0	1.732	2.442	-0.71
712.5	57.16	0.013	41.459	0	-5.58	0	1.732	2.442	-0.711
712.6	57.179	-0.02	40.054	0	-3.17	0	1.732	2.442	-0.711
712.7	57.191	-0.02	37.946	0	-1.36	0	1.732	2.442	-0.711
712.8	57.21	-0.017	35.957	0	0.86	0	1.732	2.442	-0.711
712.9	57.222	-0.052	34.079	0	2.79	0	1.732	2.443	-0.711
713	57.241	-0.087	33.125	0	3.31	0	1.732	2.443	-0.711
713.1	57.259	-0.107	31.748	0	3.32	0	1.732	2.443	-0.711
713.2	57.278	-0.107	29.675	0	3.3	0	1.732	2.443	-0.711
713.3	57.297	-0.115	28.824	0	3.32	0	1.732	2.443	-0.711
713.4	57.315	-0.1	27.556	0	3.3	0	1.732	2.443	-0.711
713.5	57.334	-0.1	27.471	0	3.33	0	1.732	2.443	-0.711
713.6	57.353	-0.1	27.959	0	3.3	0	1.733	2.443	-0.711
713.7	57.371	-0.09	28.513	0	3.32	0	1.733	2.443	-0.711
713.8	57.396	-0.087	28.781	0	3.3	0	1.733	2.443	-0.711
713.9	57.421	-0.085	29.043	0	3.32	0	1.733	2.443	-0.711
714	57.44	-0.067	30.293	0	3.31	0	1.733	2.444	-0.711
714.1	57.471	-0.047	30.318	0	3.32	0	1.733	2.444	-0.711
714.2	57.489	-0.047	30.872	0	3.31	0	1.733	2.444	-0.711
714.3	57.514	-0.03	31.66	0	3.32	0	1.733	2.444	-0.711

714.4	57.539	-0.027	32.564	0	3.32	0	1.733	2.444	-0.711
714.5	57.564	-0.027	32.564	0	3.31	0	1.733	2.444	-0.711
714.6	57.589	-0.025	32.811	0	3.32	0	1.733	2.444	-0.711
714.7	57.62	-0.025	33.164	0	3.32	0	1.734	2.444	-0.711
714.8	57.651	-0.017	33.326	0	3.33	0	1.734	2.444	-0.711
714.9	57.682	0.003	33.45	0	3.31	0	1.734	2.444	-0.711
715	57.713	0.013	33.944	0	3.34	0	1.734	2.445	-0.711
715.1	57.756	0.013	34.28	0	3.3	0	1.734	2.445	-0.711
715.2	57.788	0.028	35.417	0	3.34	0	1.734	2.445	-0.711
715.3	57.825	0.058	36.074	0	3.31	0	1.734	2.445	-0.711
715.4	57.862	0.055	38.973	0	3.34	0	1.734	2.445	-0.711
715.5	57.906	0.063	38.973	0	3.31	0	1.734	2.445	-0.711
715.6	57.943	0.063	38.779	0	3.34	0	1.734	2.445	-0.711
715.7	57.98	0.073	38.659	0	3.33	0	1.734	2.445	-0.711
715.8	58.024	0.075	38.592	0	3.3	0	1.735	2.445	-0.711
715.9	58.067	0.053	38.521	0	3.36	0	1.735	2.445	-0.711
716	58.111	0.065	39.98	0	3.31	0	1.735	2.445	-0.711
716.1	58.148	0.068	39.747	0	3.35	0	1.735	2.446	-0.711
716.2	58.185	0.068	39.037	0	3.28	0	1.735	2.446	-0.711
716.3	58.229	0.083	39.415	0	3.16	0	1.735	2.446	-0.711
716.4	58.272	0.08	39.429	0	1.97	0	1.735	2.446	-0.711
716.5	58.309	0.073	39.348	0	0.73	0	1.735	2.446	-0.711
716.6	58.353	0.085	39.814	0	0	0	1.735	2.446	-0.711
716.7	58.39	0.088	39.814	0	0	0	1.735	2.446	-0.711
716.8	58.421	0.083	38.956	0	0	0	1.735	2.446	-0.711
716.9	58.452	0.068	39.517	0	0.96	0	1.735	2.446	-0.711
717	58.49	0.048	39.531	0	1.62	0	1.735	2.446	-0.711
717.1	58.521	0.04	38.977	0	2	0	1.735	2.446	-0.711
717.2	58.552	0.04	38.218	0	2.34	0	1.735	2.446	-0.711
717.3	58.583	0.03	37.437	0	2.63	0	1.735	2.446	-0.711
717.4	58.62	0.023	37.465	0	2.64	0	1.735	2.446	-0.711
717.5	58.651	0.033	37.465	0	2.35	0	1.736	2.446	-0.711
717.6	58.689	0.03	36.96	0	0.75	0	1.736	2.446	-0.711
717.7	58.72	0.018	36.688	0	0	0	1.736	2.446	-0.711
717.8	58.751	0.025	36.879	0	0	0	1.736	2.446	-0.711
717.9	58.776	0.02	36.049	0	0	0	1.736	2.446	-0.711
718	58.8	0.005	36.226	0	0	0	1.735	2.446	-0.711
718.1	58.825	0.005	36.42	0	-1.09	0	1.735	2.446	-0.711
718.2	58.844	0.005	35.922	0	-3.38	0	1.735	2.446	-0.711
718.3	58.862	-0.022	35.534	0	-7.08	0	1.735	2.446	-0.711
718.4	58.875	-0.027	34.068	0	-6.98	0	1.735	2.446	-0.711
718.5	58.875	-0.05	34.012	0	-3.95	0	1.735	2.446	-0.711
718.6	58.875	-0.09	34.185	0	-1.52	0	1.735	2.446	-0.711
718.7	58.869	-0.152	32.634	0	0	0	1.735	2.446	-0.711
718.8	58.862	-0.202	30.801	0	1.19	0	1.735	2.446	-0.711
718.9	58.856	-0.222	27.175	0	1.81	0	1.735	2.446	-0.711
719	58.85	-0.22	24.618	0	2.22	0	1.735	2.446	-0.711

719.1	58.85	-0.217	22.969	0	2.62	0	1.735	2.446	-0.711
719.2	58.844	-0.217	21.771	0	2.8	0	1.735	2.447	-0.711
719.3	58.838	-0.242	21.719	0	2.93	0	1.735	2.447	-0.711
719.4	58.838	-0.235	21.323	0	3.14	0	1.735	2.447	-0.711
719.5	58.831	-0.22	21.238	0	3.27	0	1.735	2.447	-0.711
719.6	58.825	-0.207	21.033	0	3.05	0	1.735	2.447	-0.711
719.7	58.819	-0.21	21.531	0	2.52	0	1.736	2.447	-0.711
719.8	58.807	-0.22	21.934	0	0	0	1.736	2.447	-0.711
719.9	58.807	-0.227	22.375	0	0	0	1.736	2.447	-0.711
720	58.794	-0.215	22.492	0	1.16	0	1.736	2.447	-0.711
720.1	58.782	-0.202	22.266	0	1.64	0	1.736	2.447	-0.711
720.2	58.769	-0.202	22.043	0	2.01	0	1.736	2.447	-0.711
720.3	58.751	-0.267	21.832	0	2.19	0	1.736	2.447	-0.711
720.4	58.738	-0.272	20.804	0	2.39	0	1.736	2.447	-0.711
720.5	58.726	-0.262	20.913	0	1.32	0	1.736	2.447	-0.711
720.6	58.707	-0.26	19.232	0	-0.91	0	1.736	2.447	-0.711
720.7	58.695	-0.255	19.568	0	-1.13	0	1.736	2.447	-0.711
720.8	58.676	-0.27	19.07	0	0	0	1.736	2.447	-0.711
720.9	58.651	-0.292	19.593	0	0.81	0	1.736	2.447	-0.711
721	58.626	-0.31	19.508	0	1.48	0	1.736	2.447	-0.711
721.1	58.602	-0.31	19.441	0	2.12	0	1.736	2.447	-0.711
721.2	58.577	-0.355	17.777	0	3	0	1.736	2.447	-0.711
721.3	58.558	-0.36	17.156	0	3.31	0	1.736	2.448	-0.711
721.4	58.527	-0.357	16.019	0	3.3	0	1.736	2.448	-0.711
721.5	58.502	-0.355	15.44	0	3.14	0	1.736	2.448	-0.711
721.6	58.483	-0.352	14.793	0	3.13	0	1.736	2.448	-0.711
721.7	58.452	-0.355	14.599	0	3.07	0	1.736	2.448	-0.711
721.8	58.428	-0.355	14.783	0	3.18	0	1.737	2.448	-0.711
721.9	58.403	-0.327	15.291	0	3.24	0	1.737	2.448	-0.711
722	58.378	-0.327	14.493	0	3.3	0	1.737	2.448	-0.711
722.1	58.353	-0.345	15.037	0	2.97	0	1.737	2.448	-0.711
722.2	58.328	-0.345	15.863	0	0	0	1.737	2.448	-0.711
722.3	58.303	-0.335	15.546	0	-2.9	0	1.737	2.448	-0.712
722.4	58.272	-0.35	16.068	0	-3.76	0	1.737	2.448	-0.712
722.5	58.241	-0.335	16.178	0	-3.19	0	1.737	2.448	-0.712
722.6	58.198	-0.287	16.248	0	-1.74	0	1.736	2.448	-0.712
722.7	58.16	-0.29	15.591	0	-0.66	0	1.736	2.448	-0.712
722.8	58.111	-0.362	17.174	0	0	0	1.736	2.448	-0.712
722.9	58.073	-0.44	19.01	0	0.84	0	1.736	2.448	-0.712
723	58.017	-0.455	16.185	0	1.44	0	1.737	2.448	-0.712
723.1	57.98	-0.46	11.604	0	2.26	0	1.737	2.448	-0.712
723.2	57.937	-0.46	8.864	0	2.5	0	1.737	2.448	-0.712
723.3	57.887	-0.488	9.556	0	2.61	0	1.737	2.449	-0.712
723.4	57.843	-0.49	8.302	0	2.58	0	1.737	2.449	-0.712
723.5	57.8	-0.488	8.302	0	2.7	0	1.737	2.449	-0.712
723.6	57.756	-0.485	8.327	0	2.71	0	1.737	2.449	-0.712
723.7	57.713	-0.485	8.521	0	2.71	0	1.737	2.449	-0.712

723.8	57.663	-0.473	8.68	0	3.09	0	1.737	2.449	-0.712
723.9	57.62	-0.473	8.638	0	3.3	0	1.737	2.449	-0.712
724	57.576	-0.475	9.143	0	3.31	0	1.737	2.449	-0.712
724.1	57.533	-0.475	8.871	0	3.3	0	1.737	2.449	-0.712
724.2	57.489	-0.463	8.981	0	3.3	0	1.737	2.449	-0.712
724.3	57.452	-0.488	8.973	0	3.31	0	1.738	2.449	-0.712
724.4	57.408	-0.498	8.758	0	3.31	0	1.738	2.449	-0.712
724.5	57.365	-0.448	8.433	0	3.29	0	1.738	2.45	-0.712
724.6	57.321	-0.428	7.081	0	3.29	0	1.738	2.45	-0.712
724.7	57.297	-0.42	9.132	0	3.29	0	1.738	2.45	-0.712
724.8	57.253	-0.415	11.191	0	3.28	0	1.738	2.45	-0.712
724.9	57.216	-0.418	11.481	0	3.3	0	1.738	2.45	-0.712
725	57.179	-0.425	12.039	0	3.29	0	1.738	2.45	-0.712
725.1	57.141	-0.438	12.226	0	3.29	0	1.738	2.45	-0.712
725.2	57.116	-0.438	12.537	0	3.29	0	1.738	2.45	-0.712
725.3	57.085	-0.418	12.124	0	3.3	0	1.738	2.45	-0.712
725.4	57.048	-0.438	13.059	0	3.19	0	1.739	2.45	-0.712
725.5	57.017	-0.42	13.088	0	3.3	0	1.739	2.45	-0.712
725.6	56.986	-0.408	12.759	0	3.24	0	1.739	2.451	-0.712
725.7	56.949	-0.398	12.6	0	1.08	0	1.739	2.451	-0.712
725.8	56.924	-0.398	12.946	0	-0.84	0	1.739	2.451	-0.712
725.9	56.887	-0.408	12.639	0	-0.56	0	1.739	2.451	-0.712
726	56.855	-0.365	12.929	0	-0.96	0	1.739	2.451	-0.712
726.1	56.824	-0.33	12.664	0	-0.95	0	1.739	2.451	-0.712
726.2	56.793	-0.33	13.907	0	-0.96	0	1.739	2.451	-0.712
726.3	56.756	-0.34	15.796	0	-0.95	0	1.739	2.451	-0.712
726.4	56.719	-0.362	16.086	0	-0.96	0	1.739	2.451	-0.712
726.5	56.694	-0.365	16.167	0	-0.97	0	1.739	2.451	-0.712
726.6	56.65	-0.352	15.821	0	-0.95	0	1.739	2.451	-0.712
726.7	56.619	-0.35	15.249	0	-0.96	0	1.739	2.451	-0.712
726.8	56.588	-0.36	15.56	0	-0.95	0	1.739	2.451	-0.712
726.9	56.557	-0.36	16.241	0	-0.96	0	1.738	2.451	-0.712
727	56.526	-0.36	15.885	0	-0.97	0	1.738	2.451	-0.712
727.1	56.495	-0.36	16.22	0	-0.96	0	1.738	2.451	-0.712
727.2	56.464	-0.35	15.754	0	-1.23	0	1.738	2.451	-0.712
727.3	56.439	-0.372	15.923	0	-1.51	0	1.738	2.451	-0.712
727.4	56.408	-0.362	15.528	0	-1.89	0	1.738	2.451	-0.712
727.5	56.383	-0.347	15.447	0	-2.56	0	1.738	2.451	-0.712
727.6	56.352	-0.347	15.214	0	-3.98	0	1.738	2.451	-0.713
727.7	56.321	-0.355	15.471	0	-5.53	0	1.738	2.451	-0.713
727.8	56.284	-0.355	16.005	0	-5.82	0	1.738	2.451	-0.713
727.9	56.24	-0.355	15.708	0	-5.85	0	1.738	2.451	-0.713
728	56.203	-0.36	15.644	0	-4.59	0	1.738	2.451	-0.713
728.1	56.16	-0.36	16.167	0	-3.75	0	1.737	2.451	-0.713
728.2	56.11	-0.36	15.99	0	-3.72	0	1.737	2.451	-0.713
728.3	56.06	-0.448	16.269	0	-3.06	0	1.737	2.451	-0.713
728.4	56.01	-0.47	11.294	0	-3.01	0	1.737	2.451	-0.713

728.5	55.954	-0.47	11.378	0	-2.92	0	1.737	2.451	-0.714
728.6	55.892	-0.485	9.037	0	-2.67	0	1.737	2.451	-0.714
728.7	55.836	-0.488	8.956	0	-2.5	0	1.737	2.451	-0.714
728.8	55.774	-0.508	8.86	0	-2.46	0	1.737	2.451	-0.714
728.9	55.718	-0.513	8.942	0	-2.45	0	1.737	2.451	-0.714
729	55.656	-0.503	8.56	0	-2.42	0	1.737	2.451	-0.714
729.1	55.6	-0.5	7.921	0	-2.33	0	1.737	2.451	-0.714
729.2	55.544	-0.5	7.836	0	-2.34	0	1.737	2.451	-0.714
729.3	55.495	-0.53	7.882	0	-2.38	0	1.737	2.451	-0.714
729.4	55.439	-0.528	8.136	0	-2.41	0	1.736	2.451	-0.714
729.5	55.389	-0.503	8.136	0	-2.39	0	1.736	2.451	-0.714
729.6	55.333	-0.47	7.617	0	-2.41	0	1.736	2.451	-0.714
729.7	55.277	-0.485	7.137	0	2.96	0	1.736	2.451	-0.714
729.8	55.221	-0.495	8.331	0	8.88	0	1.737	2.451	-0.714
729.9	55.178	-0.48	9.196	0	0.55	0	1.737	2.451	-0.714
730	55.128	-0.533	8.32	0	0.53	0	1.737	2.451	-0.714
730.1	55.066	-0.533	8.913	0	0.52	0	1.737	2.451	-0.714
730.2	55.01	-0.615	8.772	0	0	0	1.737	2.451	-0.714
730.3	54.954	-0.523	-0.134	0	0	0	1.737	2.451	-0.714
730.4	54.898	-0.583	-0.667	0	0	0	1.737	2.451	-0.714
730.5	54.836	-0.628	5.315	0	0	0	1.737	2.451	-0.714
730.6	54.78	-0.638	3.736	0	0	0	1.737	2.451	-0.714
730.7	54.724	-0.628	0.745	0	0	0	1.737	2.451	-0.714
730.8	54.668	-0.613	0.23	0	0	0	1.737	2.451	-0.714
730.9	54.612	-0.623	-0.314	0	0	0	1.737	2.451	-0.714
731	54.55	-0.64	-0.127	0	0	0	1.737	2.451	-0.714
731.1	54.494	-0.648	0.699	0	0	0	1.737	2.451	-0.714
731.2	54.445	-0.648	0.067	0	0	0	1.737	2.451	-0.714
731.3	54.389	-0.668	-1.003	0	0	0	1.737	2.451	-0.714
731.4	54.333	-0.66	-2.564	0	0	0	1.737	2.451	-0.714
731.5	54.271	-0.648	-2.564	0	0	0	1.737	2.451	-0.714
731.6	54.215	-0.705	-2.091	0	0	0	1.737	2.451	-0.714
731.7	54.159	-0.71	-1.067	0	0	0	1.737	2.451	-0.714
731.8	54.103	-0.663	-3.196	0	0	0	1.737	2.451	-0.714
731.9	54.047	-0.66	-3.772	0	0	0	1.737	2.451	-0.714
732	53.997	-0.68	-2.186	0	0	0	1.737	2.451	-0.714
732.1	53.941	-0.67	-1.494	0	0	0	1.737	2.451	-0.714
732.2	53.885	-0.67	-1.165	0	0	0	1.737	2.451	-0.714
732.3	53.829	-0.658	-1.66	0	0	0	1.737	2.451	-0.714
732.4	53.767	-0.67	-0.576	0	0	0	1.737	2.451	-0.714
732.5	53.718	-0.67	-0.66	0	0	0	1.737	2.451	-0.714
732.6	53.662	-0.678	-0.66	0	0	0	1.737	2.451	-0.714
732.7	53.612	-0.668	-0.915	0	0	0	1.737	2.451	-0.714
732.8	53.556	-0.653	-0.339	0	0	0	1.737	2.451	-0.714
732.9	53.5	-0.653	-0.936	0	0	0	1.737	2.451	-0.714
733	53.438	-0.67	-0.607	0	0	0	1.737	2.451	-0.714
733.1	53.388	-0.67	-0.159	0	0	0	1.737	2.451	-0.714

733.2	53.332	-0.658	-0.046	0	0	0	1.737	2.451	-0.714
733.3	53.276	-0.63	-0.749	0	0	0	1.737	2.451	-0.714
733.4	53.227	-0.638	-1.119	0	0	0	1.737	2.451	-0.714
733.5	53.171	-0.663	-0.579	0	0	0	1.737	2.451	-0.714
733.6	53.115	-0.665	-0.06	0	0	0	1.737	2.451	-0.714
733.7	53.053	-0.678	-0.222	0	0	0	1.737	2.451	-0.714
733.8	52.997	-0.695	-0.378	0	0	0	1.737	2.451	-0.714
733.9	52.941	-0.675	0.085	0	0	0	1.737	2.451	-0.714
734	52.891	-0.643	-0.321	0	0.87	0	1.737	2.451	-0.714
734.1	52.835	-0.64	-0.992	0	0.85	0	1.737	2.451	-0.714
734.2	52.779	-0.64	-0.738	0	0.87	0	1.737	2.451	-0.714
734.3	52.73	-0.655	0.138	0	0.87	0	1.737	2.451	-0.714
734.4	52.674	-0.66	-0.374	0	0.85	0	1.737	2.451	-0.714
734.5	52.624	-0.673	-0.54	0	0.79	0	1.737	2.451	-0.714
734.6	52.568	-0.678	-0.184	0	0	0	1.737	2.451	-0.714
734.7	52.518	-0.663	0.162	0	0	0	1.737	2.452	-0.714
734.8	52.462	-0.66	-0.569	0	0	0	1.737	2.452	-0.714
734.9	52.413	-0.663	-0.487	0	0	0	1.737	2.452	-0.714
735	52.351	-0.658	-0.039	0	0	0	1.737	2.452	-0.714
735.1	52.307	-0.66	-0.614	0	0	0	1.737	2.452	-0.714
735.2	52.245	-0.66	-0.381	0	0	0	1.737	2.452	-0.714
735.3	52.195	-0.668	-0.516	0	0	0	1.737	2.452	-0.714
735.4	52.145	-0.66	-0.406	0	0	0	1.737	2.452	-0.714
735.5	52.09	-0.655	-0.378	0	0	0	1.737	2.452	-0.714
735.6	52.04	-0.653	-0.448	0	0	0	1.737	2.452	-0.714
735.7	51.99	-0.658	-0.201	0	0	0	1.737	2.452	-0.714
735.8	51.934	-0.66	-0.392	0	0	0	1.737	2.452	-0.714
735.9	51.884	-0.65	-0.025	0	0	0	1.737	2.452	-0.714
736	51.829	-0.658	-0.353	0	0	0	1.737	2.452	-0.714
736.1	51.779	-0.658	-0.48	0	0	0	1.737	2.452	-0.714
736.2	51.729	-0.663	-0.201	0	0	0	1.737	2.452	-0.714
736.3	51.673	-0.655	-0.088	0	0	0	1.737	2.452	-0.714
736.4	51.617	-0.64	-0.622	0	0	0	1.737	2.452	-0.714
736.5	51.568	-0.673	-0.622	0	0	0	1.737	2.452	-0.714
736.6	51.512	-0.68	-0.134	0	0	0	1.737	2.452	-0.714
736.7	51.462	-0.65	0.48	0	0	0	1.737	2.452	-0.714
736.8	51.406	-0.653	-0.992	0	0	0	1.737	2.452	-0.714
736.9	51.356	-0.66	-0.855	0	0	0	1.737	2.452	-0.714
737	51.307	-0.648	0.251	0	0	0	1.737	2.452	-0.714
737.1	51.251	-0.648	-0.653	0	0	0	1.737	2.452	-0.714
737.2	51.201	-0.648	-0.24	0	0	0	1.737	2.452	-0.714
737.3	51.145	-0.673	-0.148	0	0	0	1.737	2.452	-0.714
737.4	51.095	-0.67	0.042	0	-0.9	0	1.737	2.452	-0.714
737.5	51.033	-0.673	0.014	0	-6.02	0	1.737	2.452	-0.715
737.6	50.965	-0.673	-0.314	0	-10.25	0	1.737	2.452	-0.715
737.7	50.89	-0.665	-0.166	0	-13.79	0	1.737	2.452	-0.715
737.8	50.81	-0.663	-0.78	0	-15.42	0	1.736	2.452	-0.716

737.9	50.716	-0.658	-0.166	0	-15.72	0	1.736	2.452	-0.716
738	50.617	-0.663	-0.441	0	-15.98	0	1.735	2.452	-0.717
738.1	50.542	-0.658	-0.081	0	-17.68	0	1.735	2.452	-0.717
738.2	50.449	-0.658	-0.095	0	-19.82	0	1.734	2.452	-0.718
738.3	50.356	-0.663	-0.424	0	-20.15	0	1.734	2.452	-0.718
738.4	50.244	-0.658	-0.166	0	-20.3	0	1.733	2.452	-0.719
738.5	50.157	-0.653	-0.138	0	-20.19	0	1.733	2.452	-0.719
738.6	50.058	-0.668	-0.908	0	-19.51	0	1.732	2.452	-0.72
738.7	49.964	-0.675	-0.194	0	-21.33	0	1.731	2.452	-0.72
738.8	49.865	-0.67	0.191	0	-24.1	0	1.731	2.452	-0.721
738.9	49.753	-0.66	-0.314	0	-24.43	0	1.73	2.452	-0.722
739	49.641	-0.663	-0.618	0	-23.55	0	1.729	2.452	-0.722
739.1	49.523	-0.663	-0.618	0	-21.13	0	1.729	2.452	-0.723
739.2	49.43	-0.67	0.095	0	-19.8	0	1.728	2.452	-0.724
739.3	49.337	-0.68	-0.639	0	-17.79	0	1.728	2.452	-0.724
739.4	49.244	-0.683	-0.558	0	-15.53	0	1.727	2.452	-0.724
739.5	49.15	-0.673	0.039	0	-14.73	0	1.727	2.452	-0.725
739.6	49.063	-0.66	-0.459	0	-14.86	0	1.727	2.452	-0.725
739.7	48.976	-0.655	-0.487	0	-14.9	0	1.726	2.452	-0.726
739.8	48.889	-0.673	-0.572	0	-14.53	0	1.726	2.452	-0.726
739.9	48.802	-0.705	0.095	0	-14.22	0	1.725	2.452	-0.726
740	48.722	-0.688	0.6	0	-11.68	0	1.725	2.452	-0.727
740.1	48.641	-0.655	0.095	0	-11.28	0	1.725	2.452	-0.727
740.2	48.56	-0.655	-1.413	0	-11.52	0	1.724	2.452	-0.727
740.3	48.486	-0.678	-0.057	0	-14.21	0	1.724	2.452	-0.728
740.4	48.405	-0.66	-0.812	0	-16.78	0	1.723	2.452	-0.728
740.5	48.318	-0.668	-0.812	0	-18.21	0	1.723	2.452	-0.729
740.6	48.218	-0.668	-0.219	0	-18.51	0	1.722	2.452	-0.729
740.7	48.125	-0.668	0.272	0	-18.44	0	1.722	2.452	-0.73
740.8	48.032	-0.663	-0.544	0	-18.38	0	1.721	2.452	-0.73
740.9	47.939	-0.66	-0.261	0	-18.27	0	1.721	2.452	-0.731
741	47.839	-0.66	-0.385	0	-17.16	0	1.72	2.452	-0.731
741.1	47.74	-0.653	-0.092	0	-16.63	0	1.72	2.452	-0.732
741.2	47.659	-0.653	-0.318	0	-16.3	0	1.72	2.452	-0.732
741.3	47.572	-0.685	-0.071	0	-16.27	0	1.719	2.452	-0.733
741.4	47.485	-0.713	0.297	0	-16.51	0	1.719	2.452	-0.733
741.5	47.398	-0.693	0.215	0	-18.43	0	1.718	2.452	-0.734
741.6	47.305	-0.67	-0.346	0	-20.84	0	1.718	2.452	-0.734
741.7	47.212	-0.673	-1.017	0	-21.6	0	1.717	2.452	-0.735
741.8	47.106	-0.68	-0.36	0	-21.53	0	1.716	2.452	-0.735
741.9	46.994	-0.678	-0.032	0	-21.51	0	1.716	2.452	-0.736
742	46.907	-0.66	-0.689	0	-21.51	0	1.715	2.452	-0.737
742.1	46.808	-0.66	-0.434	0	-21.75	0	1.715	2.452	-0.737
742.2	46.702	-0.658	-0.833	0	-22.34	0	1.714	2.452	-0.738
742.3	46.597	-0.675	-0.307	0	-23.58	0	1.713	2.452	-0.738
742.4	46.491	-0.675	0.297	0	-24.59	0	1.713	2.452	-0.739
742.5	46.379	-0.685	-0.265	0	-25	0	1.712	2.452	-0.74

742.6	46.274	-0.69	-0.547	0	-24.93	0	1.711	2.452	-0.741
742.7	46.162	-0.678	-0.102	0	-24.91	0	1.711	2.452	-0.741
742.8	46.05	-0.668	-0.576	0	-25.58	0	1.71	2.452	-0.742
742.9	45.944	-0.655	-0.703	0	-29.02	0	1.709	2.452	-0.743
743	45.826	-0.66	-0.576	0	-31.36	0	1.708	2.452	-0.744
743.1	45.702	-0.678	-0.463	0	-31.61	0	1.707	2.452	-0.745
743.2	45.578	-0.678	0	0	-32.55	0	1.706	2.452	-0.745
743.3	45.453	-0.705	-0.293	0	-35.05	0	1.705	2.452	-0.746
743.4	45.323	-0.685	-0.162	0	-36.79	0	1.704	2.452	-0.747
743.5	45.186	-0.66	-0.332	0	-36.9	0	1.703	2.452	-0.748
743.6	45.043	-0.658	-1.398	0	-36.76	0	1.702	2.452	-0.749
743.7	44.9	-0.665	-0.491	0	-37.89	0	1.701	2.452	-0.751
743.8	44.764	-0.673	-0.166	0	-40.37	0	1.7	2.452	-0.752
743.9	44.614	-0.663	-0.293	0	-45.2	0	1.699	2.452	-0.753
744	44.465	-0.643	-0.307	0	-51.72	0	1.697	2.452	-0.754
744.1	44.291	-0.64	-0.706	0	-57.21	0	1.696	2.452	-0.756
744.2	44.099	-0.64	-0.749	0	-60.95	0	1.694	2.452	-0.758
744.3	43.906	-0.68	-0.406	0	-65.75	0	1.692	2.452	-0.759
744.4	43.689	-0.68	-0.064	0	-69.56	0	1.69	2.452	-0.761
744.5	43.465	-0.673	-0.088	0	-72.18	0	1.688	2.452	-0.763
744.6	43.229	-0.665	-0.837	0	-73.23	0	1.686	2.452	-0.765
744.7	42.98	-0.663	-0.607	0	-72.63	0	1.684	2.452	-0.767
744.8	42.725	-0.675	-0.692	0	-71.91	0	1.682	2.452	-0.769
744.9	42.465	-0.668	0.177	0	-71.29	0	1.68	2.452	-0.771
745	42.185	-0.66	0.007	0	-70.63	0	1.678	2.452	-0.773
745.1	41.905	-0.66	-0.72	0	-69.97	0	1.676	2.452	-0.775
745.2	41.632	-0.663	-0.353	0	-69.49	0	1.675	2.452	-0.777
745.3	41.352	-0.658	-0.367	0	-66.23	0	1.673	2.452	-0.779
745.4	41.066	-0.67	-0.452	0	-59.29	0	1.671	2.452	-0.781
745.5	40.762	-0.688	-0.593	0	-55.45	0	1.67	2.452	-0.782
745.6	40.414	-0.673	0.205	0	-62.44	0	1.668	2.452	-0.784
745.7	40.047	-0.665	-0.735	0	-63.92	0	1.666	2.452	-0.786
745.8	39.687	-0.668	-0.893	0	-65.88	0	1.664	2.452	-0.788
745.9	39.32	-0.668	-0.569	0	-71.8	0	1.662	2.452	-0.79
746	38.948	-0.673	-0.526	0	-76.25	0	1.66	2.452	-0.792
746.1	38.575	-0.67	-0.466	0	-77.37	0	1.658	2.452	-0.794
746.2	38.196	-0.67	-0.152	0	-76.65	0	1.656	2.452	-0.796
746.3	37.823	-0.668	-0.17	0	-75.7	0	1.654	2.452	-0.798
746.4	37.45	-0.683	-0.339	0	-78.07	0	1.651	2.452	-0.8
746.5	37.059	-0.675	-0.367	0	-80.29	0	1.649	2.452	-0.803
746.6	36.692	-0.658	-0.113	0	-68.22	0	1.647	2.452	-0.804
746.7	36.332	-0.66	-1.194	0	-63.56	0	1.646	2.452	-0.806
746.8	35.984	-0.665	-0.735	0	-69.2	0	1.644	2.452	-0.808
746.9	35.673	-0.665	-0.184	0	-70.12	0	1.642	2.452	-0.81
747	35.393	-0.668	-0.738	0	-70.42	0	1.64	2.452	-0.812
747.1	35.12	-0.67	-0.438	0	-62.93	0	1.638	2.452	-0.814
747.2	34.846	-0.67	-0.498	0	-59.49	0	1.636	2.452	-0.815

747.3	34.598	-0.67	-0.41	0	-59.77	0	1.635	2.452	-0.817
747.4	34.362	-0.69	0.035	0	-63.34	0	1.633	2.452	-0.819
747.5	34.126	-0.69	0.035	0	-70.79	0	1.631	2.452	-0.821
747.6	33.871	-0.678	-0.095	0	-74.23	0	1.629	2.452	-0.823
747.7	33.585	-0.673	-0.865	0	-74.09	0	1.627	2.452	-0.825
747.8	33.293	-0.683	-0.456	0	-73.47	0	1.625	2.452	-0.827
747.9	33.001	-0.675	-0.512	0	-72.6	0	1.623	2.452	-0.829
748	32.703	-0.673	-0.212	0	-72.07	0	1.621	2.452	-0.831
748.1	32.405	-0.673	-0.54	0	-72.3	0	1.619	2.452	-0.833
748.2	32.106	-0.695	-0.127	0	-72.09	0	1.617	2.452	-0.835
748.3	31.802	-0.68	0.526	0	-71.38	0	1.615	2.452	-0.837
748.4	31.497	-0.663	-1.377	0	-70.53	0	1.613	2.452	-0.839
748.5	31.199	-0.665	-1.293	0	-69.69	0	1.611	2.452	-0.841
748.6	30.895	-0.668	-0.456	0	-68.63	0	1.609	2.452	-0.843
748.7	30.584	-0.66	-0.498	0	-62.69	0	1.607	2.452	-0.844
748.8	30.286	-0.665	-0.498	0	-56.18	0	1.606	2.452	-0.846
748.9	29.963	-0.665	-0.583	0	-51.24	0	1.604	2.452	-0.847
749	29.646	-0.67	-0.311	0	-45.71	0	1.603	2.452	-0.849
749.1	29.329	-0.67	-0.47	0	-37.7	0	1.602	2.452	-0.85
749.2	29.024	-0.67	-0.18	0	-43.35	0	1.601	2.452	-0.851
749.3	28.738	-0.683	-0.293	0	-50.46	0	1.599	2.452	-0.852
749.4	28.477	-0.685	-0.049	0	-51.75	0	1.598	2.452	-0.854
749.5	28.229	-0.673	-0.049	0	-52.64	0	1.596	2.452	-0.855
749.6	27.98	-0.67	-0.456	0	-56.12	0	1.595	2.452	-0.857
749.7	27.726	-0.683	-0.911	0	-61.68	0	1.593	2.452	-0.859
749.8	27.458	-0.698	-0.456	0	-64.26	0	1.591	2.452	-0.86
749.9	27.16	-0.683	0.307	0	-63.94	0	1.59	2.452	-0.862
750	26.862	-0.678	-0.396	0	-63.05	0	1.588	2.452	-0.864
750.1	26.526	-0.683	-1.077	0	-62.14	0	1.586	2.452	-0.866
750.2	26.253	-0.683	-0.102	0	-60.28	0	1.584	2.452	-0.867
750.3	25.955	-0.69	-0.353	0	-58.57	0	1.583	2.452	-0.869
750.4	25.663	-0.693	-0.706	0	-55.26	0	1.581	2.452	-0.87
750.5	25.371	-0.68	-0.678	0	-54.07	0	1.58	2.452	-0.872
750.6	25.091	-0.675	-0.692	0	-52.33	0	1.578	2.452	-0.873
750.7	24.811	-0.685	-0.731	0	-49.22	0	1.577	2.452	-0.875
750.8	24.544	-0.68	-0.424	0	-44.84	0	1.576	2.452	-0.876
750.9	24.283	-0.663	-0.102	0	-37.58	0	1.575	2.452	-0.877
751	24.053	-0.65	-0.925	0	-34.22	0	1.574	2.452	-0.878
751.1	23.848	-0.65	-0.685	0	-33.79	0	1.573	2.452	-0.879
751.2	23.656	-0.638	-0.752	0	-36.57	0	1.572	2.452	-0.88
751.3	23.463	-0.683	-0.265	0	-42.32	0	1.571	2.452	-0.881
751.4	23.245	-0.683	-0.117	0	-43.36	0	1.569	2.452	-0.882
751.5	23.003	-0.678	-0.113	0	-42.89	0	1.568	2.452	-0.884
751.6	22.761	-0.67	-0.883	0	-42.33	0	1.567	2.452	-0.885
751.7	22.518	-0.685	-0.569	0	-41.81	0	1.566	2.452	-0.886
751.8	22.276	-0.693	-0.756	0	-41.26	0	1.565	2.452	-0.887
751.9	22.034	-0.68	0.184	0	-40.8	0	1.564	2.452	-0.888

752	21.791	-0.663	-0.611	0	-40.24	0	1.563	2.452	-0.889
752.1	21.555	-0.655	-0.494	0	-39.71	0	1.561	2.452	-0.89
752.2	21.307	-0.655	-0.939	0	-36.33	0	1.56	2.452	-0.891
752.3	21.064	-0.685	-0.141	0	-31.38	0	1.56	2.452	-0.892
752.4	20.847	-0.668	-0.3	0	-30.53	0	1.559	2.452	-0.893
752.5	20.648	-0.663	-0.3	0	-30.43	0	1.558	2.452	-0.894
752.6	20.443	-0.683	-0.982	0	-33.7	0	1.557	2.452	-0.895
752.7	20.238	-0.695	-0.035	0	-38.51	0	1.556	2.452	-0.896
752.8	20.002	-0.69	0.078	0	-40.96	0	1.555	2.452	-0.897
752.9	19.747	-0.67	-0.427	0	-40.98	0	1.554	2.452	-0.898
753	19.48	-0.658	-0.692	0	-40.36	0	1.552	2.452	-0.899
753.1	19.207	-0.68	-1.006	0	-40.04	0	1.551	2.452	-0.9
753.2	18.927	-0.68	0.102	0	-39.2	0	1.55	2.452	-0.902
753.3	18.654	-0.67	0.374	0	-38.2	0	1.549	2.452	-0.903
753.4	18.368	-0.673	-1.006	0	-36.36	0	1.548	2.452	-0.904
753.5	18.101	-0.685	-1.006	0	-35.55	0	1.547	2.452	-0.905
753.6	17.84	-0.683	0.173	0	-34.84	0	1.546	2.452	-0.906
753.7	17.572	-0.668	-0.325	0	-33.16	0	1.545	2.452	-0.907
753.8	17.311	-0.675	-1.021	0	-28.56	0	1.544	2.452	-0.907
753.9	17.063	-0.69	-0.526	0	-24.83	0	1.544	2.452	-0.908
754	16.839	-0.693	-0.102	0	-20.01	0	1.543	2.452	-0.909
754.1	16.615	-0.693	-0.244	0	-17.38	0	1.543	2.452	-0.909
754.2	16.441	-0.663	-0.727	0	-15.35	0	1.542	2.452	-0.909
754.3	16.243	-0.68	-0.473	0	-13.89	0	1.542	2.452	-0.91
754.4	16.044	-0.688	-0.427	0	-7.63	0	1.542	2.452	-0.91
754.5	15.851	-0.685	-0.131	0	1.41	0	1.542	2.452	-0.91
754.6	15.659	-0.68	-0.569	0	-13.59	0	1.541	2.452	-0.91
754.7	15.46	-0.67	-0.374	0	-17.12	0	1.541	2.452	-0.911
754.8	15.255	-0.658	-0.784	0	-20.49	0	1.54	2.452	-0.911
754.9	15.037	-0.67	-0.667	0	-24.94	0	1.54	2.452	-0.912
755	14.801	-0.675	-0.657	0	-25.74	0	1.539	2.452	-0.913
755.1	14.553	-0.683	-0.283	0	-24.82	0	1.538	2.452	-0.914
755.2	14.31	-0.683	-0.441	0	-24.26	0	1.538	2.452	-0.914
755.3	14.08	-0.668	-0.268	0	-23.71	0	1.537	2.452	-0.915
755.4	13.85	-0.675	-0.611	0	-23.8	0	1.536	2.452	-0.916
755.5	13.614	-0.7	-0.692	0	-25.41	0	1.536	2.452	-0.916
755.6	13.372	-0.703	-0.23	0	-26.02	0	1.535	2.452	-0.917
755.7	13.105	-0.693	-0.385	0	-25.67	0	1.534	2.452	-0.918
755.8	12.831	-0.708	-0.742	0	-24.77	0	1.533	2.452	-0.918
755.9	12.57	-0.723	-0.258	0	-24.14	0	1.533	2.452	-0.919
756	12.309	-0.71	0.403	0	-23.42	0	1.532	2.452	-0.92
756.1	12.048	-0.673	-0.445	0	-22.81	0	1.531	2.452	-0.92
756.2	11.756	-0.673	-1.155	0	-22.23	0	1.531	2.452	-0.921
756.3	11.52	-0.67	-1.324	0	-21.58	0	1.53	2.452	-0.922
756.4	11.259	-0.683	-0.042	0	-20.79	0	1.53	2.452	-0.922
756.5	10.992	-0.678	0.042	0	-19.58	0	1.529	2.452	-0.923
756.6	10.737	-0.665	-0.3	0	-18.91	0	1.529	2.452	-0.923

756.7	10.495	-0.675	-0.872	0	-18.19	0	1.528	2.452	-0.924
756.8	10.24	-0.695	-0.272	0	-17.63	0	1.528	2.452	-0.924
756.9	9.985	-0.7	-0.088	0	-17.04	0	1.527	2.452	-0.925
757	9.743	-0.678	-0.258	0	-16.49	0	1.527	2.452	-0.925
757.1	9.495	-0.678	-0.742	0	-16	0	1.526	2.452	-0.926
757.2	9.246	-0.663	-0.897	0	-15.47	0	1.526	2.452	-0.926
757.3	8.997	-0.683	-0.583	0	-14.99	0	1.525	2.452	-0.926
757.4	8.749	-0.688	-0.53	0	-14.46	0	1.525	2.452	-0.927
757.5	8.5	-0.683	-0.445	0	-13.91	0	1.525	2.452	-0.927
757.6	8.252	-0.67	-0.431	0	-12.9	0	1.524	2.452	-0.928
757.7	7.997	-0.675	-1.13	0	-11.7	0	1.524	2.452	-0.928
757.8	7.742	-0.683	-0.643	0	-10.53	0	1.524	2.452	-0.928
757.9	7.481	-0.683	-0.088	0	-9.31	0	1.523	2.452	-0.928
758	7.22	-0.69	-0.53	0	-8.19	0	1.523	2.452	-0.929
758.1	6.947	-0.695	-0.727	0	-7.05	0	1.523	2.452	-0.929
758.2	6.667	-0.695	-0.24	0	-6.02	0	1.523	2.452	-0.929
758.3	6.381	-0.683	-0.583	0	-4.8	0	1.523	2.452	-0.929
758.4	6.108	-0.685	-0.417	0	-3.83	0	1.523	2.452	-0.929
758.5	5.847	-0.673	-0.501	0	-3.11	0	1.522	2.452	-0.929
758.6	5.524	-0.665	-0.501	0	-2.44	0	1.522	2.452	-0.929
758.7	5.325	-0.678	-0.826	0	-1.88	0	1.522	2.452	-0.93
758.8	5.101	-0.675	-0.501	0	-1.35	0	1.522	2.452	-0.93
758.9	4.878	-0.66	-0.286	0	-0.92	0	1.522	2.452	-0.93
759	4.648	-0.66	-0.727	0	-0.51	0	1.522	2.452	-0.93
759.1	4.43	-0.683	-0.713	0	0	0	1.522	2.452	-0.93
759.2	4.213	-0.683	-0.173	0	0	0	1.522	2.452	-0.93
759.3	3.995	-0.698	-0.145	0	0	0	1.522	2.452	-0.93
759.4	3.79	-0.693	-0.187	0	0.68	0	1.522	2.452	-0.93
759.5	3.598	-0.68	-0.102	0	0.75	0	1.522	2.452	-0.93
759.6	3.411	-0.693	-0.996	0	0.81	0	1.522	2.452	-0.93
759.7	3.237	-0.685	-0.371	0	0.82	0	1.522	2.452	-0.93
759.8	3.063	-0.685	-0.049	0	0.84	0	1.522	2.452	-0.93
759.9	2.883	-0.673	-0.717	0	0.86	0	1.522	2.452	-0.93
760	2.709	-0.67	-0.597	0	0.87	0	1.522	2.452	-0.93
760.1	2.529	-0.67	-0.727	0	0.88	0	1.522	2.452	-0.93
760.2	2.38	-0.683	-0.459	0	0.88	0	1.522	2.452	-0.93
760.3	2.243	-0.698	-0.583	0	0.83	0	1.522	2.452	-0.93
760.4	2.1	-0.693	-0.088	0	0.8	0	1.523	2.452	-0.93
760.5	1.951	-0.68	-0.417	0	0.83	0	1.523	2.452	-0.93
760.6	1.79	-0.685	-1.155	0	0.94	0	1.523	2.452	-0.93
760.7	1.634	-0.688	-0.392	0	1.05	0	1.523	2.452	-0.93
760.8	1.479	-0.68	-0.343	0	1.13	0	1.523	2.452	-0.93
760.9	1.336	-0.66	-0.742	0	1.19	0	1.523	2.452	-0.93
761	1.205	-0.638	-0.812	0	1.24	0	1.523	2.452	-0.93
761.1	1.075	-0.663	-0.929	0	1.27	0	1.523	2.452	-0.93
761.2	0.957	-0.663	-0.258	0	1.45	0	1.523	2.452	-0.93
761.3	0.864	-0.688	0.102	0	2.12	0	1.523	2.452	-0.93

761.4	0.814	-0.683	-0.558	0	2.69	0	1.523	2.452	-0.93
761.5	0.789	-0.673	-0.643	0	1.79	0	1.523	2.453	-0.93
761.6	0.777	-0.69	-0.788	0	1.97	0	1.523	2.453	-0.93
761.7	0.764	-0.703	-0.558	0	1.78	0	1.523	2.453	-0.93
761.8	0.733	-0.683	0.403	0	1.69	0	1.523	2.453	-0.93
761.9	0.671	-0.673	-0.742	0	1.6	0	1.523	2.453	-0.93
762	0.578	-0.675	-0.985	0	1.64	0	1.523	2.453	-0.93
762.1	0.354	-0.67	-0.371	0	1.58	0	1.523	2.453	-0.93
762.2	0.23	-0.67	-0.826	0	1.57	0	1.523	2.453	-0.93
762.3	0.155	-0.69	-0.667	0	1.53	0	1.523	2.453	-0.93
762.4	0	-0.693	-0.064	0	1.51	0	1.523	2.453	-0.93
762.5	0	-0.688	-0.088	0	1.44	0	1.523	2.453	-0.93
762.6	-0.081	-0.7	-0.968	0	1.45	0	1.523	2.453	-0.93
762.7	-0.087	-0.7	-0.544	0	1.54	0	1.523	2.453	-0.93
762.8	0	-0.69	-0.314	0	1.71	0	1.524	2.453	-0.93
762.9	0	-0.683	-0.798	0	1.89	0	1.524	2.453	-0.93
763	0	-0.688	-0.798	0	2.04	0	1.524	2.453	-0.93
763.1	0	-0.688	-0.233	0	2.19	0	1.524	2.453	-0.93
763.2	0	-0.683	-0.788	0	1.69	0	1.524	2.453	-0.93
763.3	0	-0.69	-0.558	0	1.53	0	1.524	2.453	-0.93
763.4	0	-0.693	-0.516	0	1.55	0	1.524	2.453	-0.93
763.5	0	-0.69	-0.459	0	1.53	0	1.524	2.453	-0.93
763.6	0	-0.67	-0.554	0	1.53	0	1.524	2.454	-0.93
763.7	0	-0.66	-0.667	0	1.54	0	1.524	2.454	-0.93
763.8	0	-0.69	-1.504	0	1.55	0	1.524	2.454	-0.93
763.9	0	-0.705	-0.131	0	1.54	0	1.524	2.454	-0.93
764	0	-0.688	0.067	0	1.55	0	1.524	2.454	-0.93
764.1	0	-0.678	-0.798	0	1.55	0	1.524	2.454	-0.93
764.2	0	-0.678	-1.127	0	1.55	0	1.524	2.454	-0.93
764.3	0	-0.69	-0.713	0	1.55	0	1.524	2.454	-0.93
764.4	0	-0.678	-0.763	0	1.55	0	1.524	2.454	-0.93
764.5	0	-0.683	-0.763	0	1.56	0	1.524	2.454	-0.93
764.6	0	-0.685	-0.773	0	1.56	0	1.524	2.454	-0.93
764.7	0	-0.695	-0.173	0	1.57	0	1.524	2.454	-0.93
764.8	0	-0.708	-0.611	0	1.56	0	1.524	2.454	-0.93
764.9	0	-0.71	-0.314	0	1.58	0	1.524	2.454	-0.93
765	0	-0.703	-0.473	0	1.58	0	1.525	2.454	-0.93
765.05	0	-0.69	-0.558	0	1.41	0	1.525	2.454	-0.93
765.05	0	-0.69	-0.971	0	1.47	0	1.525	2.454	-0.93
765.05	0	-0.668	-0.717	0	1.53	0	1.525	2.454	-0.93
765.05	0	-0.67	-0.802	0	1.83	0	1.525	2.454	-0.93
765.05	0	-0.66	-0.59	0	1.56	0	1.525	2.454	-0.93

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TraceTime	DynoSpeed	TpBkPress	ExhaustFlo	HPM_Urm	HPM_Idc1	HPM_P1	HPM_IH1	HPM_IH1p	HPM_IH1n
FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT	FLOAT
s	mi/hr	inH2O	scfm	V	A	kW	Ah	Ah	Ah
0	0	-0.665	0.244	0	0	0	0	0	0
0	0	-0.665	0.244	0	1.74	0	0	0	0
0	0	-0.665	0.244	0	1.74	0	0	0	0
0	0	-0.675	0.311	0	1.76	0	0	0	0
0.1	0	-0.675	0.809	0	1.54	0	0	0	0
0.2	0	-0.668	-0.466	0	1.55	0	0	0	0
0.3	0	-0.698	-0.477	0	1.56	0	0	0	0
0.4	0	-0.685	1.123	0	1.58	0	0	0	0
0.5	0	-0.673	-0.102	0	1.64	0	0	0	0
0.6	0	-0.675	-1.038	0	1.64	0	0	0	0
0.7	0	-0.683	-1.084	0	1.64	0	0	0	0
0.8	0	-0.695	-0.367	0	1.64	0	0	0	0
0.9	0	-0.695	-0.826	0	1.62	0	0	0	0
1	0	-0.648	-0.657	0	1.56	0	0	0	0
1.1	0	-0.648	-1.37	0	1.55	0	0.001	0.001	0
1.2	0	-0.678	-1.194	0	1.5	0	0.001	0.001	0
1.3	0	-0.68	0.007	0	1.53	0	0.001	0.001	0
1.4	0	-0.688	-0.088	0	1.72	0	0.001	0.001	0
1.5	0	-0.708	-1.031	0	2.08	0	0.001	0.001	0
1.6	0	-0.695	-0.378	0	1.84	0	0.001	0.001	0
1.7	0	-0.68	-0.36	0	1.91	0	0.001	0.001	0
1.8	0	-0.673	-1.028	0	2	0	0.001	0.001	0
1.9	0	-0.668	-0.699	0	2.14	0	0.001	0.001	0
2	0	-0.67	-1.427	0	2.26	0	0.001	0.001	0
2.1	0	-0.68	-0.897	0	2.57	0	0.001	0.001	0
2.2	0	-0.673	-0.671	0	3.35	0	0.001	0.001	0
2.3	0	-0.665	-0.777	0	4.91	0	0.001	0.001	0
2.4	0.118	-0.68	-1.155	0	6.87	0	0.001	0.001	0
2.5	0.224	-0.705	-0.78	0	8.64	0	0.002	0.002	0
2.6	0.348	-0.69	-0.134	0	9.8	0	0.002	0.002	0
2.7	0.565	-0.655	-0.727	0	10.42	0	0.002	0.002	0
2.8	0.565	-0.663	-1.843	0	10.58	0	0.003	0.003	0
2.9	1.118	-0.663	-1.321	0	10.49	0	0.003	0.003	0
3	1.398	-0.675	0.162	0	11.21	0	0.003	0.003	0
3.1	1.671	-0.683	-0.696	0	12.15	0	0.004	0.004	0
3.2	1.671	-0.698	-0.78	0	13.69	0	0.004	0.004	0
3.3	2.218	-0.685	-0.293	0	15.19	0	0.004	0.004	0
3.4	2.498	-0.693	-0.696	0	17.23	0	0.005	0.005	0
3.5	2.79	-0.698	-1.247	0	19.47	0	0.005	0.005	0
3.6	3.101	-0.698	-0.498	0	21.14	0	0.006	0.006	0
3.7	3.43	-0.693	-0.696	0	22.34	0	0.007	0.007	0
3.8	3.753	-0.688	-0.918	0	23.65	0	0.007	0.007	0
3.9	4.07	-0.688	-0.95	0	25.06	0	0.008	0.008	0
4	4.387	-0.703	-0.696	0	26.7	0	0.009	0.009	0

4.1	4.729	-0.69	-0.385	0	29.1	0	0.009	0.009	0
4.2	5.07	-0.678	-1.187	0	44.16	0	0.011	0.011	0
4.3	5.456	-0.68	-0.692	0	60.21	0	0.012	0.012	0
4.4	5.891	-0.695	-1.19	0	64.65	0	0.014	0.014	0
4.5	6.363	-0.69	-0.385	0	80.7	0	0.016	0.016	0
4.6	6.841	-0.685	-0.537	0	107.34	0	0.019	0.019	0
4.7	7.32	-0.688	-1.19	0	110.81	0	0.022	0.022	0
4.8	7.786	-0.648	-0.24	0	109.03	0	0.025	0.025	0
4.9	8.239	-0.56	-0.795	0	72.54	0	0.028	0.028	0
5	8.637	-0.23	0.625	0	43.61	0	0.029	0.029	0
5.1	8.637	-0.08	3.832	0	37.26	0	0.03	0.03	0
5.2	9.358	-0.207	16.683	0	40.32	0	0.031	0.031	0
5.3	9.637	-0.415	31.847	0	40.98	0	0.032	0.032	0
5.4	9.88	-0.623	26.843	0	31.6	0	0.033	0.033	0
5.5	10.11	-0.538	20.645	0	19.38	0	0.033	0.033	0
5.6	10.346	-0.388	5.781	0	17.57	0	0.034	0.034	0
5.7	10.607	-0.242	4.199	0	-10.21	0	0.034	0.034	0
5.8	10.88	-0.037	12.533	0	0	0	0.034	0.034	0
5.9	11.154	-0.037	20.013	0	10.53	0	0.034	0.034	0
6	11.408	0.003	30.66	0	18.73	0	0.034	0.035	0
6.1	11.657	-0.067	40.149	0	24.43	0	0.035	0.036	0
6.2	11.874	-0.07	40.156	0	26.71	0	0.036	0.036	0
6.3	12.104	-0.08	35.456	0	29.22	0	0.037	0.037	0
6.4	12.365	-0.1	33.492	0	31.59	0	0.038	0.038	0
6.5	12.645	-0.07	33.531	0	33.86	0	0.038	0.039	0
6.6	12.937	-0.03	31.819	0	35.56	0	0.039	0.04	0
6.7	13.229	-0.025	31.232	0	37.66	0	0.041	0.041	0
6.8	13.509	-0.052	33.535	0	36.88	0	0.042	0.042	0
6.9	13.782	-0.052	34.421	0	36.06	0	0.043	0.043	0
7	14.049	-0.057	34.054	0	37.99	0	0.044	0.044	0
7.1	14.316	-0.045	32.663	0	41.99	0	0.045	0.045	0
7.2	14.602	-0.052	32.687	0	47.8	0	0.046	0.047	0
7.3	14.9	-0.047	33.492	0	52.73	0	0.048	0.048	0
7.4	15.211	-0.035	34.093	0	53.68	0	0.049	0.049	0
7.5	15.522	-0.045	33.93	0	54.26	0	0.051	0.051	0
7.6	15.833	-0.055	34.361	0	54.67	0	0.052	0.053	0
7.7	16.125	-0.072	33.676	0	54.67	0	0.054	0.054	0
7.8	16.417	-0.095	33.295	0	54.56	0	0.055	0.056	0
7.9	16.734	-0.13	32.539	0	54.23	0	0.057	0.057	0
8	17.019	-0.145	31.995	0	53.11	0	0.058	0.059	0
8.1	17.305	-0.125	31.112	0	52.92	0	0.06	0.06	0
8.2	17.591	-0.127	29.869	0	52.17	0	0.061	0.061	0
8.3	17.858	-0.14	29.844	0	48.19	0	0.062	0.063	0
8.4	18.107	-0.16	29.011	0	47.62	0	0.064	0.064	0
8.5	18.355	-0.177	28.647	0	48.1	0	0.065	0.065	0
8.6	18.604	-0.212	27.937	0	48.4	0	0.066	0.067	0
8.7	18.859	-0.215	27.21	0	48.49	0	0.068	0.068	0

8.8	19.095	-0.207	27.033	0	49.55	0	0.069	0.07	0
8.9	19.325	-0.207	25.451	0	54.49	0	0.071	0.071	0
9	19.561	-0.22	25.056	0	60.81	0	0.072	0.073	0
9.1	19.784	-0.21	24.551	0	67.17	0	0.074	0.075	0
9.2	20.008	-0.2	24.523	0	74	0	0.076	0.077	0
9.3	20.25	-0.207	24.159	0	63.32	0	0.078	0.078	0
9.4	20.505	-0.177	25.356	0	8.25	0	0.078	0.079	-0.001
9.5	20.754	-0.112	25.596	0	30.4	0	0.079	0.08	-0.001
9.6	21.021	-0.065	26.211	0	48.82	0	0.08	0.081	-0.001
9.7	21.307	-0.14	28.725	0	63.73	0	0.082	0.083	-0.001
9.8	21.307	-0.21	31.9	0	75.39	0	0.084	0.085	-0.001
9.9	21.916	-0.21	30.759	0	81.72	0	0.087	0.087	-0.001
10	22.22	-0.177	26.08	0	82.06	0	0.089	0.089	-0.001
10.1	22.518	-0.197	24.703	0	81.35	0	0.091	0.092	-0.001
10.2	22.811	-0.225	25.342	0	78.47	0	0.093	0.094	-0.001
10.3	23.084	-0.215	25.896	0	73.54	0	0.095	0.096	-0.001
10.4	23.32	-0.202	24.809	0	65.68	0	0.097	0.098	-0.001
10.5	23.513	-0.197	24.632	0	63.82	0	0.099	0.099	-0.001
10.6	23.693	-0.22	25.095	0	58.96	0	0.101	0.101	-0.001
10.7	23.873	-0.285	25.356	0	53.63	0	0.102	0.103	-0.001
10.8	24.047	-0.32	25.133	0	52.44	0	0.103	0.104	-0.001
10.9	24.233	-0.277	22.774	0	52.81	0	0.105	0.105	-0.001
11	24.432	-0.187	19.727	0	52.56	0	0.106	0.107	-0.001
11.1	24.619	-0.137	19.254	0	52.11	0	0.108	0.108	-0.001
11.2	24.811	-0.165	23.064	0	52.31	0	0.109	0.11	-0.001
11.3	24.998	-0.18	27.602	0	56.31	0	0.111	0.111	-0.001
11.4	25.19	-0.182	28.365	0	62.7	0	0.113	0.113	-0.001
11.5	25.364	-0.17	27.284	0	69.4	0	0.115	0.115	-0.001
11.6	25.557	-0.145	27.076	0	62.93	0	0.116	0.117	-0.001
11.7	25.731	-0.147	26.747	0	29.61	0	0.117	0.118	-0.001
11.8	25.911	-0.132	27.284	0	40.92	0	0.118	0.119	-0.001
11.9	26.073	-0.132	27.99	0	43.59	0	0.119	0.12	-0.001
12	26.216	-0.257	28.266	0	43.27	0	0.121	0.121	-0.001
12.1	26.346	-0.317	29.597	0	44.22	0	0.122	0.122	-0.001
12.2	26.489	-0.302	25.07	0	44.42	0	0.123	0.124	-0.001
12.3	26.632	-0.275	20.211	0	45.16	0	0.124	0.125	-0.001
12.4	26.775	-0.255	19.582	0	47.09	0	0.126	0.126	-0.001
12.5	26.912	-0.252	20.656	0	47.23	0	0.127	0.127	-0.001
12.6	27.061	-0.257	21.969	0	46.9	0	0.128	0.129	-0.001
12.7	27.21	-0.25	22.146	0	46.52	0	0.13	0.13	-0.001
12.8	27.347	-0.235	22.495	0	44.65	0	0.131	0.131	-0.001
12.9	27.477	-0.235	21.983	0	42.78	0	0.132	0.133	-0.001
13	27.601	-0.245	22.672	0	38.9	0	0.133	0.134	-0.001
13.1	27.719	-0.242	22.82	0	35.65	0	0.134	0.135	-0.001
13.2	27.813	-0.237	22.806	0	30.96	0	0.135	0.135	-0.001
13.3	27.893	-0.23	23.036	0	26.17	0	0.136	0.136	-0.001
13.4	27.968	-0.235	22.425	0	24.02	0	0.136	0.137	-0.001

13.5	28.036	-0.252	22.937	0	22.65	0	0.137	0.137	-0.001
13.6	28.098	-0.257	23.463	0	22.51	0	0.138	0.138	-0.001
13.7	28.167	-0.245	23.357	0	23.03	0	0.138	0.139	-0.001
13.8	28.235	-0.227	22.291	0	23.61	0	0.139	0.139	-0.001
13.9	28.31	-0.225	22.704	0	23.97	0	0.14	0.14	-0.001
14	28.384	-0.22	22.979	0	23.94	0	0.14	0.141	-0.001
14.1	28.459	-0.225	23.354	0	25.14	0	0.141	0.141	-0.001
14.2	28.54	-0.225	23.753	0	26.54	0	0.142	0.142	-0.001
14.3	28.614	-0.222	23.573	0	28.94	0	0.142	0.143	-0.001
14.4	28.707	-0.232	23.318	0	32.35	0	0.143	0.144	-0.001
14.5	28.801	-0.227	24.226	0	32.53	0	0.144	0.145	-0.001
14.6	28.801	-0.212	23.707	0	32.42	0	0.145	0.146	-0.001
14.7	28.993	-0.215	23.548	0	30.99	0	0.146	0.147	-0.001
14.8	29.08	-0.222	24.025	0	27.52	0	0.147	0.147	-0.001
14.9	29.08	-0.222	24.215	0	24.02	0	0.147	0.148	-0.001
15	29.223	-0.222	24.431	0	22.14	0	0.148	0.149	-0.001
15.1	29.285	-0.21	24.388	0	20.83	0	0.149	0.149	-0.001
15.2	29.341	-0.225	23.901	0	20.97	0	0.149	0.15	-0.001
15.3	29.397	-0.232	23.901	0	22.44	0	0.15	0.15	-0.001
15.4	29.459	-0.205	24.611	0	23.83	0	0.151	0.151	-0.001
15.5	29.528	-0.197	23.505	0	26.76	0	0.151	0.152	-0.001
15.6	29.608	-0.202	23.587	0	28.52	0	0.152	0.153	-0.001
15.7	29.689	-0.195	24.568	0	30.27	0	0.153	0.153	-0.001
15.8	29.776	-0.2	24.12	0	32.45	0	0.154	0.154	-0.001
15.9	29.869	-0.2	24.201	0	33.4	0	0.155	0.155	-0.001
16	29.869	-0.222	24.907	0	33.59	0	0.156	0.156	-0.001
16.1	30.062	-0.225	24.611	0	33.37	0	0.157	0.157	-0.001
16.2	30.155	-0.217	24.47	0	33.32	0	0.158	0.158	-0.001
16.3	30.242	-0.207	24.201	0	33.3	0	0.158	0.159	-0.001
16.4	30.335	-0.202	24.65	0	33.17	0	0.159	0.16	-0.001
16.5	30.429	-0.215	24.568	0	33.05	0	0.16	0.161	-0.001
16.6	30.522	-0.22	24.989	0	32.98	0	0.161	0.162	-0.001
16.7	30.621	-0.225	24.54	0	30.36	0	0.162	0.163	-0.001
16.8	30.702	-0.215	24.809	0	25.91	0	0.163	0.163	-0.001
16.9	30.783	-0.212	24.745	0	21.62	0	0.163	0.164	-0.001
17	30.832	-0.215	24.66	0	21.39	0	0.164	0.164	-0.001
17.1	30.895	-0.215	25.158	0	21.35	0	0.165	0.165	-0.001
17.2	30.95	-0.22	24.989	0	21.2	0	0.165	0.166	-0.001
17.3	31.006	-0.225	25.172	0	21.42	0	0.166	0.166	-0.001
17.4	31.006	-0.22	24.487	0	22.09	0	0.166	0.167	-0.001
17.5	31.062	-0.197	24.844	0	22.96	0	0.167	0.167	-0.001
17.6	31.18	-0.192	24.717	0	23.46	0	0.168	0.168	-0.001
17.7	31.243	-0.21	24.417	0	24.66	0	0.168	0.169	-0.001
17.8	31.311	-0.227	24.989	0	26.64	0	0.169	0.17	-0.001
17.9	31.385	-0.227	25.646	0	27.18	0	0.17	0.17	-0.001
18	31.46	-0.197	25.25	0	27.34	0	0.171	0.171	-0.001
18.1	31.535	-0.192	24.816	0	27.8	0	0.171	0.172	-0.001

18.2	31.609	-0.205	24.975	0	29.19	0	0.172	0.173	-0.001
18.3	31.609	-0.205	25.529	0	30.02	0	0.173	0.173	-0.001
18.4	31.764	-0.195	25.25	0	30.05	0	0.174	0.174	-0.001
18.5	31.839	-0.177	25.264	0	30.11	0	0.175	0.175	-0.001
18.6	31.914	-0.18	25.105	0	30.1	0	0.175	0.176	-0.001
18.7	31.988	-0.195	25.448	0	30.23	0	0.176	0.177	-0.001
18.8	32.063	-0.195	25.97	0	30.11	0	0.177	0.178	-0.001
18.9	32.063	-0.195	26.02	0	29.34	0	0.178	0.178	-0.001
19	32.206	-0.197	25.13	0	31.7	0	0.179	0.179	-0.001
19.1	32.28	-0.187	25.847	0	34.02	0	0.18	0.18	-0.001
19.2	32.342	-0.187	25.766	0	38.04	0	0.181	0.181	-0.001
19.3	32.411	-0.207	25.49	0	31.88	0	0.182	0.182	-0.001
19.4	32.479	-0.215	25.766	0	14.82	0	0.182	0.183	-0.001
19.5	32.479	-0.195	26.309	0	20.04	0	0.183	0.183	-0.001
19.6	32.597	-0.205	25.088	0	23.59	0	0.183	0.184	-0.001
19.7	32.665	-0.25	25.063	0	26.64	0	0.184	0.185	-0.001
19.8	32.728	-0.265	25.582	0	29.28	0	0.185	0.185	-0.001
19.9	32.802	-0.262	23.226	0	30.22	0	0.186	0.186	-0.001
20	32.877	-0.27	21.567	0	32.19	0	0.187	0.187	-0.001
20.1	32.951	-0.275	21.577	0	31.98	0	0.188	0.188	-0.001
20.2	33.032	-0.265	21.482	0	31.64	0	0.188	0.189	-0.001
20.3	33.107	-0.267	20.67	0	31.51	0	0.189	0.19	-0.001
20.4	33.175	-0.27	21.323	0	31.63	0	0.19	0.191	-0.001
20.5	33.175	-0.285	21.44	0	30.63	0	0.191	0.192	-0.001
20.6	33.318	-0.287	21.673	0	30.45	0	0.192	0.192	-0.001
20.7	33.386	-0.287	21.673	0	30.5	0	0.193	0.193	-0.001
20.8	33.455	-0.282	21.323	0	30.47	0	0.194	0.194	-0.001
20.9	33.455	-0.282	21.482	0	29.55	0	0.194	0.195	-0.001
21	33.591	-0.262	21.496	0	29.52	0	0.195	0.196	-0.001
21.1	33.66	-0.272	21.365	0	29.45	0	0.196	0.197	-0.001
21.2	33.722	-0.275	21.835	0	29.17	0	0.197	0.197	-0.001
21.3	33.784	-0.257	22.326	0	28.54	0	0.198	0.198	-0.001
21.4	33.852	-0.262	21.761	0	28.57	0	0.198	0.199	-0.001
21.5	33.852	-0.275	22.1	0	28.5	0	0.199	0.2	-0.001
21.6	33.983	-0.265	22.375	0	28.2	0	0.2	0.2	-0.001
21.7	34.039	-0.26	21.715	0	27.18	0	0.201	0.201	-0.001
21.8	34.101	-0.257	21.567	0	26.3	0	0.201	0.202	-0.001
21.9	34.157	-0.257	22.192	0	24.6	0	0.202	0.203	-0.001
22	34.219	-0.24	22.026	0	24.43	0	0.203	0.203	-0.001
22.1	34.269	-0.24	22.46	0	24.43	0	0.204	0.204	-0.001
22.2	34.318	-0.242	21.846	0	24.52	0	0.204	0.205	-0.001
22.3	34.374	-0.247	22.375	0	24.36	0	0.205	0.205	-0.001
22.4	34.43	-0.257	22.552	0	23.85	0	0.206	0.206	-0.001
22.5	34.48	-0.262	22.714	0	23.12	0	0.206	0.207	-0.001
22.6	34.48	-0.257	22.552	0	22.22	0	0.207	0.207	-0.001
22.7	34.567	-0.26	22.241	0	20.94	0	0.207	0.208	-0.001
22.8	34.61	-0.257	22.566	0	20.69	0	0.208	0.208	-0.001

22.9	34.654	-0.252	22.418	0	20.62	0	0.209	0.209	-0.001
23	34.697	-0.242	22.199	0	19.21	0	0.209	0.21	-0.001
23.1	34.735	-0.25	22.156	0	16.98	0	0.21	0.21	-0.001
23.2	34.766	-0.257	22.46	0	14.76	0	0.21	0.21	-0.001
23.3	34.797	-0.26	22.986	0	13.39	0	0.21	0.211	-0.001
23.4	34.822	-0.265	22.566	0	13.35	0	0.211	0.211	-0.001
23.5	34.822	-0.255	22.757	0	12.15	0	0.211	0.212	-0.001
23.6	34.878	-0.255	22.418	0	10.82	0	0.211	0.212	-0.001
23.7	34.89	-0.252	22.026	0	9.8	0	0.212	0.212	-0.001
23.8	34.902	-0.265	22.291	0	8.8	0	0.212	0.212	-0.001
23.9	34.921	-0.265	22.729	0	8.71	0	0.212	0.213	-0.001
24	34.921	-0.25	22.729	0	8.55	0	0.212	0.213	-0.001
24.1	34.946	-0.252	22.171	0	8.57	0	0.213	0.213	-0.001
24.2	34.958	-0.257	22.552	0	8.57	0	0.213	0.213	-0.001
24.3	34.971	-0.25	23.082	0	9.19	0	0.213	0.214	-0.001
24.4	34.983	-0.25	22.266	0	9.77	0	0.213	0.214	-0.001
24.5	34.983	-0.235	22.637	0	10.83	0	0.214	0.214	-0.001
24.6	35.014	-0.232	22.658	0	11.56	0	0.214	0.214	-0.001
24.7	35.033	-0.24	22.729	0	12.23	0	0.214	0.215	-0.001
24.8	35.058	-0.245	23.124	0	12.19	0	0.215	0.215	-0.001
24.9	35.076	-0.245	22.552	0	12.32	0	0.215	0.215	-0.001
25	35.101	-0.265	22.873	0	13.33	0	0.215	0.216	-0.001
25.1	35.132	-0.267	22.859	0	15.25	0	0.216	0.216	-0.001
25.2	35.163	-0.25	22.771	0	16.6	0	0.216	0.217	-0.001
25.3	35.194	-0.245	22.432	0	17.56	0	0.217	0.217	-0.001
25.4	35.232	-0.257	22.608	0	17.66	0	0.217	0.218	-0.001
25.5	35.232	-0.257	23.096	0	17.67	0	0.218	0.218	-0.001
25.6	35.306	-0.265	22.51	0	17.79	0	0.218	0.219	-0.001
25.7	35.337	-0.255	22.608	0	18.67	0	0.219	0.219	-0.001
25.8	35.368	-0.242	22.704	0	19.56	0	0.219	0.22	-0.001
25.9	35.406	-0.25	22.199	0	19.48	0	0.22	0.22	-0.001
26	35.449	-0.237	22.608	0	19.24	0	0.22	0.221	-0.001
26.1	35.48	-0.23	22.81	0	18.64	0	0.221	0.221	-0.001
26.2	35.518	-0.247	22.499	0	18.46	0	0.221	0.222	-0.001
26.3	35.549	-0.247	23.265	0	17.61	0	0.222	0.222	-0.001
26.4	35.58	-0.232	23.068	0	16.3	0	0.222	0.223	-0.001
26.5	35.611	-0.242	22.757	0	13.96	0	0.223	0.223	-0.001
26.6	35.629	-0.237	22.88	0	9.43	0	0.223	0.223	-0.001
26.7	35.642	-0.232	23.202	0	4.74	0	0.223	0.224	-0.001
26.8	35.636	-0.247	22.813	0	0	0	0.223	0.224	-0.001
26.9	35.617	-0.247	23.11	0	-1.11	0	0.223	0.224	-0.001
27	35.611	-0.257	23.424	0	-1.17	0	0.223	0.224	-0.001
27.1	35.605	-0.275	22.894	0	-1.14	0	0.223	0.224	-0.001
27.2	35.592	-0.242	22.757	0	-1.09	0	0.223	0.224	-0.001
27.3	35.574	-0.232	21.482	0	-0.65	0	0.223	0.224	-0.001
27.4	35.561	-0.25	21.397	0	-0.69	0	0.223	0.224	-0.001
27.5	35.561	-0.255	23.721	0	-0.83	0	0.223	0.224	-0.001

27.6	35.542	-0.24	23.096	0	-1.22	0	0.223	0.224	-0.001
27.7	35.536	-0.217	22.743	0	-2.99	0	0.223	0.224	-0.001
27.8	35.524	-0.225	22.389	0	-5.77	0	0.223	0.224	-0.001
27.9	35.499	-0.225	23.082	0	-8.42	0	0.222	0.224	-0.001
28	35.462	-0.235	23.59	0	-8.49	0	0.222	0.224	-0.001
28.1	35.424	-0.255	23.096	0	-8.74	0	0.222	0.224	-0.002
28.2	35.393	-0.245	23.565	0	-9.22	0	0.222	0.224	-0.002
28.3	35.362	-0.232	22.916	0	-10.58	0	0.221	0.224	-0.002
28.4	35.325	-0.235	22.404	0	-12.54	0	0.221	0.224	-0.003
28.5	35.325	-0.24	22.637	0	-13.48	0	0.221	0.224	-0.003
28.6	35.238	-0.24	23.223	0	-12.95	0	0.22	0.224	-0.003
28.7	35.194	-0.242	22.58	0	-12.89	0	0.22	0.224	-0.004
28.8	35.145	-0.24	22.538	0	-12.83	0	0.22	0.224	-0.004
28.9	35.101	-0.23	23.11	0	-12.18	0	0.219	0.224	-0.004
29	35.052	-0.252	22.986	0	-11.95	0	0.219	0.224	-0.005
29.1	35.008	-0.272	23.357	0	-11.48	0	0.219	0.224	-0.005
29.2	34.971	-0.265	23.357	0	-11.47	0	0.218	0.224	-0.005
29.3	34.927	-0.267	22.146	0	-11.5	0	0.218	0.224	-0.006
29.4	34.89	-0.27	21.733	0	-11.43	0	0.218	0.224	-0.006
29.5	34.853	-0.255	22.202	0	-11.46	0	0.217	0.224	-0.006
29.6	34.815	-0.262	21.955	0	-11.47	0	0.217	0.224	-0.007
29.7	34.815	-0.267	22.337	0	-10.99	0	0.217	0.224	-0.007
29.8	34.735	-0.25	22.919	0	-10.98	0	0.216	0.224	-0.007
29.9	34.691	-0.25	22.012	0	-11.07	0	0.216	0.224	-0.008
30	34.654	-0.257	22.216	0	-10.48	0	0.216	0.224	-0.008
30.1	34.61	-0.255	22.799	0	-9.85	0	0.216	0.224	-0.008
30.2	34.579	-0.25	22.471	0	-9.17	0	0.215	0.224	-0.008
30.3	34.548	-0.247	22.202	0	-8.02	0	0.215	0.224	-0.009
30.4	34.517	-0.232	22.732	0	-7.28	0	0.215	0.224	-0.009
30.5	34.517	-0.235	22.379	0	-5.55	0	0.215	0.224	-0.009
30.6	34.467	-0.257	22.174	0	-2.48	0	0.215	0.224	-0.009
30.7	34.449	-0.26	22.891	0	-0.93	0	0.215	0.224	-0.009
30.8	34.443	-0.26	22.294	0	0	0	0.215	0.224	-0.009
30.9	34.43	-0.26	22.202	0	1.87	0	0.215	0.224	-0.009
31	34.43	-0.247	22.849	0	3.62	0	0.215	0.224	-0.009
31.1	34.436	-0.247	22.252	0	4.43	0	0.215	0.224	-0.009
31.2	34.443	-0.242	22.245	0	5.57	0	0.215	0.224	-0.009
31.3	34.455	-0.247	22.704	0	7.48	0	0.215	0.224	-0.009
31.4	34.467	-0.247	22.555	0	8.64	0	0.215	0.224	-0.009
31.5	34.486	-0.235	23.099	0	8.69	0	0.216	0.225	-0.009
31.6	34.499	-0.235	22.216	0	8.75	0	0.216	0.225	-0.009
31.7	34.511	-0.25	22.337	0	8.71	0	0.216	0.225	-0.009
31.8	34.53	-0.255	22.732	0	8.63	0	0.216	0.225	-0.009
31.9	34.548	-0.24	22.647	0	8.57	0	0.217	0.226	-0.009
32	34.567	-0.23	22.337	0	8.9	0	0.217	0.226	-0.009
32.1	34.567	-0.225	22.361	0	9.38	0	0.217	0.226	-0.009
32.2	34.598	-0.24	22.428	0	9.37	0	0.217	0.226	-0.009

32.3	34.623	-0.255	22.555	0	9.19	0	0.218	0.227	-0.009
32.4	34.635	-0.245	23.099	0	9.18	0	0.218	0.227	-0.009
32.5	34.654	-0.232	22.216	0	9.62	0	0.218	0.227	-0.009
32.6	34.673	-0.245	22.294	0	9.93	0	0.218	0.228	-0.009
32.7	34.691	-0.255	22.884	0	9.87	0	0.219	0.228	-0.009
32.8	34.71	-0.242	22.732	0	9.82	0	0.219	0.228	-0.009
32.9	34.728	-0.242	22.414	0	9.84	0	0.219	0.228	-0.009
33	34.747	-0.242	22.308	0	10.18	0	0.22	0.229	-0.009
33.1	34.766	-0.25	22.69	0	11.1	0	0.22	0.229	-0.009
33.2	34.791	-0.25	23.099	0	12.47	0	0.22	0.229	-0.009
33.3	34.815	-0.247	22.57	0	13.88	0	0.221	0.23	-0.009
33.4	34.815	-0.237	22.527	0	14.72	0	0.221	0.23	-0.009
33.5	34.878	-0.245	22.442	0	14.67	0	0.221	0.23	-0.009
33.6	34.909	-0.255	22.57	0	15.92	0	0.222	0.231	-0.009
33.7	34.94	-0.25	23.015	0	17.16	0	0.222	0.231	-0.009
33.8	34.94	-0.257	22.746	0	18.04	0	0.223	0.232	-0.009
33.9	34.977	-0.257	22.704	0	18.8	0	0.223	0.232	-0.009
34	35.064	-0.227	22.732	0	20.62	0	0.224	0.233	-0.009
34.1	35.107	-0.222	22.312	0	22.22	0	0.225	0.234	-0.009
34.2	35.151	-0.225	22.633	0	23.75	0	0.225	0.234	-0.009
34.3	35.194	-0.237	22.676	0	24.89	0	0.226	0.235	-0.009
34.4	35.194	-0.237	23.085	0	25.54	0	0.227	0.236	-0.009
34.5	35.244	-0.24	23.029	0	25.43	0	0.227	0.236	-0.009
34.6	35.362	-0.255	22.856	0	25.32	0	0.228	0.237	-0.009
34.7	35.412	-0.245	23.315	0	25.31	0	0.229	0.238	-0.009
34.8	35.462	-0.247	22.891	0	24.31	0	0.229	0.238	-0.009
34.9	35.511	-0.24	22.704	0	23.04	0	0.23	0.239	-0.009
35	35.555	-0.227	23.382	0	22.8	0	0.231	0.24	-0.009
35.1	35.605	-0.225	22.676	0	22.6	0	0.231	0.24	-0.009
35.2	35.648	-0.22	23.113	0	23.27	0	0.232	0.241	-0.009
35.3	35.698	-0.227	23.244	0	23.41	0	0.233	0.242	-0.009
35.4	35.741	-0.235	22.986	0	22.61	0	0.233	0.242	-0.009
35.5	35.785	-0.24	23.382	0	21.42	0	0.234	0.243	-0.009
35.6	35.834	-0.247	22.986	0	18.4	0	0.234	0.243	-0.009
35.7	35.866	-0.24	23.424	0	14.89	0	0.235	0.244	-0.009
35.8	35.89	-0.222	23.438	0	12.04	0	0.235	0.244	-0.009
35.9	35.909	-0.222	22.827	0	11.7	0	0.235	0.244	-0.009
36	35.928	-0.222	23.371	0	11.57	0	0.236	0.245	-0.009
36.1	35.928	-0.227	24.106	0	11.57	0	0.236	0.245	-0.009
36.2	35.965	-0.225	23.791	0	11.57	0	0.236	0.245	-0.009
36.3	35.977	-0.222	23.749	0	11.56	0	0.237	0.246	-0.009
36.4	35.996	-0.23	23.767	0	11.59	0	0.237	0.246	-0.009
36.5	36.015	-0.227	23.95	0	11.99	0	0.237	0.246	-0.009
36.6	36.033	-0.225	23.866	0	12.93	0	0.238	0.247	-0.009
36.7	36.052	-0.225	23.382	0	13.82	0	0.238	0.247	-0.009
36.8	36.052	-0.227	23.629	0	13.73	0	0.238	0.248	-0.009
36.9	36.102	-0.227	23.357	0	13.76	0	0.239	0.248	-0.009

37	36.127	-0.217	24.261	0	13.76	0	0.239	0.248	-0.009
37.1	36.151	-0.222	23.894	0	13.68	0	0.24	0.249	-0.009
37.2	36.176	-0.227	23.52	0	13.63	0	0.24	0.249	-0.009
37.3	36.201	-0.23	24.007	0	13.6	0	0.24	0.249	-0.009
37.4	36.226	-0.237	23.71	0	13.58	0	0.241	0.25	-0.009
37.5	36.245	-0.23	24.109	0	13.69	0	0.241	0.25	-0.009
37.6	36.276	-0.215	23.919	0	14.09	0	0.242	0.251	-0.009
37.7	36.294	-0.217	23.414	0	14.34	0	0.242	0.251	-0.009
37.8	36.319	-0.222	23.636	0	14.34	0	0.242	0.251	-0.009
37.9	36.344	-0.212	24.148	0	14.28	0	0.243	0.252	-0.009
38	36.369	-0.217	24.078	0	13.74	0	0.243	0.252	-0.009
38.1	36.394	-0.237	23.816	0	13.43	0	0.243	0.253	-0.009
38.2	36.419	-0.235	24.607	0	12.59	0	0.244	0.253	-0.009
38.3	36.437	-0.225	24.251	0	12.02	0	0.244	0.253	-0.009
38.4	36.462	-0.222	23.59	0	11.93	0	0.244	0.254	-0.009
38.5	36.462	-0.222	24.244	0	11.82	0	0.245	0.254	-0.009
38.6	36.506	-0.222	24.293	0	11.82	0	0.245	0.254	-0.009
38.7	36.518	-0.207	24.293	0	11.85	0	0.245	0.255	-0.009
38.8	36.537	-0.21	24.092	0	11.86	0	0.246	0.255	-0.009
38.9	36.555	-0.21	23.876	0	11.89	0	0.246	0.255	-0.009
39	36.574	-0.205	24.515	0	11.97	0	0.246	0.256	-0.009
39.1	36.599	-0.225	23.901	0	11.24	0	0.247	0.256	-0.009
39.2	36.624	-0.227	24.296	0	11.09	0	0.247	0.256	-0.009
39.3	36.642	-0.202	24.653	0	9.98	0	0.247	0.256	-0.009
39.4	36.655	-0.217	23.509	0	9.43	0	0.248	0.257	-0.009
39.5	36.655	-0.237	24.515	0	9.48	0	0.248	0.257	-0.009
39.6	36.686	-0.235	25.063	0	9.48	0	0.248	0.257	-0.009
39.7	36.686	-0.222	24.251	0	9.48	0	0.248	0.257	-0.009
39.8	36.711	-0.215	23.668	0	9.52	0	0.249	0.258	-0.009
39.9	36.729	-0.215	24.078	0	9.47	0	0.249	0.258	-0.009
40	36.742	-0.217	24.477	0	9.46	0	0.249	0.258	-0.009
40.1	36.742	-0.222	23.996	0	9.5	0	0.249	0.259	-0.009
40.2	36.767	-0.215	24.215	0	9.49	0	0.25	0.259	-0.009
40.3	36.779	-0.212	24.466	0	9.51	0	0.25	0.259	-0.009
40.4	36.779	-0.2	24.053	0	9.38	0	0.25	0.259	-0.009
40.5	36.791	-0.192	23.901	0	9.39	0	0.251	0.26	-0.009
40.6	36.822	-0.192	24.01	0	9.36	0	0.251	0.26	-0.009
40.7	36.829	-0.217	24.438	0	9.41	0	0.251	0.26	-0.009
40.8	36.847	-0.21	24.982	0	9.42	0	0.251	0.26	-0.009
40.9	36.847	-0.215	24.187	0	9.39	0	0.252	0.261	-0.009
41	36.872	-0.212	24.406	0	9.39	0	0.252	0.261	-0.009
41.1	36.891	-0.217	24.053	0	9.43	0	0.252	0.261	-0.009
41.2	36.891	-0.225	24.3	0	9.43	0	0.252	0.261	-0.009
41.3	36.916	-0.217	24.544	0	9.39	0	0.253	0.262	-0.009
41.4	36.934	-0.215	23.968	0	9.4	0	0.253	0.262	-0.009
41.5	36.941	-0.215	24.053	0	9.44	0	0.253	0.262	-0.009
41.6	36.959	-0.217	24.653	0	9.2	0	0.253	0.262	-0.009

41.7	36.959	-0.212	24.325	0	8.26	0	0.254	0.263	-0.009
41.8	36.984	-0.202	24.095	0	7.08	0	0.254	0.263	-0.009
41.9	36.984	-0.202	24.152	0	7.09	0	0.254	0.263	-0.009
42	36.996	-0.212	24.844	0	6.61	0	0.254	0.263	-0.009
42.1	37.009	-0.215	24.625	0	6.44	0	0.254	0.263	-0.009
42.2	37.015	-0.202	24.321	0	6.07	0	0.255	0.264	-0.009
42.3	37.021	-0.2	24.625	0	5.6	0	0.255	0.264	-0.009
42.4	37.021	-0.21	24.42	0	5.51	0	0.255	0.264	-0.009
42.5	37.028	-0.212	24.773	0	5	0	0.255	0.264	-0.009
42.6	37.04	-0.217	24.597	0	4.38	0	0.255	0.264	-0.009
42.7	37.04	-0.22	24.477	0	4.37	0	0.255	0.264	-0.009
42.8	37.04	-0.217	24.515	0	4.42	0	0.255	0.264	-0.009
42.9	37.046	-0.217	24.519	0	5.01	0	0.256	0.265	-0.009
43	37.046	-0.207	24.448	0	5	0	0.256	0.265	-0.009
43.1	37.046	-0.2	24.141	0	5.01	0	0.256	0.265	-0.009
43.2	37.052	-0.21	23.94	0	5	0	0.256	0.265	-0.009
43.3	37.052	-0.22	24.583	0	4.46	0	0.256	0.265	-0.009
43.4	37.065	-0.215	24.798	0	4.15	0	0.256	0.265	-0.009
43.5	37.065	-0.202	24.667	0	3.5	0	0.256	0.265	-0.009
43.6	37.071	-0.202	24.296	0	3.5	0	0.256	0.265	-0.009
43.7	37.071	-0.2	24.568	0	3.49	0	0.256	0.265	-0.009
43.8	37.071	-0.197	24.554	0	3.5	0	0.257	0.266	-0.009
43.9	37.071	-0.18	24.568	0	3.5	0	0.257	0.266	-0.009
44	37.071	-0.192	24.039	0	3.51	0	0.257	0.266	-0.009
44.1	37.071	-0.207	24.487	0	4.26	0	0.257	0.266	-0.009
44.2	37.071	-0.207	24.911	0	5.03	0	0.257	0.266	-0.009
44.3	37.077	-0.205	24.583	0	5.16	0	0.257	0.266	-0.009
44.4	37.09	-0.207	24.505	0	5.15	0	0.257	0.266	-0.009
44.5	37.096	-0.215	24.392	0	5.15	0	0.257	0.266	-0.009
44.6	37.096	-0.222	24.784	0	5.17	0	0.258	0.267	-0.009
44.7	37.102	-0.227	24.745	0	5.17	0	0.258	0.267	-0.009
44.8	37.108	-0.215	24.568	0	5.17	0	0.258	0.267	-0.009
44.9	37.108	-0.215	24.335	0	5.17	0	0.258	0.267	-0.009
45	37.115	-0.207	23.954	0	5.17	0	0.258	0.267	-0.009
45.1	37.121	-0.21	24.925	0	5.19	0	0.258	0.267	-0.009
45.2	37.121	-0.22	24.611	0	5.19	0	0.258	0.267	-0.009
45.3	37.127	-0.222	24.745	0	5.19	0	0.259	0.268	-0.009
45.4	37.139	-0.207	24.911	0	5.18	0	0.259	0.268	-0.009
45.5	37.139	-0.197	24.159	0	5.2	0	0.259	0.268	-0.009
45.6	37.139	-0.207	24.039	0	5.2	0	0.259	0.268	-0.009
45.7	37.139	-0.2	24.911	0	5.19	0	0.259	0.268	-0.009
45.8	37.146	-0.185	24.681	0	5.19	0	0.259	0.268	-0.009
45.9	37.146	-0.185	24.123	0	5.2	0	0.259	0.268	-0.009
46	37.152	-0.21	24.568	0	5.19	0	0.26	0.269	-0.009
46.1	37.152	-0.205	24.964	0	5.2	0	0.26	0.269	-0.009
46.2	37.158	-0.21	24.653	0	5.5	0	0.26	0.269	-0.009
46.3	37.164	-0.207	24.929	0	5.83	0	0.26	0.269	-0.009

46.4	37.164	-0.195	24.568	0	5.82	0	0.26	0.269	-0.009
46.5	37.17	-0.192	24.409	0	6.56	0	0.26	0.269	-0.009
46.6	37.177	-0.182	24.392	0	6.51	0	0.261	0.27	-0.009
46.7	37.189	-0.177	24.611	0	7.03	0	0.261	0.27	-0.009
46.8	37.189	-0.18	24.636	0	7.45	0	0.261	0.27	-0.009
46.9	37.214	-0.192	24.72	0	8.46	0	0.261	0.27	-0.009
47	37.214	-0.2	25.186	0	10.17	0	0.261	0.271	-0.009
47.1	37.239	-0.192	24.685	0	11.44	0	0.262	0.271	-0.009
47.2	37.239	-0.19	24.244	0	11.42	0	0.262	0.271	-0.009
47.3	37.282	-0.215	24.116	0	11.43	0	0.262	0.271	-0.009
47.4	37.307	-0.217	24.982	0	11.38	0	0.263	0.272	-0.009
47.5	37.32	-0.212	24.95	0	11.41	0	0.263	0.272	-0.009
47.6	37.344	-0.205	24.586	0	11.41	0	0.263	0.272	-0.009
47.7	37.363	-0.2	24.544	0	11.68	0	0.264	0.273	-0.009
47.8	37.388	-0.2	23.929	0	12.59	0	0.264	0.273	-0.009
47.9	37.407	-0.202	24.459	0	14.04	0	0.264	0.273	-0.009
48	37.431	-0.18	24.477	0	15.24	0	0.265	0.274	-0.009
48.1	37.456	-0.182	24.268	0	17.03	0	0.265	0.274	-0.009
48.2	37.487	-0.187	24.9	0	19.08	0	0.266	0.275	-0.009
48.3	37.531	-0.192	24.801	0	20	0	0.266	0.275	-0.009
48.4	37.568	-0.192	24.544	0	21.33	0	0.267	0.276	-0.009
48.5	37.612	-0.177	25.102	0	22.36	0	0.268	0.277	-0.009
48.6	37.661	-0.192	24.929	0	24.7	0	0.268	0.277	-0.009
48.7	37.711	-0.205	24.72	0	26.09	0	0.269	0.278	-0.009
48.8	37.711	-0.187	25.299	0	27.72	0	0.27	0.279	-0.009
48.9	37.761	-0.187	24.544	0	28.86	0	0.271	0.28	-0.009
49	37.879	-0.182	24.367	0	28.77	0	0.271	0.28	-0.009
49.1	37.879	-0.195	24.982	0	28.79	0	0.272	0.281	-0.009
49.2	37.997	-0.19	25.515	0	28.67	0	0.273	0.282	-0.009
49.3	37.997	-0.192	24.9	0	30.03	0	0.274	0.283	-0.009
49.4	38.109	-0.2	24.967	0	32.17	0	0.275	0.284	-0.009
49.5	38.177	-0.18	25.571	0	34.44	0	0.276	0.285	-0.009
49.6	38.245	-0.18	25.352	0	35.85	0	0.277	0.286	-0.009
49.7	38.245	-0.19	25.049	0	37.72	0	0.278	0.287	-0.009
49.8	38.32	-0.227	25.261	0	39.52	0	0.279	0.288	-0.009
49.9	38.469	-0.24	26.288	0	39.61	0	0.28	0.289	-0.009
50	38.544	-0.227	26.161	0	39.46	0	0.281	0.29	-0.009
50.1	38.544	-0.197	25.434	0	39.35	0	0.282	0.291	-0.009
50.2	38.624	-0.177	25.133	0	38.46	0	0.283	0.292	-0.009
50.3	38.699	-0.19	24.501	0	38.34	0	0.284	0.293	-0.009
50.4	38.848	-0.177	25.847	0	36.13	0	0.285	0.294	-0.009
50.5	38.91	-0.165	25.928	0	32.39	0	0.286	0.295	-0.009
50.6	38.972	-0.182	25.059	0	30.31	0	0.287	0.296	-0.009
50.7	39.022	-0.192	25.946	0	30.21	0	0.288	0.297	-0.009
50.8	39.022	-0.187	25.847	0	30.38	0	0.289	0.298	-0.009
50.9	39.14	-0.187	25.585	0	31.35	0	0.29	0.299	-0.009
51	39.209	-0.185	25.935	0	31.79	0	0.29	0.299	-0.009

51.1	39.264	-0.172	26.203	0	32.35	0	0.291	0.3	-0.009
51.2	39.327	-0.162	26.016	0	33.32	0	0.292	0.301	-0.009
51.3	39.389	-0.162	26.03	0	34.62	0	0.293	0.302	-0.009
51.4	39.451	-0.165	25.946	0	37.61	0	0.294	0.303	-0.009
51.5	39.513	-0.172	26.08	0	41.48	0	0.295	0.304	-0.009
51.6	39.513	-0.19	25.946	0	44.93	0	0.297	0.306	-0.009
51.7	39.643	-0.19	26.203	0	29.24	0	0.298	0.307	-0.009
51.8	39.643	-0.162	26.419	0	31.11	0	0.298	0.307	-0.009
51.9	39.786	-0.162	25.398	0	37.7	0	0.299	0.308	-0.009
52	39.849	-0.212	25.363	0	40.55	0	0.301	0.31	-0.009
52.1	39.849	-0.287	26.264	0	41.81	0	0.302	0.311	-0.009
52.2	40.004	-0.292	25.663	0	44.15	0	0.303	0.312	-0.009
52.3	40.085	-0.247	23.657	0	44.33	0	0.304	0.313	-0.009
52.4	40.159	-0.23	21.556	0	44	0	0.305	0.314	-0.009
52.5	40.234	-0.242	21.471	0	43.83	0	0.307	0.316	-0.009
52.6	40.315	-0.242	22.432	0	43.7	0	0.308	0.317	-0.009
52.7	40.389	-0.24	22.665	0	43.57	0	0.309	0.318	-0.009
52.8	40.457	-0.227	22.834	0	43.6	0	0.31	0.319	-0.009
52.9	40.532	-0.207	22.781	0	43.71	0	0.311	0.32	-0.009
53	40.607	-0.23	22.118	0	42.93	0	0.313	0.322	-0.009
53.1	40.681	-0.257	22.933	0	42.36	0	0.314	0.323	-0.009
53.2	40.756	-0.235	23.7	0	41.37	0	0.315	0.324	-0.009
53.3	40.824	-0.22	22.923	0	41.31	0	0.316	0.325	-0.009
53.4	40.892	-0.235	22.012	0	41.32	0	0.317	0.326	-0.009
53.5	40.961	-0.245	23.615	0	41.33	0	0.318	0.327	-0.009
53.6	41.029	-0.222	24	0	41.36	0	0.32	0.329	-0.009
53.7	41.029	-0.215	22.976	0	41.6	0	0.321	0.33	-0.009
53.8	41.166	-0.22	22.64	0	42.18	0	0.322	0.331	-0.009
53.9	41.234	-0.22	23.643	0	43	0	0.323	0.332	-0.009
54	41.309	-0.232	23.784	0	44	0	0.324	0.333	-0.009
54.1	41.377	-0.227	24.028	0	44.25	0	0.326	0.335	-0.009
54.2	41.452	-0.225	23.671	0	43.89	0	0.327	0.336	-0.009
54.3	41.52	-0.222	23.276	0	43.4	0	0.328	0.337	-0.009
54.4	41.595	-0.212	23.714	0	42.73	0	0.329	0.338	-0.009
54.5	41.663	-0.212	23.544	0	42.68	0	0.33	0.339	-0.009
54.6	41.731	-0.23	23.714	0	43.41	0	0.332	0.341	-0.009
54.7	41.806	-0.237	24.159	0	44.83	0	0.333	0.342	-0.009
54.8	41.88	-0.227	24.254	0	45.22	0	0.334	0.343	-0.009
54.9	41.955	-0.227	23.996	0	46.6	0	0.335	0.344	-0.009
55	42.03	-0.215	24.028	0	46.47	0	0.337	0.346	-0.009
55.1	42.104	-0.225	23.657	0	45.27	0	0.338	0.347	-0.009
55.2	42.179	-0.222	24.431	0	44.38	0	0.339	0.348	-0.009
55.3	42.247	-0.22	24.296	0	43.32	0	0.34	0.349	-0.009
55.4	42.315	-0.217	24.095	0	43.3	0	0.342	0.351	-0.009
55.5	42.384	-0.22	23.809	0	43.55	0	0.343	0.352	-0.009
55.6	42.452	-0.22	23.671	0	43.19	0	0.344	0.353	-0.009
55.7	42.52	-0.232	23.901	0	43.37	0	0.345	0.354	-0.009

55.8	42.589	-0.247	23.834	0	43.44	0	0.346	0.355	-0.009
55.9	42.657	-0.262	23.219	0	43.51	0	0.348	0.357	-0.009
56	42.725	-0.27	23.219	0	43.29	0	0.349	0.358	-0.009
56.1	42.788	-0.272	22.178	0	43.31	0	0.35	0.359	-0.009
56.2	42.856	-0.27	21.669	0	43.19	0	0.351	0.36	-0.009
56.3	42.924	-0.282	21.266	0	43.27	0	0.352	0.361	-0.009
56.4	42.986	-0.285	21.39	0	43.19	0	0.354	0.363	-0.009
56.5	43.049	-0.28	20.645	0	43.25	0	0.355	0.364	-0.009
56.6	43.117	-0.305	19.518	0	43.24	0	0.356	0.365	-0.009
56.7	43.179	-0.335	19.328	0	43.26	0	0.357	0.366	-0.009
56.8	43.241	-0.335	19.843	0	43.16	0	0.358	0.367	-0.009
56.9	43.241	-0.332	18.59	0	43.39	0	0.36	0.369	-0.009
57	43.365	-0.345	17.449	0	43.38	0	0.361	0.37	-0.009
57.1	43.421	-0.365	17.34	0	43.52	0	0.362	0.371	-0.009
57.2	43.49	-0.375	17.163	0	41.76	0	0.363	0.372	-0.009
57.3	43.552	-0.38	16.241	0	40.56	0	0.364	0.373	-0.009
57.4	43.608	-0.377	15.934	0	37.27	0	0.365	0.374	-0.009
57.5	43.658	-0.4	15.108	0	33.65	0	0.366	0.375	-0.009
57.6	43.707	-0.418	15.005	0	32.08	0	0.367	0.376	-0.009
57.7	43.757	-0.408	15.076	0	32.64	0	0.368	0.377	-0.009
57.8	43.8	-0.438	13.709	0	34.46	0	0.369	0.378	-0.009
57.9	43.85	-0.438	13.699	0	35.14	0	0.37	0.379	-0.009
58	43.906	-0.418	12.763	0	35.35	0	0.371	0.38	-0.009
58.1	43.95	-0.435	11.396	0	33.03	0	0.372	0.381	-0.009
58.2	43.999	-0.453	12.251	0	30.96	0	0.373	0.382	-0.009
58.3	44.037	-0.453	12.508	0	28.53	0	0.374	0.383	-0.009
58.4	44.074	-0.423	11.682	0	25.66	0	0.374	0.383	-0.009
58.5	44.105	-0.44	11.174	0	25.41	0	0.375	0.384	-0.009
58.6	44.13	-0.445	12.106	0	25.42	0	0.376	0.385	-0.009
58.7	44.161	-0.433	12.279	0	25.41	0	0.376	0.385	-0.009
58.8	44.198	-0.425	11.898	0	25.48	0	0.377	0.386	-0.009
58.9	44.223	-0.43	11.763	0	25.49	0	0.378	0.387	-0.009
59	44.254	-0.445	12.208	0	25.33	0	0.378	0.388	-0.009
59.1	44.285	-0.458	12.194	0	26.15	0	0.379	0.388	-0.009
59.2	44.285	-0.453	12.833	0	26.22	0	0.38	0.389	-0.009
59.3	44.347	-0.448	12.12	0	26.2	0	0.381	0.39	-0.009
59.4	44.378	-0.445	12.095	0	26.25	0	0.381	0.39	-0.009
59.5	44.409	-0.438	11.88	0	26.33	0	0.382	0.391	-0.009
59.6	44.44	-0.433	12.332	0	26.36	0	0.383	0.392	-0.009
59.7	44.44	-0.42	12.159	0	26.22	0	0.384	0.393	-0.009
59.8	44.503	-0.403	12.346	0	26.17	0	0.384	0.393	-0.009
59.9	44.54	-0.403	11.816	0	26.25	0	0.385	0.394	-0.009
60	44.571	-0.443	12.346	0	26.22	0	0.386	0.395	-0.009
60.1	44.602	-0.428	13.186	0	25.56	0	0.386	0.395	-0.009
60.2	44.633	-0.418	12.403	0	25.4	0	0.387	0.396	-0.009
60.3	44.664	-0.42	12.018	0	25.38	0	0.388	0.397	-0.009
60.4	44.695	-0.425	12.314	0	23.38	0	0.389	0.398	-0.009

60.5	44.733	-0.423	12.703	0	21.39	0	0.389	0.398	-0.009
60.6	44.757	-0.418	12.374	0	18.87	0	0.39	0.399	-0.009
60.7	44.782	-0.4	12.187	0	17	0	0.39	0.399	-0.009
60.8	44.813	-0.38	12.681	0	14.67	0	0.391	0.4	-0.009
60.9	44.838	-0.38	13.427	0	12.21	0	0.391	0.4	-0.009
61	44.863	-0.367	14.239	0	10.67	0	0.391	0.4	-0.009
61.1	44.888	-0.34	15.355	0	9.36	0	0.391	0.4	-0.009
61.2	44.913	-0.315	15.867	0	7.69	0	0.392	0.401	-0.009
61.3	44.938	-0.31	16.216	0	5.87	0	0.392	0.401	-0.009
61.4	44.962	-0.287	17.802	0	3.96	0	0.392	0.401	-0.009
61.5	44.981	-0.255	18.378	0	1.75	0	0.392	0.401	-0.009
61.6	45.006	-0.255	19.017	0	0	0	0.392	0.401	-0.009
61.7	45.031	-0.227	20.691	0	-1.11	0	0.392	0.401	-0.009
61.8	45.056	-0.21	22.132	0	-1.75	0	0.392	0.401	-0.009
61.9	45.08	-0.21	23.848	0	-2.67	0	0.392	0.401	-0.009
62	45.112	-0.185	24.911	0	-5.78	0	0.392	0.401	-0.009
62.1	45.13	-0.185	25.091	0	-7.39	0	0.391	0.401	-0.01
62.2	45.143	-0.172	25.981	0	-7.65	0	0.391	0.401	-0.01
62.3	45.155	-0.182	26.02	0	-7.14	0	0.391	0.401	-0.01
62.4	45.167	-0.192	25.794	0	-6.56	0	0.391	0.401	-0.01
62.5	45.18	-0.192	26.175	0	-6.23	0	0.391	0.401	-0.01
62.6	45.186	-0.21	25.141	0	-6.33	0	0.391	0.401	-0.01
62.7	45.186	-0.222	24.826	0	-6.6	0	0.39	0.401	-0.011
62.8	45.205	-0.237	24.636	0	-6.23	0	0.39	0.401	-0.011
62.9	45.211	-0.237	23.919	0	-5.98	0	0.39	0.401	-0.011
63	45.223	-0.242	23.777	0	-5.91	0	0.39	0.401	-0.011
63.1	45.23	-0.235	23.209	0	-5.09	0	0.39	0.401	-0.011
63.2	45.242	-0.235	22.319	0	-4.98	0	0.39	0.401	-0.011
63.3	45.242	-0.235	22.859	0	-4.15	0	0.389	0.401	-0.012
63.4	45.267	-0.235	22.743	0	-2.42	0	0.389	0.401	-0.012
63.5	45.279	-0.235	22.51	0	-2.79	0	0.389	0.401	-0.012
63.6	45.298	-0.237	22.142	0	-3.41	0	0.389	0.401	-0.012
63.7	45.317	-0.237	22.209	0	-4.44	0	0.389	0.401	-0.012
63.8	45.329	-0.222	22.69	0	-4.98	0	0.389	0.401	-0.012
63.9	45.341	-0.222	23.184	0	-5	0	0.389	0.401	-0.012
64	45.36	-0.22	23.989	0	-5	0	0.389	0.401	-0.012
64.1	45.373	-0.215	23.739	0	-5	0	0.389	0.401	-0.012
64.2	45.391	-0.212	23.537	0	-5	0	0.388	0.401	-0.013
64.3	45.404	-0.195	24.42	0	-4.99	0	0.388	0.401	-0.013
64.4	45.422	-0.177	24.505	0	-4.93	0	0.388	0.401	-0.013
64.5	45.441	-0.185	24.335	0	-2.25	0	0.388	0.401	-0.013
64.6	45.46	-0.185	24.925	0	-1.27	0	0.388	0.401	-0.013
64.7	45.484	-0.2	25.37	0	-0.99	0	0.388	0.401	-0.013
64.8	45.509	-0.2	24.653	0	-1.57	0	0.388	0.401	-0.013
64.9	45.54	-0.182	24.745	0	-2.52	0	0.388	0.401	-0.013
65	45.565	-0.17	25.186	0	-4.45	0	0.388	0.401	-0.013
65.1	45.59	-0.152	25.6	0	-5.05	0	0.388	0.401	-0.013

65.2	45.615	-0.135	26.186	0	-5.04	0	0.387	0.401	-0.014
65.3	45.64	-0.142	26.186	0	-5.04	0	0.387	0.401	-0.014
65.4	45.671	-0.157	26.959	0	-5.03	0	0.387	0.401	-0.014
65.5	45.696	-0.152	27.616	0	-5.05	0	0.387	0.401	-0.014
65.6	45.727	-0.14	27.309	0	-5.29	0	0.387	0.401	-0.014
65.7	45.752	-0.14	27.196	0	-5.49	0	0.387	0.401	-0.014
65.8	45.783	-0.145	27.485	0	-5.75	0	0.387	0.401	-0.014
65.9	45.807	-0.145	28.118	0	-6	0	0.386	0.401	-0.015
66	45.807	-0.132	27.828	0	-6.59	0	0.386	0.401	-0.015
66.1	45.832	-0.115	27.937	0	-7.63	0	0.386	0.401	-0.015
66.2	45.882	-0.13	27.747	0	-8.24	0	0.386	0.401	-0.015
66.3	45.907	-0.147	27.983	0	-8.2	0	0.386	0.401	-0.015
66.4	45.907	-0.14	29.106	0	-7.96	0	0.385	0.401	-0.016
66.5	45.95	-0.147	28.22	0	-7.7	0	0.385	0.401	-0.016
66.6	45.975	-0.162	28.192	0	-7.59	0	0.385	0.401	-0.016
66.7	46	-0.152	28.093	0	-8.08	0	0.385	0.401	-0.016
66.8	46.019	-0.15	27.747	0	-7.81	0	0.384	0.401	-0.017
66.9	46.019	-0.15	27.058	0	-7.57	0	0.384	0.401	-0.017
67	46.062	-0.157	27.86	0	-7.56	0	0.384	0.401	-0.017
67.1	46.081	-0.14	27.153	0	-7.53	0	0.384	0.401	-0.017
67.2	46.106	-0.137	26.716	0	-7.46	0	0.384	0.401	-0.017
67.3	46.124	-0.137	27.002	0	-7.48	0	0.383	0.401	-0.018
67.4	46.143	-0.14	27.443	0	-7.84	0	0.383	0.401	-0.018
67.5	46.168	-0.15	26.687	0	-7.52	0	0.383	0.401	-0.018
67.6	46.187	-0.15	26.878	0	-7.28	0	0.383	0.401	-0.018
67.7	46.205	-0.155	27.033	0	-7.22	0	0.383	0.401	-0.018
67.8	46.23	-0.167	26.896	0	-7.18	0	0.382	0.401	-0.019
67.9	46.23	-0.172	26.973	0	-7.16	0	0.382	0.401	-0.019
68	46.274	-0.155	27.062	0	-7.13	0	0.382	0.401	-0.019
68.1	46.274	-0.152	26.493	0	-6.55	0	0.382	0.401	-0.019
68.2	46.317	-0.155	26.235	0	-6.43	0	0.382	0.401	-0.019
68.3	46.342	-0.15	26.807	0	-6.56	0	0.381	0.401	-0.02
68.4	46.367	-0.152	26.892	0	-6.55	0	0.381	0.401	-0.02
68.5	46.385	-0.145	27.351	0	-6.51	0	0.381	0.401	-0.02
68.6	46.41	-0.142	27.213	0	-6.44	0	0.381	0.401	-0.02
68.7	46.429	-0.14	26.829	0	-6.11	0	0.381	0.401	-0.02
68.8	46.454	-0.14	27.319	0	-6.12	0	0.381	0.401	-0.02
68.9	46.472	-0.15	27.312	0	-6.05	0	0.38	0.401	-0.021
69	46.497	-0.165	28.114	0	-5.94	0	0.38	0.401	-0.021
69.1	46.522	-0.155	27.75	0	-5.19	0	0.38	0.401	-0.021
69.2	46.547	-0.142	27.143	0	-4.6	0	0.38	0.401	-0.021
69.3	46.547	-0.155	26.991	0	-4.49	0	0.38	0.401	-0.021
69.4	46.572	-0.16	27.39	0	-4.52	0	0.38	0.401	-0.021
69.5	46.621	-0.15	27.496	0	-4.28	0	0.38	0.401	-0.021
69.6	46.653	-0.14	27.03	0	-4.29	0	0.379	0.401	-0.022
69.7	46.677	-0.122	27.461	0	-4.29	0	0.379	0.401	-0.022
69.8	46.702	-0.115	27.376	0	-4.44	0	0.379	0.401	-0.022

69.9	46.727	-0.115	27.1	0	-4.36	0	0.379	0.401	-0.022
70	46.758	-0.135	27.542	0	-4.47	0	0.379	0.401	-0.022
70.1	46.783	-0.132	27.888	0	-4.43	0	0.379	0.401	-0.022
70.2	46.808	-0.14	27.874	0	-4.58	0	0.379	0.401	-0.022
70.3	46.833	-0.125	28.012	0	-5.29	0	0.379	0.401	-0.022
70.4	46.858	-0.117	28.047	0	-5.74	0	0.378	0.401	-0.023
70.5	46.882	-0.142	27.747	0	-6.12	0	0.378	0.401	-0.023
70.6	46.907	-0.145	28.594	0	-6.43	0	0.378	0.401	-0.023
70.7	46.926	-0.132	28.633	0	-6.86	0	0.378	0.401	-0.023
70.8	46.951	-0.135	27.641	0	-7.58	0	0.378	0.401	-0.023
70.9	46.969	-0.147	28.058	0	-8.23	0	0.377	0.401	-0.024
71	46.988	-0.13	28.541	0	-9.14	0	0.377	0.401	-0.024
71.1	46.988	-0.117	27.966	0	-9.82	0	0.377	0.401	-0.024
71.2	47.013	-0.132	27.821	0	-10.25	0	0.377	0.401	-0.024
71.3	47.013	-0.145	28.178	0	-10.93	0	0.376	0.401	-0.025
71.4	47.044	-0.142	28.485	0	-11.36	0	0.376	0.401	-0.025
71.5	47.05	-0.13	28.149	0	-11.65	0	0.376	0.401	-0.025
71.6	47.05	-0.13	28.301	0	-11.87	0	0.375	0.401	-0.026
71.7	47.069	-0.13	27.959	0	-11.75	0	0.375	0.401	-0.026
71.8	47.081	-0.13	28.594	0	-11.56	0	0.375	0.401	-0.026
71.9	47.081	-0.125	28.195	0	-11.51	0	0.374	0.401	-0.027
72	47.106	-0.107	28.393	0	-11.63	0	0.374	0.401	-0.027
72.1	47.119	-0.102	28.195	0	-11.67	0	0.374	0.401	-0.027
72.2	47.131	-0.11	28.598	0	-11.79	0	0.373	0.401	-0.028
72.3	47.143	-0.122	28.933	0	-12.23	0	0.373	0.401	-0.028
72.4	47.156	-0.122	29.279	0	-12.26	0	0.373	0.401	-0.028
72.5	47.156	-0.117	29.417	0	-12.34	0	0.372	0.401	-0.029
72.6	47.181	-0.1	28.743	0	-12.92	0	0.372	0.401	-0.029
72.7	47.187	-0.085	28.57	0	-13.27	0	0.372	0.401	-0.029
72.8	47.199	-0.097	28.598	0	-13.25	0	0.371	0.401	-0.03
72.9	47.199	-0.097	28.806	0	-13.28	0	0.371	0.401	-0.03
73	47.218	-0.14	29.498	0	-13.7	0	0.371	0.401	-0.03
73.1	47.218	-0.117	29.844	0	-14.38	0	0.37	0.401	-0.031
73.2	47.237	-0.11	28.192	0	-14.66	0	0.37	0.401	-0.031
73.3	47.237	-0.11	29.06	0	-15.02	0	0.369	0.401	-0.032
73.4	47.249	-0.122	29.484	0	-15.81	0	0.369	0.401	-0.032
73.5	47.249	-0.122	29.431	0	-16.51	0	0.368	0.401	-0.033
73.6	47.255	-0.122	29.163	0	-16.72	0	0.368	0.401	-0.033
73.7	47.261	-0.095	29.018	0	-16.87	0	0.368	0.401	-0.033
73.8	47.261	-0.085	29.163	0	-16.97	0	0.367	0.401	-0.034
73.9	47.268	-0.085	28.891	0	-16.99	0	0.367	0.401	-0.034
74	47.268	-0.115	29.696	0	-17	0	0.366	0.401	-0.035
74.1	47.274	-0.112	30.07	0	-16.96	0	0.366	0.401	-0.035
74.2	47.28	-0.097	29.738	0	-17	0	0.365	0.401	-0.036
74.3	47.28	-0.097	29.078	0	-16.94	0	0.365	0.401	-0.036
74.4	47.286	-0.092	29.629	0	-16.93	0	0.364	0.401	-0.037
74.5	47.286	-0.085	30.212	0	-16.85	0	0.364	0.401	-0.037

74.6	47.293	-0.09	29.403	0	-16.84	0	0.363	0.401	-0.038
74.7	47.299	-0.11	29.59	0	-17.35	0	0.363	0.401	-0.038
74.8	47.299	-0.13	29.59	0	-17.73	0	0.362	0.401	-0.039
74.9	47.299	-0.13	30.07	0	-18.46	0	0.362	0.401	-0.039
75	47.299	-0.115	29.89	0	-19.5	0	0.361	0.401	-0.04
75.1	47.299	-0.115	29.06	0	-20.73	0	0.361	0.401	-0.04
75.2	47.293	-0.1	28.849	0	-21.54	0	0.36	0.401	-0.041
75.3	47.286	-0.095	29.527	0	-21.85	0	0.359	0.401	-0.042
75.4	47.286	-0.092	29.265	0	-22.06	0	0.359	0.401	-0.042
75.5	47.286	-0.097	29.407	0	-22.14	0	0.358	0.401	-0.043
75.6	47.274	-0.105	29.89	0	-21.83	0	0.358	0.401	-0.043
75.7	47.268	-0.105	30.169	0	-21.78	0	0.357	0.401	-0.044
75.8	47.268	-0.095	30.127	0	-22.48	0	0.356	0.401	-0.045
75.9	47.268	-0.095	29.851	0	-22.68	0	0.356	0.401	-0.045
76	47.261	-0.072	30.519	0	-22.07	0	0.355	0.401	-0.046
76.1	47.261	-0.07	30.537	0	-21.47	0	0.355	0.401	-0.046
76.2	47.255	-0.082	31.54	0	-20.89	0	0.354	0.401	-0.047
76.3	47.255	-0.1	31.946	0	-20.71	0	0.353	0.401	-0.048
76.4	47.249	-0.11	31.402	0	-20.62	0	0.353	0.401	-0.048
76.5	47.249	-0.105	30.508	0	-20.49	0	0.352	0.401	-0.049
76.6	47.243	-0.105	29.742	0	-20.45	0	0.352	0.401	-0.049
76.7	47.243	-0.09	29.686	0	-20.44	0	0.351	0.401	-0.05
76.8	47.237	-0.092	29.463	0	-20.88	0	0.351	0.401	-0.05
76.9	47.224	-0.102	29.477	0	-21.4	0	0.35	0.401	-0.051
77	47.218	-0.12	29.17	0	-22.89	0	0.349	0.401	-0.052
77.1	47.212	-0.12	29.696	0	-24.64	0	0.349	0.401	-0.052
77.2	47.212	-0.117	29.283	0	-25.83	0	0.348	0.401	-0.053
77.3	47.199	-0.11	29.145	0	-26.26	0	0.347	0.401	-0.054
77.4	47.181	-0.105	28.983	0	-26.64	0	0.346	0.401	-0.055
77.5	47.156	-0.09	28.732	0	-26.95	0	0.346	0.401	-0.055
77.6	47.15	-0.07	29.011	0	-26.88	0	0.345	0.401	-0.056
77.7	47.137	-0.067	29.618	0	-26.75	0	0.344	0.401	-0.057
77.8	47.125	-0.067	30.967	0	-26.56	0	0.343	0.401	-0.058
77.9	47.125	-0.07	31.963	0	-26.39	0	0.343	0.401	-0.058
78	47.1	-0.062	31.797	0	-25.97	0	0.342	0.401	-0.059
78.1	47.1	-0.072	31.232	0	-25.06	0	0.341	0.401	-0.06
78.2	47.075	-0.09	30.84	0	-24.22	0	0.341	0.401	-0.06
78.3	47.069	-0.077	31.54	0	-23.77	0	0.34	0.401	-0.061
78.4	47.069	-0.087	31.105	0	-23.46	0	0.339	0.401	-0.062
78.5	47.05	-0.105	30.618	0	-23.19	0	0.339	0.401	-0.062
78.6	47.05	-0.117	30.83	0	-22.86	0	0.338	0.401	-0.063
78.7	47.032	-0.12	30.325	0	-22.66	0	0.337	0.401	-0.064
78.8	47.025	-0.117	29.89	0	-22.53	0	0.337	0.401	-0.064
78.9	47.013	-0.117	29.304	0	-22.42	0	0.336	0.401	-0.065
79	47.007	-0.107	29.032	0	-22.22	0	0.336	0.401	-0.065
79.1	47.001	-0.11	29.212	0	-22.18	0	0.335	0.401	-0.066
79.2	47.001	-0.112	29.565	0	-21.99	0	0.334	0.401	-0.067

79.3	46.976	-0.112	28.81	0	-21.31	0	0.334	0.401	-0.067
79.4	46.969	-0.107	28.81	0	-20.77	0	0.333	0.401	-0.068
79.5	46.969	-0.135	28.178	0	-20.38	0	0.333	0.401	-0.068
79.6	46.963	-0.135	29.212	0	-20.19	0	0.332	0.401	-0.069
79.7	46.951	-0.135	28.99	0	-20.05	0	0.331	0.401	-0.07
79.8	46.951	-0.125	28.086	0	-19.65	0	0.331	0.401	-0.07
79.9	46.938	-0.122	28.284	0	-18.29	0	0.33	0.401	-0.071
80	46.938	-0.105	28.234	0	-16.3	0	0.33	0.401	-0.071
80.1	46.938	-0.107	28.202	0	-15.36	0	0.33	0.401	-0.071
80.2	46.938	-0.132	27.913	0	-15.21	0	0.329	0.401	-0.072
80.3	46.945	-0.13	28.449	0	-14.68	0	0.329	0.401	-0.072
80.4	46.945	-0.12	28.365	0	-14.27	0	0.328	0.401	-0.073
80.5	46.945	-0.14	27.521	0	-13.74	0	0.328	0.401	-0.073
80.6	46.945	-0.157	27.874	0	-13.44	0	0.328	0.401	-0.073
80.7	46.951	-0.147	28.054	0	-12.53	0	0.327	0.401	-0.074
80.8	46.957	-0.147	27.026	0	-12.13	0	0.327	0.401	-0.074
80.9	46.963	-0.147	26.804	0	-12.02	0	0.327	0.401	-0.074
81	46.969	-0.145	26.832	0	-11.91	0	0.326	0.401	-0.075
81.1	46.976	-0.145	26.638	0	-11.76	0	0.326	0.401	-0.075
81.2	46.982	-0.145	26.461	0	-11.65	0	0.326	0.401	-0.075
81.3	46.982	-0.147	26.391	0	-11.49	0	0.325	0.401	-0.076
81.4	46.988	-0.147	26.239	0	-11.45	0	0.325	0.401	-0.076
81.5	46.988	-0.157	26.931	0	-11.42	0	0.325	0.401	-0.076
81.6	46.994	-0.15	26.211	0	-11.38	0	0.324	0.401	-0.077
81.7	47.001	-0.162	25.854	0	-11.44	0	0.324	0.401	-0.077
81.8	47.001	-0.167	25.924	0	-11.6	0	0.324	0.401	-0.077
81.9	47.007	-0.167	26.595	0	-10.87	0	0.323	0.401	-0.078
82	47.007	-0.165	25.762	0	-11.05	0	0.323	0.401	-0.078
82.1	47.013	-0.17	25.992	0	-11.09	0	0.323	0.401	-0.078
82.2	47.019	-0.167	25.494	0	-10.88	0	0.322	0.401	-0.079
82.3	47.019	-0.167	26.073	0	-11.04	0	0.322	0.401	-0.079
82.4	47.025	-0.162	25.981	0	-11.04	0	0.322	0.401	-0.079
82.5	47.025	-0.165	25.879	0	-11.01	0	0.322	0.401	-0.079
82.6	47.025	-0.165	26.119	0	-11	0	0.321	0.401	-0.08
82.7	47.044	-0.152	25.977	0	-10.95	0	0.321	0.401	-0.08
82.8	47.044	-0.15	25.663	0	-11.03	0	0.321	0.401	-0.08
82.9	47.05	-0.15	25.713	0	-11.12	0	0.32	0.401	-0.081
83	47.056	-0.165	26.143	0	-11.17	0	0.32	0.401	-0.081
83.1	47.063	-0.165	26.373	0	-11.38	0	0.32	0.401	-0.081
83.2	47.069	-0.162	26.32	0	-11.82	0	0.319	0.401	-0.082
83.3	47.069	-0.17	26.006	0	-11.95	0	0.319	0.401	-0.082
83.4	47.075	-0.182	26.045	0	-12	0	0.319	0.401	-0.082
83.5	47.075	-0.17	26.959	0	-12.04	0	0.318	0.401	-0.083
83.6	47.081	-0.147	26.55	0	-12.11	0	0.318	0.401	-0.083
83.7	47.088	-0.147	25.589	0	-12.07	0	0.318	0.401	-0.083
83.8	47.094	-0.16	26.196	0	-12.05	0	0.317	0.401	-0.084
83.9	47.1	-0.16	26.581	0	-12.31	0	0.317	0.401	-0.084

84	47.1	-0.145	26.235	0	-13.06	0	0.317	0.401	-0.084
84.1	47.1	-0.157	25.868	0	-13.56	0	0.316	0.401	-0.085
84.2	47.1	-0.155	26.761	0	-13.69	0	0.316	0.401	-0.085
84.3	47.1	-0.162	26.415	0	-13.74	0	0.315	0.401	-0.086
84.4	47.106	-0.162	26.059	0	-13.7	0	0.315	0.401	-0.086
84.5	47.106	-0.142	26.249	0	-13.72	0	0.315	0.401	-0.086
84.6	47.106	-0.142	26.235	0	-13.67	0	0.314	0.401	-0.087
84.7	47.106	-0.15	26.281	0	-13.7	0	0.314	0.401	-0.087
84.8	47.112	-0.152	26.814	0	-13.66	0	0.314	0.401	-0.087
84.9	47.112	-0.152	26.62	0	-13.63	0	0.313	0.401	-0.088
85	47.112	-0.142	26.444	0	-13.59	0	0.313	0.401	-0.088
85.1	47.119	-0.13	26.087	0	-13.59	0	0.312	0.401	-0.089
85.2	47.119	-0.14	26.486	0	-13.56	0	0.312	0.401	-0.089
85.3	47.119	-0.152	26.627	0	-13.56	0	0.312	0.401	-0.089
85.4	47.119	-0.15	26.984	0	-13.53	0	0.311	0.401	-0.09
85.5	47.119	-0.152	26.592	0	-13.49	0	0.311	0.401	-0.09
85.6	47.119	-0.152	26.666	0	-13.49	0	0.311	0.401	-0.09
85.7	47.125	-0.135	26.419	0	-12.81	0	0.31	0.401	-0.091
85.8	47.125	-0.157	26.048	0	-11.26	0	0.31	0.401	-0.091
85.9	47.137	-0.157	26.595	0	-11.15	0	0.31	0.401	-0.091
86	47.143	-0.152	26.581	0	-11.2	0	0.309	0.401	-0.092
86.1	47.15	-0.155	26.221	0	-12.56	0	0.309	0.401	-0.092
86.2	47.15	-0.157	26.539	0	-15.71	0	0.308	0.401	-0.093
86.3	47.15	-0.155	26.677	0	-21.25	0	0.308	0.401	-0.093
86.4	47.125	-0.16	26.5	0	-24.08	0	0.307	0.401	-0.094
86.5	47.106	-0.162	26.419	0	-24.22	0	0.307	0.401	-0.094
86.6	47.106	-0.175	26.359	0	-24.81	0	0.306	0.401	-0.095
86.7	47.063	-0.177	26.059	0	-25.38	0	0.305	0.401	-0.096
86.8	47.063	-0.157	26.486	0	-26.47	0	0.304	0.401	-0.097
86.9	47.013	-0.157	25.561	0	-29.17	0	0.304	0.401	-0.097
87	46.994	-0.11	26.143	0	-30.79	0	0.303	0.401	-0.098
87.1	46.969	-0.105	27.757	0	-31.84	0	0.302	0.401	-0.099
87.2	46.951	-0.087	29.198	0	-31.5	0	0.301	0.401	-0.1
87.3	46.951	-0.05	30.148	0	-31.3	0	0.3	0.401	-0.101
87.4	46.907	-0.05	30.914	0	-31.21	0	0.299	0.401	-0.102
87.5	46.907	-0.067	32.316	0	-33.41	0	0.298	0.401	-0.103
87.6	46.889	-0.075	32.864	0	-35.62	0	0.297	0.401	-0.104
87.7	46.82	-0.082	32.867	0	-35.88	0	0.296	0.401	-0.105
87.8	46.82	-0.075	31.674	0	-35.9	0	0.295	0.401	-0.106
87.9	46.752	-0.075	31.271	0	-35.92	0	0.294	0.401	-0.107
88	46.752	-0.072	30.688	0	-36.01	0	0.293	0.401	-0.108
88.1	46.721	-0.072	31.052	0	-36.02	0	0.292	0.401	-0.109
88.2	46.659	-0.07	30.953	0	-36.06	0	0.291	0.401	-0.11
88.3	46.628	-0.07	31.409	0	-35.94	0	0.29	0.401	-0.111
88.4	46.597	-0.06	31.487	0	-35.83	0	0.289	0.401	-0.112
88.5	46.566	-0.07	31.596	0	-36.09	0	0.288	0.401	-0.113
88.6	46.566	-0.067	32.306	0	-36.28	0	0.287	0.401	-0.114

88.7	46.503	-0.065	32.331	0	-36.36	0	0.286	0.401	-0.115
88.8	46.503	-0.057	31.854	0	-36.38	0	0.285	0.401	-0.116
88.9	46.472	-0.062	32.419	0	-36.16	0	0.284	0.401	-0.117
89	46.41	-0.08	32.027	0	-35.72	0	0.283	0.401	-0.118
89.1	46.41	-0.065	32.853	0	-34.84	0	0.282	0.401	-0.119
89.2	46.348	-0.065	32.112	0	-33.48	0	0.281	0.401	-0.12
89.3	46.348	-0.035	31.515	0	-31.75	0	0.281	0.401	-0.12
89.4	46.298	-0.065	31.748	0	-30.41	0	0.28	0.401	-0.121
89.5	46.28	-0.087	32.366	0	-29.43	0	0.279	0.401	-0.122
89.6	46.28	-0.087	32.394	0	-28.69	0	0.278	0.401	-0.123
89.7	46.236	-0.08	31.321	0	-27.18	0	0.277	0.401	-0.124
89.8	46.218	-0.08	30.173	0	-26.55	0	0.277	0.401	-0.124
89.9	46.199	-0.09	30.286	0	-25.93	0	0.276	0.401	-0.125
90	46.199	-0.112	29.982	0	-25.43	0	0.275	0.401	-0.126
90.1	46.168	-0.13	29.396	0	-25.09	0	0.274	0.401	-0.127
90.2	46.149	-0.135	28.796	0	-24.81	0	0.274	0.401	-0.127
90.3	46.149	-0.132	28.771	0	-24.34	0	0.273	0.401	-0.128
90.4	46.118	-0.127	28.407	0	-24.04	0	0.272	0.401	-0.129
90.5	46.106	-0.117	28.022	0	-23.52	0	0.272	0.401	-0.129
90.6	46.093	-0.117	28.153	0	-23.1	0	0.271	0.401	-0.13
90.7	46.081	-0.122	28.019	0	-21.28	0	0.271	0.401	-0.13
90.8	46.075	-0.11	28.962	0	-19.97	0	0.27	0.401	-0.131
90.9	46.068	-0.11	28.178	0	-18.83	0	0.269	0.401	-0.132
91	46.062	-0.105	27.662	0	-17.43	0	0.269	0.401	-0.132
91.1	46.056	-0.147	28.167	0	-15.96	0	0.269	0.401	-0.132
91.2	46.056	-0.15	28.206	0	-13.84	0	0.268	0.401	-0.133
91.3	46.056	-0.16	27.04	0	-12	0	0.268	0.401	-0.133
91.4	46.062	-0.167	26.765	0	-10.58	0	0.268	0.401	-0.133
91.5	46.062	-0.18	26.405	0	-9.39	0	0.267	0.401	-0.134
91.6	46.068	-0.175	26.228	0	-8.1	0	0.267	0.401	-0.134
91.7	46.081	-0.172	25.596	0	-5.81	0	0.267	0.401	-0.134
91.8	46.093	-0.197	25.098	0	-3.35	0	0.267	0.401	-0.134
91.9	46.112	-0.205	24.897	0	-1.77	0	0.267	0.401	-0.134
92	46.131	-0.19	24.625	0	0	0	0.267	0.401	-0.134
92.1	46.155	-0.2	23.297	0	0.84	0	0.267	0.401	-0.134
92.2	46.155	-0.21	23.784	0	2.32	0	0.267	0.401	-0.134
92.3	46.205	-0.207	24.085	0	3.18	0	0.267	0.401	-0.134
92.4	46.23	-0.207	22.955	0	3.69	0	0.267	0.401	-0.134
92.5	46.255	-0.207	22.944	0	4.82	0	0.267	0.401	-0.134
92.6	46.286	-0.222	22.573	0	4.98	0	0.267	0.402	-0.134
92.7	46.317	-0.235	22.683	0	5.8	0	0.267	0.402	-0.134
92.8	46.348	-0.235	23.255	0	5.67	0	0.268	0.402	-0.134
92.9	46.373	-0.227	22.598	0	5.52	0	0.268	0.402	-0.134
93	46.373	-0.255	22.351	0	5.49	0	0.268	0.402	-0.134
93.1	46.435	-0.25	23.142	0	5.42	0	0.268	0.402	-0.134
93.2	46.46	-0.232	22.891	0	5.37	0	0.268	0.402	-0.134
93.3	46.491	-0.237	22.058	0	5.33	0	0.268	0.403	-0.134

93.4	46.522	-0.237	22.63	0	5.26	0	0.269	0.403	-0.134
93.5	46.522	-0.235	22.93	0	5.25	0	0.269	0.403	-0.134
93.6	46.578	-0.212	22.898	0	5.07	0	0.269	0.403	-0.134
93.7	46.578	-0.217	22.248	0	5.01	0	0.269	0.403	-0.134
93.8	46.609	-0.23	22.739	0	4.96	0	0.269	0.403	-0.134
93.9	46.665	-0.23	23.35	0	4.9	0	0.269	0.403	-0.134
94	46.696	-0.22	23.138	0	4.87	0	0.269	0.404	-0.134
94.1	46.721	-0.222	22.453	0	4.81	0	0.269	0.404	-0.134
94.2	46.721	-0.235	22.926	0	4.79	0	0.27	0.404	-0.134
94.3	46.777	-0.235	23.308	0	4.73	0	0.27	0.404	-0.134
94.4	46.808	-0.23	23.163	0	4.43	0	0.27	0.404	-0.134
94.5	46.808	-0.247	22.598	0	4.39	0	0.27	0.404	-0.134
94.6	46.864	-0.247	23.431	0	4.34	0	0.27	0.404	-0.134
94.7	46.889	-0.235	23.421	0	4.31	0	0.27	0.404	-0.134
94.8	46.92	-0.222	22.842	0	4.23	0	0.27	0.405	-0.134
94.9	46.945	-0.222	23.053	0	4.19	0	0.27	0.405	-0.134
95	46.976	-0.212	23.364	0	4.16	0	0.271	0.405	-0.134
95.1	47.001	-0.205	23.294	0	3.99	0	0.271	0.405	-0.134
95.2	47.032	-0.205	23.177	0	3.64	0	0.271	0.405	-0.134
95.3	47.063	-0.21	23.191	0	3.39	0	0.271	0.405	-0.134
95.4	47.081	-0.207	23.576	0	3.3	0	0.271	0.405	-0.134
95.5	47.112	-0.202	23.618	0	3.3	0	0.271	0.405	-0.134
95.6	47.143	-0.215	23.286	0	3.25	0	0.271	0.405	-0.134
95.7	47.168	-0.205	24.085	0	3.18	0	0.271	0.406	-0.134
95.8	47.168	-0.192	23.809	0	3.15	0	0.271	0.406	-0.134
95.9	47.218	-0.192	23.59	0	3.1	0	0.271	0.406	-0.134
96	47.249	-0.22	23.717	0	2.96	0	0.272	0.406	-0.134
96.1	47.274	-0.22	23.989	0	2.83	0	0.272	0.406	-0.134
96.2	47.299	-0.202	24.212	0	2.75	0	0.272	0.406	-0.134
96.3	47.324	-0.207	23.361	0	2.7	0	0.272	0.406	-0.134
96.4	47.348	-0.207	23.894	0	2.68	0	0.272	0.406	-0.134
96.5	47.38	-0.207	24.604	0	2.6	0	0.272	0.406	-0.134
96.6	47.38	-0.202	23.894	0	2.58	0	0.272	0.406	-0.134
96.7	47.429	-0.202	23.576	0	2.53	0	0.272	0.406	-0.134
96.8	47.429	-0.192	24.462	0	2.45	0	0.272	0.406	-0.134
96.9	47.485	-0.192	24.07	0	2.23	0	0.272	0.406	-0.134
97	47.485	-0.187	24.113	0	2.13	0	0.272	0.406	-0.134
97.1	47.535	-0.18	24.607	0	2.96	0	0.272	0.407	-0.134
97.2	47.56	-0.187	24.251	0	2.95	0	0.272	0.407	-0.134
97.3	47.591	-0.2	24.688	0	2.88	0	0.272	0.407	-0.134
97.4	47.616	-0.207	24.236	0	2.92	0	0.273	0.407	-0.134
97.5	47.647	-0.197	24.893	0	3.78	0	0.273	0.407	-0.134
97.6	47.647	-0.197	24.741	0	3.77	0	0.273	0.407	-0.134
97.7	47.703	-0.19	24.286	0	3.83	0	0.273	0.407	-0.134
97.8	47.703	-0.2	24.688	0	3.62	0	0.273	0.407	-0.134
97.9	47.759	-0.2	24.922	0	4.42	0	0.273	0.407	-0.134
98	47.79	-0.187	24.978	0	4.77	0	0.273	0.407	-0.134

98.1	47.827	-0.18	24.904	0	4.39	0	0.273	0.408	-0.134
98.2	47.858	-0.175	24.332	0	3.21	0	0.273	0.408	-0.134
98.3	47.895	-0.17	24.688	0	2.1	0	0.273	0.408	-0.134
98.4	47.926	-0.15	25.391	0	-0.95	0	0.273	0.408	-0.134
98.5	47.964	-0.117	26.324	0	-2.63	0	0.273	0.408	-0.134
98.6	47.964	-0.087	27.012	0	-4.49	0	0.273	0.408	-0.134
98.7	48.044	-0.05	28.644	0	-6.08	0	0.273	0.408	-0.135
98.8	48.044	-0.05	29.933	0	-6.03	0	0.273	0.408	-0.135
98.9	48.119	-0.035	32.112	0	-6.07	0	0.273	0.408	-0.135
99	48.162	-0.015	33.461	0	-5.96	0	0.273	0.408	-0.135
99.1	48.206	-0.015	33.955	0	-6	0	0.272	0.408	-0.135
99.2	48.243	0.01	34.266	0	-6.36	0	0.272	0.408	-0.135
99.3	48.243	0	35.159	0	-6.63	0	0.272	0.408	-0.136
99.4	48.324	0	36.311	0	-6.72	0	0.272	0.408	-0.136
99.5	48.368	0.01	36.166	0	-7.75	0	0.272	0.408	-0.136
99.6	48.405	-0.002	35.625	0	-7.71	0	0.271	0.408	-0.136
99.7	48.442	-0.002	36.176	0	-7.8	0	0.271	0.408	-0.137
99.8	48.442	0.008	36.222	0	-7.63	0	0.271	0.408	-0.137
99.9	48.517	0.008	36.024	0	-8.36	0	0.271	0.408	-0.137
100	48.554	0.003	36.282	0	-8.58	0	0.271	0.408	-0.137
100.1	48.585	0	36.236	0	-9.45	0	0.27	0.408	-0.137
100.2	48.585	-0.032	35.399	0	-9.62	0	0.27	0.408	-0.138
100.3	48.647	-0.05	35.83	0	-9.31	0	0.27	0.408	-0.138
100.4	48.672	-0.04	35.399	0	-9.02	0	0.27	0.408	-0.138
100.5	48.703	-0.057	33.432	0	-8.47	0	0.269	0.408	-0.138
100.6	48.703	-0.057	32.994	0	-8.1	0	0.269	0.408	-0.139
100.7	48.753	-0.06	33.175	0	-7.76	0	0.269	0.408	-0.139
100.8	48.753	-0.06	32.408	0	-7.53	0	0.269	0.408	-0.139
100.9	48.809	-0.05	32.687	0	-7.39	0	0.268	0.408	-0.139
101	48.84	-0.057	31.861	0	-7.31	0	0.268	0.408	-0.14
101.1	48.865	-0.08	31.847	0	-8.41	0	0.268	0.408	-0.14
101.2	48.889	-0.095	32.101	0	-8.86	0	0.268	0.408	-0.14
101.3	48.914	-0.082	32.384	0	-8.98	0	0.267	0.408	-0.14
101.4	48.933	-0.075	31.391	0	-9.25	0	0.267	0.408	-0.141
101.5	48.952	-0.082	30.95	0	-9	0	0.267	0.408	-0.141
101.6	48.952	-0.075	31.352	0	-8.56	0	0.267	0.408	-0.141
101.7	48.995	-0.08	30.974	0	-8.27	0	0.267	0.408	-0.141
101.8	48.995	-0.08	30.621	0	-8.06	0	0.266	0.408	-0.141
101.9	49.02	-0.085	30.95	0	-8.03	0	0.266	0.408	-0.142
102	49.057	-0.085	29.972	0	-9.02	0	0.266	0.408	-0.142
102.1	49.076	-0.087	30.159	0	-9.18	0	0.266	0.408	-0.142
102.2	49.095	-0.082	30.42	0	-8.72	0	0.265	0.408	-0.142
102.3	49.113	-0.085	29.876	0	-7.75	0	0.265	0.408	-0.143
102.4	49.132	-0.1	30.067	0	-7.65	0	0.265	0.408	-0.143
102.5	49.15	-0.102	30.243	0	-7.66	0	0.265	0.408	-0.143
102.6	49.15	-0.09	29.837	0	-7.68	0	0.264	0.408	-0.143
102.7	49.169	-0.095	29.166	0	-9.48	0	0.264	0.408	-0.144

102.8	49.188	-0.107	29.152	0	-14.22	0	0.264	0.408	-0.144
102.9	49.2	-0.107	29.848	0	-15.95	0	0.263	0.408	-0.144
103	49.2	-0.12	29.633	0	-15.76	0	0.263	0.408	-0.145
103.1	49.2	-0.147	29.332	0	-14.84	0	0.263	0.408	-0.145
103.2	49.194	-0.16	29.633	0	-13.93	0	0.262	0.408	-0.146
103.3	49.194	-0.16	29.191	0	-12.95	0	0.262	0.408	-0.146
103.4	49.188	-0.175	27.457	0	-12.06	0	0.261	0.408	-0.146
103.5	49.188	-0.18	27.221	0	-12.64	0	0.261	0.408	-0.147
103.6	49.175	-0.18	26.468	0	-14.29	0	0.261	0.408	-0.147
103.7	49.157	-0.202	25.847	0	-13.24	0	0.26	0.408	-0.147
103.8	49.157	-0.215	25.515	0	-12.6	0	0.26	0.408	-0.148
103.9	49.144	-0.215	24.166	0	-12.29	0	0.26	0.408	-0.148
104	49.126	-0.232	23.869	0	-11.98	0	0.259	0.408	-0.148
104.1	49.126	-0.232	23.294	0	-11.45	0	0.259	0.408	-0.149
104.2	49.107	-0.242	22.167	0	-11.02	0	0.259	0.408	-0.149
104.3	49.088	-0.242	22.693	0	-10.98	0	0.258	0.408	-0.149
104.4	49.076	-0.237	22.45	0	-10.98	0	0.258	0.408	-0.15
104.5	49.063	-0.23	22.266	0	-11	0	0.258	0.408	-0.15
104.6	49.063	-0.23	22.054	0	-10.81	0	0.257	0.408	-0.15
104.7	49.045	-0.23	21.906	0	-10.46	0	0.257	0.408	-0.151
104.8	49.032	-0.23	21.966	0	-10.46	0	0.257	0.408	-0.151
104.9	49.032	-0.225	21.99	0	-10.45	0	0.257	0.408	-0.151
105	49.014	-0.225	21.976	0	-10.29	0	0.256	0.408	-0.151
105.1	49.001	-0.225	22.693	0	-9.51	0	0.256	0.408	-0.152
105.2	48.995	-0.215	22.255	0	-6.82	0	0.256	0.408	-0.152
105.3	48.995	-0.23	22.52	0	-8.96	0	0.256	0.408	-0.152
105.4	48.989	-0.232	22.764	0	-9.25	0	0.255	0.408	-0.152
105.5	48.989	-0.21	23.445	0	-9.26	0	0.255	0.408	-0.153
105.6	48.989	-0.195	22.863	0	-9.25	0	0.255	0.408	-0.153
105.7	48.983	-0.195	23.202	0	-9	0	0.255	0.408	-0.153
105.8	48.976	-0.2	23.587	0	-8.94	0	0.254	0.408	-0.153
105.9	48.976	-0.2	23.887	0	-8.76	0	0.254	0.408	-0.154
106	48.976	-0.205	24.674	0	-8.52	0	0.254	0.408	-0.154
106.1	48.976	-0.212	24.021	0	-8.43	0	0.254	0.408	-0.154
106.2	48.976	-0.207	24.088	0	-8.3	0	0.253	0.408	-0.154
106.3	48.983	-0.197	25.003	0	-8.29	0	0.253	0.408	-0.155
106.4	48.983	-0.205	24.289	0	-8.29	0	0.253	0.408	-0.155
106.5	48.995	-0.187	24.989	0	-8.31	0	0.253	0.408	-0.155
106.6	48.995	-0.187	25.028	0	-8.35	0	0.252	0.408	-0.155
106.7	49.001	-0.165	25.102	0	-8.35	0	0.252	0.408	-0.156
106.8	49.001	-0.17	25.557	0	-8.35	0	0.252	0.408	-0.156
106.9	49.001	-0.17	25.67	0	-8.35	0	0.252	0.408	-0.156
107	49.014	-0.18	26.348	0	-8.35	0	0.252	0.408	-0.156
107.1	49.014	-0.165	25.84	0	-8.34	0	0.251	0.408	-0.156
107.2	49.02	-0.165	25.003	0	-8.35	0	0.251	0.408	-0.157
107.3	49.026	-0.18	25.903	0	-8.13	0	0.251	0.408	-0.157
107.4	49.026	-0.18	25.762	0	-8.13	0	0.251	0.408	-0.157

107.5	49.032	-0.185	25.956	0	-8.14	0	0.25	0.408	-0.157
107.6	49.032	-0.18	25.596	0	-8.13	0	0.25	0.408	-0.158
107.7	49.039	-0.18	25.402	0	-8.14	0	0.25	0.408	-0.158
107.8	49.045	-0.185	25.762	0	-8.09	0	0.25	0.408	-0.158
107.9	49.051	-0.185	25.762	0	-8.07	0	0.249	0.408	-0.158
108	49.051	-0.177	25.942	0	-8.08	0	0.249	0.408	-0.158
108.1	49.057	-0.17	25.67	0	-8.03	0	0.249	0.408	-0.159
108.2	49.076	-0.167	25.589	0	-7.97	0	0.249	0.408	-0.159
108.3	49.082	-0.17	26.041	0	-7.94	0	0.249	0.408	-0.159
108.4	49.095	-0.17	25.942	0	-7.93	0	0.248	0.408	-0.159
108.5	49.101	-0.185	26.518	0	-7.92	0	0.248	0.408	-0.16
108.6	49.101	-0.165	26.995	0	-7.92	0	0.248	0.408	-0.16
108.7	49.113	-0.165	26.574	0	-7.94	0	0.248	0.408	-0.16
108.8	49.119	-0.142	26.267	0	-7.87	0	0.247	0.408	-0.16
108.9	49.144	-0.142	27.136	0	-7.87	0	0.247	0.408	-0.16
109	49.157	-0.152	27.634	0	-7.85	0	0.247	0.408	-0.161
109.1	49.157	-0.152	27.549	0	-7.87	0	0.247	0.408	-0.161
109.2	49.182	-0.152	27.372	0	-7.87	0	0.247	0.408	-0.161
109.3	49.2	-0.152	27.673	0	-7.82	0	0.246	0.408	-0.161
109.4	49.213	-0.16	27.952	0	-7.82	0	0.246	0.408	-0.162
109.5	49.225	-0.16	27.955	0	-7.8	0	0.246	0.408	-0.162
109.6	49.225	-0.13	28.513	0	-7.8	0	0.246	0.408	-0.162
109.7	49.25	-0.117	27.443	0	-7.79	0	0.246	0.408	-0.162
109.8	49.269	-0.137	27.747	0	-7.35	0	0.245	0.408	-0.162
109.9	49.269	-0.137	28.305	0	-6.44	0	0.245	0.408	-0.163
110	49.306	-0.14	28.64	0	-6.9	0	0.245	0.408	-0.163
110.1	49.324	-0.13	28.163	0	-7.6	0	0.245	0.408	-0.163
110.2	49.337	-0.115	28.344	0	-7.59	0	0.245	0.408	-0.163
110.3	49.356	-0.105	28.679	0	-7.65	0	0.244	0.408	-0.163
110.4	49.368	-0.12	28.527	0	-8.36	0	0.244	0.408	-0.164
110.5	49.387	-0.12	29.29	0	-8.35	0	0.244	0.408	-0.164
110.6	49.387	-0.112	29.47	0	-8.29	0	0.244	0.408	-0.164
110.7	49.418	-0.12	29.011	0	-8.34	0	0.243	0.408	-0.164
110.8	49.43	-0.12	29.29	0	-8.36	0	0.243	0.408	-0.165
110.9	49.449	-0.125	29.77	0	-8.35	0	0.243	0.408	-0.165
111	49.461	-0.092	28.926	0	-8.35	0	0.243	0.408	-0.165
111.1	49.474	-0.102	28.743	0	-8.32	0	0.242	0.408	-0.165
111.2	49.492	-0.115	29.541	0	-8.24	0	0.242	0.408	-0.165
111.3	49.505	-0.112	29.731	0	-8.26	0	0.242	0.408	-0.166
111.4	49.523	-0.112	29.11	0	-8.29	0	0.242	0.408	-0.166
111.5	49.536	-0.13	29.527	0	-8.49	0	0.242	0.408	-0.166
111.6	49.536	-0.12	29.509	0	-8.76	0	0.241	0.408	-0.166
111.7	49.561	-0.12	28.926	0	-8.72	0	0.241	0.408	-0.167
111.8	49.561	-0.135	29.082	0	-8.6	0	0.241	0.408	-0.167
111.9	49.592	-0.135	29.445	0	-8.48	0	0.241	0.408	-0.167
112	49.604	-0.12	29.431	0	-8.49	0	0.24	0.408	-0.167
112.1	49.604	-0.115	28.541	0	-8.48	0	0.24	0.408	-0.168

112.2	49.635	-0.125	29.152	0	-8.5	0	0.24	0.408	-0.168
112.3	49.648	-0.14	29.643	0	-8.72	0	0.24	0.408	-0.168
112.4	49.66	-0.135	29.58	0	-9.31	0	0.239	0.408	-0.168
112.5	49.672	-0.11	29.361	0	-9.13	0	0.239	0.408	-0.169
112.6	49.672	-0.11	28.421	0	-9.63	0	0.239	0.408	-0.169
112.7	49.691	-0.122	29.138	0	-9.9	0	0.239	0.408	-0.169
112.8	49.703	-0.127	29.488	0	-11.48	0	0.238	0.408	-0.169
112.9	49.703	-0.127	28.82	0	-12.07	0	0.238	0.408	-0.17
113	49.71	-0.127	29.128	0	-12.31	0	0.238	0.408	-0.17
113.1	49.71	-0.13	28.485	0	-11.94	0	0.237	0.408	-0.17
113.2	49.716	-0.137	28.612	0	-12.27	0	0.237	0.408	-0.171
113.3	49.716	-0.155	28.64	0	-14.22	0	0.237	0.408	-0.171
113.4	49.71	-0.155	28.421	0	-14.35	0	0.236	0.408	-0.172
113.5	49.71	-0.162	27.828	0	-14.11	0	0.236	0.408	-0.172
113.6	49.71	-0.172	27.291	0	-14.3	0	0.235	0.408	-0.172
113.7	49.691	-0.177	27.277	0	-14.17	0	0.235	0.408	-0.173
113.8	49.679	-0.177	26.588	0	-13.38	0	0.235	0.408	-0.173
113.9	49.672	-0.192	25.681	0	-12.55	0	0.234	0.408	-0.174
114	49.654	-0.2	25.656	0	-12.05	0	0.234	0.408	-0.174
114.1	49.654	-0.197	24.777	0	-11.71	0	0.234	0.408	-0.174
114.2	49.635	-0.2	24.049	0	-11.57	0	0.233	0.408	-0.174
114.3	49.629	-0.222	23.138	0	-11.54	0	0.233	0.408	-0.175
114.4	49.616	-0.222	23.873	0	-11.72	0	0.233	0.408	-0.175
114.5	49.604	-0.222	23.965	0	-12.86	0	0.232	0.408	-0.176
114.6	49.604	-0.225	23.131	0	-13.21	0	0.232	0.408	-0.176
114.7	49.592	-0.23	23.145	0	-13.47	0	0.231	0.408	-0.176
114.8	49.561	-0.235	23.534	0	-13.93	0	0.231	0.408	-0.177
114.9	49.548	-0.235	23.516	0	-14.23	0	0.231	0.408	-0.177
115	49.529	-0.225	23.121	0	-14.55	0	0.23	0.408	-0.177
115.1	49.529	-0.215	22.796	0	-14.9	0	0.23	0.408	-0.178
115.2	49.492	-0.21	22.891	0	-16.41	0	0.229	0.408	-0.178
115.3	49.492	-0.21	22.478	0	-16.68	0	0.229	0.408	-0.179
115.4	49.443	-0.247	22.683	0	-16.36	0	0.229	0.408	-0.179
115.5	49.418	-0.24	23.145	0	-16.21	0	0.228	0.408	-0.18
115.6	49.418	-0.242	22.308	0	-16.12	0	0.228	0.408	-0.18
115.7	49.399	-0.262	22.167	0	-15.84	0	0.227	0.408	-0.181
115.8	49.349	-0.26	22.224	0	-15.65	0	0.227	0.408	-0.181
115.9	49.331	-0.26	22.354	0	-15.62	0	0.226	0.408	-0.181
116	49.306	-0.255	21.814	0	-15.57	0	0.226	0.408	-0.182
116.1	49.281	-0.247	22.1	0	-15.55	0	0.225	0.408	-0.182
116.2	49.281	-0.247	21.842	0	-15.56	0	0.225	0.408	-0.183
116.3	49.237	-0.237	21.231	0	-15.43	0	0.225	0.408	-0.183
116.4	49.219	-0.247	21.231	0	-15.39	0	0.224	0.408	-0.184
116.5	49.194	-0.247	21.715	0	-15.42	0	0.224	0.408	-0.184
116.6	49.194	-0.257	21.489	0	-15.37	0	0.223	0.408	-0.184
116.7	49.169	-0.27	21.715	0	-15.37	0	0.223	0.408	-0.185
116.8	49.15	-0.27	21.68	0	-15.67	0	0.222	0.408	-0.185

116.9	49.101	-0.252	21.655	0	-17.26	0	0.222	0.408	-0.186
117	49.07	-0.237	21.129	0	-18.63	0	0.221	0.408	-0.186
117.1	49.07	-0.26	21.143	0	-18.97	0	0.221	0.408	-0.187
117.2	49.014	-0.27	21.863	0	-19.03	0	0.22	0.408	-0.187
117.3	49.014	-0.265	21.623	0	-18.99	0	0.22	0.408	-0.188
117.4	48.945	-0.265	21.199	0	-18.26	0	0.219	0.408	-0.188
117.5	48.921	-0.285	21.189	0	-17.34	0	0.219	0.408	-0.189
117.6	48.921	-0.272	21.475	0	-16.6	0	0.218	0.408	-0.189
117.7	48.889	-0.257	20.73	0	-16.49	0	0.218	0.408	-0.19
117.8	48.84	-0.267	20.758	0	-16.49	0	0.218	0.408	-0.19
117.9	48.84	-0.267	21.125	0	-16.88	0	0.217	0.408	-0.191
118	48.79	-0.277	21.719	0	-17.21	0	0.217	0.408	-0.191
118.1	48.79	-0.265	20.843	0	-17.48	0	0.216	0.408	-0.192
118.2	48.759	-0.275	21.016	0	-18.26	0	0.216	0.408	-0.192
118.3	48.697	-0.275	20.97	0	-19.08	0	0.215	0.408	-0.193
118.4	48.697	-0.26	21.196	0	-19.62	0	0.214	0.408	-0.193
118.5	48.635	-0.26	20.634	0	-11.04	0	0.214	0.408	-0.194
118.6	48.604	-0.26	20.479	0	2.21	0	0.214	0.408	-0.194
118.7	48.604	-0.25	21.196	0	10.38	0	0.215	0.408	-0.194
118.8	48.554	-0.24	20.772	0	10.13	0	0.215	0.408	-0.194
118.9	48.517	-0.24	20.942	0	9.79	0	0.215	0.409	-0.194
119	48.479	-0.488	21.952	0	9.39	0	0.215	0.409	-0.194
119.1	48.442	-0.57	20.059	0	9.37	0	0.216	0.409	-0.194
119.2	48.411	-0.57	10.481	0	10.14	0	0.216	0.409	-0.194
119.3	48.374	-0.623	5.619	0	12.19	0	0.216	0.41	-0.194
119.4	48.343	-0.658	1.497	0	14.31	0	0.217	0.41	-0.194
119.5	48.318	-0.683	0.922	0	14.82	0	0.217	0.411	-0.194
119.6	48.293	-0.66	1.119	0	15.4	0	0.217	0.411	-0.194
119.7	48.293	-0.625	-0.025	0	15.58	0	0.218	0.411	-0.194
119.8	48.243	-0.625	-2.034	0	16.61	0	0.218	0.412	-0.194
119.9	48.218	-0.643	-0.713	0	16.55	0	0.219	0.412	-0.194
120	48.218	-0.663	0.046	0	16.88	0	0.219	0.413	-0.194
120.1	48.175	-0.685	-0.788	0	16.82	0	0.22	0.413	-0.194
120.2	48.15	-0.698	-1.187	0	16.52	0	0.22	0.414	-0.194
120.3	48.15	-0.678	-1.017	0	15.98	0	0.221	0.414	-0.194
120.4	48.107	-0.678	-2.564	0	14.4	0	0.221	0.415	-0.194
120.5	48.075	-0.688	-2.408	0	12.9	0	0.221	0.415	-0.194
120.6	48.044	-0.685	-1.095	0	11.57	0	0.222	0.415	-0.194
120.7	48.044	-0.685	-1.854	0	11.09	0	0.222	0.416	-0.194
120.8	47.982	-0.69	-1.501	0	10.53	0	0.222	0.416	-0.194
120.9	47.951	-0.69	-1.681	0	10.08	0	0.223	0.416	-0.194
121	47.92	-0.68	-1.674	0	9.51	0	0.223	0.416	-0.194
121.1	47.883	-0.688	-1.271	0	9.5	0	0.223	0.417	-0.194
121.2	47.852	-0.685	-0.759	0	9.47	0	0.223	0.417	-0.194
121.3	47.815	-0.673	-0.12	0	9.46	0	0.224	0.417	-0.194
121.4	47.783	-0.68	-1.261	0	9.47	0	0.224	0.418	-0.194
121.5	47.783	-0.7	-0.731	0	9.46	0	0.224	0.418	-0.194

121.6	47.715	-0.7	-0.265	0	9.45	0	0.224	0.418	-0.194
121.7	47.715	-0.7	-0.18	0	9.46	0	0.225	0.418	-0.194
121.8	47.653	-0.685	-0.576	0	9.98	0	0.225	0.419	-0.194
121.9	47.616	-0.685	-1.109	0	10.47	0	0.225	0.419	-0.194
122	47.585	-0.675	-0.307	0	11.11	0	0.226	0.419	-0.194
122.1	47.554	-0.665	-0.484	0	13.03	0	0.226	0.42	-0.194
122.2	47.529	-0.665	-0.47	0	16.02	0	0.226	0.42	-0.194
122.3	47.51	-0.665	-0.583	0	19.25	0	0.227	0.421	-0.194
122.4	47.491	-0.67	-0.459	0	21.82	0	0.228	0.421	-0.194
122.5	47.485	-0.655	0.046	0	24.4	0	0.228	0.422	-0.194
122.6	47.479	-0.66	-0.547	0	28.04	0	0.229	0.423	-0.194
122.7	47.479	-0.673	-0.742	0	30.82	0	0.23	0.423	-0.194
122.8	47.485	-0.673	0.102	0	31.23	0	0.231	0.424	-0.194
122.9	47.491	-0.665	-0.445	0	31.26	0	0.232	0.425	-0.194
123	47.498	-0.68	-1.003	0	31.67	0	0.232	0.426	-0.194
123.1	47.498	-0.688	-0.011	0	33.72	0	0.233	0.427	-0.194
123.2	47.51	-0.678	0.155	0	34.43	0	0.234	0.428	-0.194
123.3	47.522	-0.678	-0.717	0	34.44	0	0.235	0.429	-0.194
123.4	47.529	-0.678	-0.275	0	34.45	0	0.236	0.43	-0.194
123.5	47.541	-0.65	0.283	0	34.47	0	0.237	0.431	-0.194
123.6	47.541	-0.643	-0.66	0	34.45	0	0.238	0.432	-0.194
123.7	47.56	-0.643	-1.119	0	34.51	0	0.239	0.433	-0.194
123.8	47.572	-0.675	0.283	0	34.82	0	0.24	0.434	-0.194
123.9	47.585	-0.675	0.113	0	35.19	0	0.241	0.435	-0.194
124	47.591	-0.683	-0.021	0	35.36	0	0.242	0.436	-0.194
124.1	47.603	-0.668	-0.258	0	36.96	0	0.243	0.437	-0.194
124.2	47.603	-0.678	-0.72	0	37.94	0	0.244	0.438	-0.194
124.3	47.622	-0.678	-0.092	0	37.75	0	0.245	0.439	-0.194
124.4	47.653	-0.67	-0.032	0	37.1	0	0.246	0.44	-0.194
124.5	47.665	-0.678	-0.562	0	36.84	0	0.247	0.441	-0.194
124.6	47.678	-0.678	-0.41	0	36.85	0	0.248	0.442	-0.194
124.7	47.678	-0.673	0.18	0	36.88	0	0.249	0.443	-0.194
124.8	47.696	-0.66	-0.307	0	45.58	0	0.251	0.444	-0.194
124.9	47.721	-0.66	-1.049	0	61.84	0	0.252	0.446	-0.194
125	47.74	-0.66	-0.353	0	50.01	0	0.254	0.447	-0.194
125.1	47.752	-0.66	-0.477	0	57.11	0	0.255	0.449	-0.194
125.2	47.752	-0.66	-0.756	0	111.74	0	0.258	0.452	-0.194
125.3	47.783	-0.688	-0.124	0	103.56	0	0.261	0.455	-0.194
125.4	47.802	-0.643	-0.12	0	66.62	0	0.263	0.457	-0.194
125.5	47.802	-0.438	-0.198	0	4.81	0	0.263	0.457	-0.194
125.6	47.846	0.138	1.218	0	8.14	0	0.263	0.457	-0.194
125.7	47.858	0.141	6.049	0	13.47	0	0.264	0.457	-0.194
125.8	47.864	0.141	30.261	0	13.8	0	0.264	0.458	-0.194
125.9	47.864	-0.375	49.868	0	9.11	0	0.264	0.458	-0.194
126	47.87	-0.357	28.153	0	6.12	0	0.265	0.458	-0.194
126.1	47.877	-0.362	12.784	0	2.5	0	0.265	0.458	-0.194
126.2	47.877	-0.34	15.139	0	-0.82	0	0.265	0.458	-0.194

126.3	47.864	-0.292	17.053	0	-3.36	0	0.265	0.458	-0.194
126.4	47.858	-0.292	16.82	0	-4.22	0	0.264	0.458	-0.194
126.5	47.852	-0.277	18.791	0	-4.89	0	0.264	0.458	-0.194
126.6	47.852	-0.305	20.694	0	-5.28	0	0.264	0.458	-0.194
126.7	47.833	-0.295	21.358	0	-5.52	0	0.264	0.458	-0.194
126.8	47.833	-0.27	21.026	0	-4.83	0	0.264	0.458	-0.194
126.9	47.815	-0.27	20.281	0	-4.17	0	0.264	0.458	-0.195
127	47.815	-0.275	20.747	0	-5.05	0	0.264	0.458	-0.195
127.1	47.802	-0.3	21.132	0	-5.49	0	0.263	0.458	-0.195
127.2	47.802	-0.292	19.621	0	-6.03	0	0.263	0.458	-0.195
127.3	47.796	-0.29	19.37	0	-6.55	0	0.263	0.458	-0.195
127.4	47.79	-0.27	20.55	0	-6.93	0	0.263	0.458	-0.195
127.5	47.79	-0.272	20.606	0	-8.66	0	0.263	0.458	-0.196
127.6	47.777	-0.272	20.624	0	-9.44	0	0.262	0.458	-0.196
127.7	47.777	-0.265	22.132	0	-9.45	0	0.262	0.458	-0.196
127.8	47.765	-0.247	21.779	0	-9.21	0	0.262	0.458	-0.196
127.9	47.759	-0.247	21.429	0	-8.92	0	0.262	0.458	-0.197
128	47.759	-0.26	22.192	0	-8.69	0	0.261	0.458	-0.197
128.1	47.759	-0.242	22.81	0	-8.63	0	0.261	0.458	-0.197
128.2	47.746	-0.242	21.86	0	-8.45	0	0.261	0.458	-0.197
128.3	47.746	-0.32	21.937	0	-8.44	0	0.261	0.458	-0.198
128.4	47.746	-0.29	23.399	0	-8.45	0	0.26	0.458	-0.198
128.5	47.74	-0.232	23.149	0	-8.45	0	0.26	0.458	-0.198
128.6	47.74	-0.235	20.779	0	-8.42	0	0.26	0.458	-0.198
128.7	47.74	-0.245	22.488	0	-8.32	0	0.26	0.458	-0.198
128.8	47.734	-0.245	23.407	0	-8.29	0	0.26	0.458	-0.199
128.9	47.734	-0.237	22.757	0	-8.29	0	0.259	0.458	-0.199
129	47.734	-0.24	22.866	0	-8.29	0	0.259	0.458	-0.199
129.1	47.734	-0.232	23.103	0	-8.3	0	0.259	0.458	-0.199
129.2	47.734	-0.22	22.824	0	-8.3	0	0.259	0.458	-0.2
129.3	47.734	-0.23	22.707	0	-8.28	0	0.258	0.458	-0.2
129.4	47.734	-0.23	23.237	0	-8.27	0	0.258	0.458	-0.2
129.5	47.734	-0.24	23.364	0	-8.28	0	0.258	0.458	-0.2
129.6	47.734	-0.242	23.06	0	-8.28	0	0.258	0.458	-0.201
129.7	47.734	-0.247	23.435	0	-8.07	0	0.258	0.458	-0.201
129.8	47.734	-0.25	23.548	0	-8.03	0	0.257	0.458	-0.201
129.9	47.728	-0.25	23.251	0	-8.06	0	0.257	0.458	-0.201
130	47.734	-0.245	23.032	0	-8.06	0	0.257	0.458	-0.201
130.1	47.734	-0.237	23.166	0	-8.01	0	0.257	0.458	-0.202
130.2	47.734	-0.237	23.421	0	-7.91	0	0.256	0.458	-0.202
130.3	47.734	-0.237	23.565	0	-7.9	0	0.256	0.458	-0.202
130.4	47.734	-0.22	23.099	0	-7.9	0	0.256	0.458	-0.202
130.5	47.74	-0.23	23.008	0	-7.9	0	0.256	0.458	-0.203
130.6	47.74	-0.225	23.89	0	-7.9	0	0.256	0.458	-0.203
130.7	47.74	-0.21	23.823	0	-7.71	0	0.255	0.458	-0.203
130.8	47.746	-0.22	23.113	0	-7.44	0	0.255	0.458	-0.203
130.9	47.752	-0.22	23.71	0	-7.41	0	0.255	0.458	-0.203

131	47.752	-0.227	24.166	0	-7.17	0	0.255	0.458	-0.204
131.1	47.759	-0.212	24.067	0	-5.01	0	0.255	0.458	-0.204
131.2	47.771	-0.212	23.809	0	-4.59	0	0.254	0.458	-0.204
131.3	47.783	-0.205	23.767	0	-4.47	0	0.254	0.458	-0.204
131.4	47.796	-0.222	23.862	0	-4.87	0	0.254	0.458	-0.204
131.5	47.815	-0.21	24.738	0	-6.57	0	0.254	0.458	-0.204
131.6	47.815	-0.192	24.794	0	-7.04	0	0.254	0.458	-0.205
131.7	47.821	-0.187	24.547	0	-7.04	0	0.254	0.458	-0.205
131.8	47.846	-0.187	25.172	0	-7.06	0	0.253	0.458	-0.205
131.9	47.858	-0.217	25.935	0	-7.05	0	0.253	0.458	-0.205
132	47.87	-0.18	26.839	0	-7.05	0	0.253	0.458	-0.205
132.1	47.877	-0.18	25.056	0	-7.07	0	0.253	0.458	-0.205
132.2	47.895	-0.187	25.585	0	-7.06	0	0.253	0.458	-0.206
132.3	47.908	-0.18	26.758	0	-7.07	0	0.252	0.458	-0.206
132.4	47.92	-0.18	26.316	0	-7.06	0	0.252	0.458	-0.206
132.5	47.926	-0.19	25.932	0	-7.07	0	0.252	0.458	-0.206
132.6	47.945	-0.177	26.624	0	-7.09	0	0.252	0.458	-0.206
132.7	47.957	-0.177	26.302	0	-7.21	0	0.252	0.458	-0.207
132.8	47.964	-0.19	25.804	0	-7.21	0	0.251	0.458	-0.207
132.9	47.976	-0.19	26.482	0	-7.62	0	0.251	0.458	-0.207
133	47.988	-0.19	26.719	0	-7.51	0	0.251	0.458	-0.207
133.1	48.001	-0.175	25.72	0	-7.77	0	0.251	0.458	-0.208
133.2	48.007	-0.175	25.949	0	-8.27	0	0.251	0.458	-0.208
133.3	48.013	-0.167	26.292	0	-9.31	0	0.25	0.458	-0.208
133.4	48.02	-0.162	25.935	0	-10.76	0	0.25	0.458	-0.208
133.5	48.02	-0.172	25.716	0	-15.72	0	0.25	0.458	-0.209
133.6	48.001	-0.172	25.317	0	-21.2	0	0.249	0.458	-0.209
133.7	47.97	-0.202	25.787	0	-24.35	0	0.248	0.458	-0.21
133.8	47.933	-0.212	25.631	0	-24.17	0	0.248	0.458	-0.211
133.9	47.889	-0.212	24.628	0	-24.19	0	0.247	0.458	-0.211
134	47.839	-0.292	24.046	0	-22.59	0	0.246	0.458	-0.212
134.1	47.839	-0.28	22.725	0	-20.92	0	0.246	0.458	-0.213
134.2	47.734	-0.307	20.514	0	-19.27	0	0.245	0.458	-0.213
134.3	47.684	-0.362	20.528	0	-17.79	0	0.245	0.458	-0.214
134.4	47.628	-0.37	20.377	0	-16.47	0	0.244	0.458	-0.214
134.5	47.578	-0.39	17.675	0	-15.45	0	0.244	0.458	-0.214
134.6	47.522	-0.433	14.762	0	-14.81	0	0.243	0.458	-0.215
134.7	47.467	-0.435	14.913	0	-11.31	0	0.243	0.458	-0.215
134.8	47.417	-0.435	13.451	0	-2.02	0	0.243	0.458	-0.215
134.9	47.348	-0.433	12.134	0	-10.93	0	0.243	0.458	-0.216
135	47.249	-0.433	11.982	0	-17.1	0	0.242	0.458	-0.216
135.1	47.131	-0.57	11.205	0	-19.04	0	0.242	0.458	-0.217
135.2	47.038	-0.705	12.081	0	-22.17	0	0.241	0.458	-0.217
135.3	46.907	-0.708	8.197	0	-25.88	0	0.24	0.458	-0.218
135.4	46.907	-0.708	0.918	0	-28.16	0	0.24	0.458	-0.219
135.5	46.659	-0.623	-3.581	0	-29.53	0	0.239	0.458	-0.219
135.6	46.528	-0.66	-1.098	0	-35.18	0	0.238	0.458	-0.22

135.7	46.385	-0.653	1.088	0	-37.5	0	0.237	0.458	-0.222
135.8	46.242	-0.65	-0.272	0	-37.33	0	0.236	0.458	-0.223
135.9	46.1	-0.65	-1.13	0	-37.33	0	0.235	0.458	-0.224
136	45.957	-0.665	0.028	0	-38.6	0	0.234	0.458	-0.225
136.1	45.957	-0.7	-0.364	0	-43.42	0	0.232	0.458	-0.226
136.2	45.64	-0.695	-0.23	0	-49.71	0	0.231	0.458	-0.227
136.3	45.478	-0.665	-1.388	0	-52.58	0	0.23	0.458	-0.229
136.4	45.273	-0.638	-2.772	0	-57.59	0	0.228	0.458	-0.23
136.5	45.068	-0.7	-2.454	0	-64.98	0	0.226	0.458	-0.232
136.6	45.068	-0.7	-1.73	0	-67.16	0	0.224	0.458	-0.234
136.7	44.621	-0.713	-1.3	0	-67.65	0	0.222	0.458	-0.236
136.8	44.416	-0.685	-4.068	0	-71.08	0	0.22	0.458	-0.238
136.9	44.173	-0.685	-3.602	0	-74.1	0	0.218	0.458	-0.24
137	43.919	-0.685	-1.141	0	-75.28	0	0.216	0.458	-0.242
137.1	43.67	-0.678	-0.999	0	-74.87	0	0.214	0.458	-0.244
137.2	43.384	-0.678	-1.589	0	-74.37	0	0.212	0.458	-0.246
137.3	43.16	-0.708	-0.833	0	-73.66	0	0.21	0.458	-0.248
137.4	42.906	-0.703	-0.307	0	-73.29	0	0.208	0.458	-0.25
137.5	42.651	-0.693	-0.749	0	-68.87	0	0.206	0.458	-0.252
137.6	42.39	-0.69	-1.014	0	-62.29	0	0.204	0.458	-0.254
137.7	42.104	-0.67	-0.639	0	-57.87	0	0.203	0.458	-0.255
137.8	41.88	-0.67	-0.699	0	-63.76	0	0.201	0.458	-0.257
137.9	41.644	-0.658	-1.423	0	-65.52	0	0.199	0.458	-0.259
138	41.644	-0.678	-1.112	0	-66.05	0	0.197	0.458	-0.261
138.1	41.135	-0.665	-0.004	0	-66.88	0	0.196	0.458	-0.263
138.2	40.899	-0.668	-1.201	0	-67.2	0	0.194	0.458	-0.265
138.3	40.694	-0.678	-0.975	0	-57.26	0	0.192	0.458	-0.266
138.4	40.694	-0.678	-0.212	0	-48.68	0	0.191	0.458	-0.268
138.5	40.315	-0.718	-0.226	0	-47.62	0	0.189	0.458	-0.269
138.6	40.116	-0.69	0.254	0	-47.48	0	0.188	0.458	-0.27
138.7	39.936	-0.69	-1.141	0	-47.55	0	0.187	0.458	-0.272
138.8	39.774	-0.678	-0.915	0	-48.28	0	0.185	0.458	-0.273
138.9	39.594	-0.678	-0.689	0	-34.7	0	0.184	0.458	-0.274
139	39.594	-0.665	-0.66	0	-21.34	0	0.184	0.458	-0.274
139.1	39.376	-0.675	-0.932	0	-11.05	0	0.184	0.458	-0.275
139.2	39.302	-0.668	-0.448	0	-1.47	0	0.184	0.458	-0.275
139.3	39.246	-0.68	-0.583	0	0	0	0.184	0.458	-0.275
139.4	39.202	-0.685	-0.745	0	0	0	0.184	0.458	-0.275
139.5	39.202	-0.68	-0.403	0	0	0	0.184	0.458	-0.275
139.6	39.122	-0.68	-0.879	0	0	0	0.184	0.458	-0.275
139.7	39.122	-0.668	-0.678	0	0	0	0.184	0.458	-0.275
139.8	39.028	-0.66	-0.837	0	0.89	0	0.184	0.458	-0.275
139.9	38.991	-0.66	-1.208	0	3.42	0	0.184	0.458	-0.275
140	38.96	-0.675	-0.145	0	9.11	0	0.184	0.459	-0.275
140.1	38.96	-0.663	-0.29	0	16.09	0	0.184	0.459	-0.275
140.2	38.935	-0.673	-1.25	0	17.34	0	0.185	0.46	-0.275
140.3	38.929	-0.68	-0.607	0	17.51	0	0.185	0.46	-0.275

140.4	38.923	-0.675	-0.265	0	17.53	0	0.186	0.461	-0.275
140.5	38.916	-0.668	-0.876	0	17.46	0	0.186	0.461	-0.275
140.6	38.916	-0.665	-0.837	0	17.42	0	0.187	0.462	-0.275
140.7	38.91	-0.658	-0.477	0	17.73	0	0.187	0.462	-0.275
140.8	38.91	-0.658	-0.918	0	18.96	0	0.188	0.463	-0.275
140.9	38.904	-0.665	-0.565	0	19.54	0	0.188	0.463	-0.275
141	38.91	-0.655	-0.265	0	21.31	0	0.189	0.464	-0.275
141.1	38.91	-0.655	-0.403	0	21.88	0	0.19	0.464	-0.275
141.2	38.91	-0.65	-0.936	0	21.86	0	0.19	0.465	-0.275
141.3	38.923	-0.663	-0.724	0	21.87	0	0.191	0.466	-0.275
141.4	38.923	-0.675	-0.724	0	21.88	0	0.191	0.466	-0.275
141.5	38.935	-0.683	-0.265	0	21.89	0	0.192	0.467	-0.275
141.6	38.935	-0.678	-0.784	0	21.89	0	0.193	0.467	-0.275
141.7	38.935	-0.678	-0.54	0	21.48	0	0.193	0.468	-0.275
141.8	38.948	-0.665	-0.865	0	21.21	0	0.194	0.469	-0.275
141.9	38.948	-0.665	-0.883	0	21.22	0	0.194	0.469	-0.275
142	38.954	-0.67	-0.491	0	21.24	0	0.195	0.47	-0.275
142.1	38.954	-0.66	-0.622	0	21.32	0	0.196	0.47	-0.275
142.2	38.96	-0.658	-0.865	0	21.86	0	0.196	0.471	-0.275
142.3	38.966	-0.658	-0.865	0	25.4	0	0.197	0.472	-0.275
142.4	38.979	-0.653	-0.526	0	28.42	0	0.198	0.472	-0.275
142.5	38.979	-0.653	-0.851	0	31.17	0	0.199	0.473	-0.275
142.6	39.016	-0.673	-0.583	0	33.19	0	0.199	0.474	-0.275
142.7	39.035	-0.678	-0.434	0	35.22	0	0.2	0.475	-0.275
142.8	39.053	-0.668	-0.434	0	29.01	0	0.201	0.476	-0.275
142.9	39.078	-0.668	-1.042	0	27.92	0	0.202	0.477	-0.275
143	39.097	-0.665	-0.745	0	28.34	0	0.203	0.478	-0.275
143.1	39.109	-0.685	-0.837	0	28.98	0	0.204	0.478	-0.275
143.2	39.134	-0.685	-0.265	0	29.9	0	0.204	0.479	-0.275
143.3	39.153	-0.67	-0.17	0	30.85	0	0.205	0.48	-0.275
143.4	39.177	-0.67	-1.028	0	32.82	0	0.206	0.481	-0.275
143.5	39.209	-0.675	-0.922	0	35.24	0	0.207	0.482	-0.275
143.6	39.24	-0.675	-0.586	0	36.25	0	0.208	0.483	-0.275
143.7	39.277	-0.67	-0.572	0	37.78	0	0.209	0.484	-0.275
143.8	39.314	-0.67	-0.872	0	39	0	0.21	0.485	-0.275
143.9	39.345	-0.668	-0.689	0	41.02	0	0.211	0.486	-0.275
144	39.389	-0.678	-0.586	0	51.6	0	0.213	0.488	-0.275
144.1	39.445	-0.678	-0.731	0	66.96	0	0.215	0.49	-0.275
144.2	39.494	-0.69	-0.727	0	62.07	0	0.217	0.491	-0.275
144.3	39.563	-0.718	-0.671	0	76.71	0	0.219	0.493	-0.275
144.4	39.625	-0.69	0.618	0	117.65	0	0.222	0.497	-0.275
144.5	39.681	-0.665	-0.812	0	115.93	0	0.225	0.5	-0.275
144.6	39.749	-0.615	-1.596	0	108.11	0	0.228	0.503	-0.275
144.7	39.836	-0.615	-0.219	0	52.04	0	0.23	0.504	-0.275
144.8	39.898	-0.055	0.911	0	35.95	0	0.231	0.505	-0.275
144.9	39.973	-0.055	7.812	0	34.28	0	0.232	0.506	-0.275
145	40.041	-0.025	25.963	0	38.24	0	0.233	0.507	-0.275

145.1	40.116	-0.46	34.414	0	36.34	0	0.234	0.508	-0.275
145.2	40.184	-0.52	33.711	0	33.47	0	0.235	0.509	-0.275
145.3	40.259	-0.52	18.357	0	31.31	0	0.235	0.51	-0.275
145.4	40.333	-0.322	7.518	0	30.18	0	0.236	0.511	-0.275
145.5	40.414	-0.305	13.522	0	29.24	0	0.237	0.512	-0.275
145.6	40.489	-0.305	17.534	0	27.99	0	0.238	0.513	-0.275
145.7	40.582	-0.217	19.006	0	27.32	0	0.239	0.513	-0.275
145.8	40.663	-0.207	21.535	0	26.86	0	0.239	0.514	-0.275
145.9	40.756	-0.207	23.121	0	26.71	0	0.24	0.515	-0.275
146	40.849	-0.187	24.374	0	24.75	0	0.241	0.516	-0.275
146.1	40.942	-0.212	24.907	0	23.1	0	0.241	0.516	-0.275
146.2	41.029	-0.212	25.402	0	24.8	0	0.242	0.517	-0.275
146.3	41.129	-0.157	26.295	0	25.94	0	0.243	0.518	-0.275
146.4	41.234	-0.122	25.236	0	27.27	0	0.244	0.518	-0.275
146.5	41.346	-0.135	26.624	0	28.25	0	0.244	0.519	-0.275
146.6	41.458	-0.142	29	0	29.76	0	0.245	0.52	-0.275
146.7	41.588	-0.12	29.841	0	29.3	0	0.246	0.521	-0.275
146.8	41.7	-0.12	29.477	0	27.88	0	0.247	0.522	-0.275
146.9	41.818	-0.102	29.562	0	26.7	0	0.248	0.522	-0.275
147	41.936	-0.065	30.876	0	26.12	0	0.248	0.523	-0.275
147.1	42.054	-0.065	31.19	0	25.74	0	0.249	0.524	-0.275
147.2	42.172	-0.055	31.465	0	24.71	0	0.25	0.524	-0.275
147.3	42.278	-0.05	32.705	0	23.57	0	0.25	0.525	-0.275
147.4	42.396	-0.04	33.044	0	22.52	0	0.251	0.526	-0.275
147.5	42.508	-0.022	32.998	0	21.56	0	0.252	0.526	-0.275
147.6	42.632	-0.02	33.86	0	20.73	0	0.252	0.527	-0.275
147.7	42.757	-0.02	34.333	0	19.96	0	0.253	0.527	-0.275
147.8	42.868	0.008	35.375	0	17.99	0	0.253	0.528	-0.275
147.9	42.868	0.008	35.375	0	15.21	0	0.254	0.528	-0.275
148	43.092	0.02	35.989	0	12.11	0	0.254	0.529	-0.275
148.1	43.185	0.02	37.349	0	7.76	0	0.254	0.529	-0.275
148.2	43.291	0.035	37.787	0	1.99	0	0.254	0.529	-0.275
148.3	43.291	0.035	37.359	0	-4.5	0	0.254	0.529	-0.275
148.4	43.44	0.033	38.147	0	-8.97	0	0.254	0.529	-0.275
148.5	43.508	0.05	38.684	0	-9.67	0	0.254	0.529	-0.275
148.6	43.571	0.05	38.588	0	-8.88	0	0.253	0.529	-0.276
148.7	43.639	0.053	39.111	0	-7.63	0	0.253	0.529	-0.276
148.8	43.701	0.053	40.248	0	-6.42	0	0.253	0.529	-0.276
148.9	43.769	0.053	40.294	0	-5.7	0	0.253	0.529	-0.276
149	43.832	0.025	39.821	0	-5.55	0	0.253	0.529	-0.276
149.1	43.881	0.01	38.889	0	-7.29	0	0.252	0.529	-0.277
149.2	43.943	0.01	37.409	0	-8.92	0	0.252	0.529	-0.277
149.3	43.993	-0.02	37.409	0	-9.16	0	0.252	0.529	-0.277
149.4	44.037	-0.007	36.653	0	-9.03	0	0.252	0.529	-0.277
149.5	44.037	-0.01	35.873	0	-11.13	0	0.251	0.529	-0.278
149.6	44.099	-0.065	35.375	0	-13.3	0	0.251	0.529	-0.278
149.7	44.117	-0.107	35.022	0	-13.29	0	0.251	0.529	-0.278

149.8	44.13	-0.107	33.326	0	-12.59	0	0.25	0.529	-0.279
149.9	44.142	-0.125	30.982	0	-11.34	0	0.25	0.529	-0.279
150	44.148	-0.167	29.576	0	-10.84	0	0.25	0.529	-0.279
150.1	44.155	-0.167	27.87	0	-9.9	0	0.249	0.529	-0.28
150.2	44.167	-0.227	25.653	0	-9.06	0	0.249	0.529	-0.28
150.3	44.167	-0.252	24.794	0	-8.56	0	0.249	0.529	-0.28
150.4	44.173	-0.262	23.392	0	-8.03	0	0.249	0.529	-0.28
150.5	44.179	-0.265	22.654	0	-6.8	0	0.248	0.529	-0.281
150.6	44.186	-0.287	21.496	0	-5.83	0	0.248	0.529	-0.281
150.7	44.198	-0.287	21.673	0	-5.63	0	0.248	0.529	-0.281
150.8	44.204	-0.27	21.514	0	-5.62	0	0.248	0.529	-0.281
150.9	44.204	-0.27	20.532	0	-5.63	0	0.248	0.529	-0.281
151	44.217	-0.272	20.641	0	-5.64	0	0.248	0.529	-0.281
151.1	44.223	-0.27	21.016	0	-5.66	0	0.247	0.529	-0.281
151.2	44.229	-0.272	20.829	0	-5.63	0	0.247	0.529	-0.282
151.3	44.235	-0.272	20.878	0	-5.43	0	0.247	0.529	-0.282
151.4	44.248	-0.262	21.355	0	-5.36	0	0.247	0.529	-0.282
151.5	44.254	-0.255	21.224	0	-5.34	0	0.247	0.529	-0.282
151.6	44.26	-0.255	21.542	0	-4.29	0	0.247	0.529	-0.282
151.7	44.273	-0.247	21.139	0	0	0	0.247	0.529	-0.282
151.8	44.291	-0.247	21.404	0	0.69	0	0.247	0.529	-0.282
151.9	44.329	-0.247	21.68	0	0	0	0.247	0.529	-0.282
152	44.329	-0.212	21.775	0	-0.72	0	0.247	0.529	-0.282
152.1	44.385	-0.2	21.733	0	-1.42	0	0.247	0.529	-0.282
152.2	44.416	-0.195	22.757	0	-2.27	0	0.247	0.529	-0.282
152.3	44.44	-0.18	24.869	0	-3.07	0	0.247	0.529	-0.282
152.4	44.472	-0.182	25.296	0	-4.77	0	0.246	0.529	-0.283
152.5	44.496	-0.18	25.427	0	-4.78	0	0.246	0.529	-0.283
152.6	44.521	-0.175	26.348	0	-4.78	0	0.246	0.529	-0.283
152.7	44.521	-0.162	25.797	0	-4.8	0	0.246	0.529	-0.283
152.8	44.571	-0.162	26.168	0	-4.78	0	0.246	0.529	-0.283
152.9	44.571	-0.147	25.896	0	-4.79	0	0.246	0.529	-0.283
153	44.621	-0.172	26.599	0	-4.98	0	0.246	0.529	-0.283
153.1	44.652	-0.172	27.242	0	-5.08	0	0.245	0.529	-0.283
153.2	44.652	-0.145	26.514	0	-5.23	0	0.245	0.529	-0.284
153.3	44.708	-0.15	26.419	0	-5.31	0	0.245	0.529	-0.284
153.4	44.733	-0.15	27.175	0	-5.21	0	0.245	0.529	-0.284
153.5	44.764	-0.16	27.136	0	-5.22	0	0.245	0.529	-0.284
153.6	44.782	-0.152	27.228	0	-5.22	0	0.245	0.529	-0.284
153.7	44.782	-0.145	27.51	0	-5.21	0	0.245	0.529	-0.284
153.8	44.838	-0.142	27.535	0	-5.22	0	0.244	0.529	-0.284
153.9	44.838	-0.142	27.549	0	-5.21	0	0.244	0.529	-0.285
154	44.9	-0.147	27.464	0	-5.24	0	0.244	0.529	-0.285
154.1	44.931	-0.132	27.602	0	-5.53	0	0.244	0.529	-0.285
154.2	44.931	-0.135	27.415	0	-6.24	0	0.244	0.529	-0.285
154.3	44.981	-0.135	27.817	0	-6	0	0.244	0.529	-0.285
154.4	45.012	-0.13	28.216	0	-5.79	0	0.244	0.529	-0.285

154.5	45.037	-0.122	27.856	0	-5.68	0	0.243	0.529	-0.286
154.6	45.062	-0.137	27.288	0	-5.43	0	0.243	0.529	-0.286
154.7	45.062	-0.142	28.149	0	-5.32	0	0.243	0.529	-0.286
154.8	45.118	-0.15	27.831	0	-5.31	0	0.243	0.529	-0.286
154.9	45.118	-0.15	27.401	0	-5.25	0	0.243	0.529	-0.286
155	45.174	-0.142	27.793	0	-5.24	0	0.243	0.529	-0.286
155.1	45.199	-0.145	27.457	0	-5.24	0	0.242	0.529	-0.286
155.2	45.223	-0.15	27.302	0	-5.18	0	0.242	0.529	-0.287
155.3	45.248	-0.152	27.662	0	-4.88	0	0.242	0.529	-0.287
155.4	45.286	-0.142	27.21	0	-4.03	0	0.242	0.529	-0.287
155.5	45.317	-0.147	27.468	0	-2.85	0	0.242	0.529	-0.287
155.6	45.354	-0.152	27.362	0	-2.82	0	0.242	0.529	-0.287
155.7	45.391	-0.142	28.163	0	-2.97	0	0.242	0.529	-0.287
155.8	45.422	-0.142	28.04	0	-3.59	0	0.242	0.529	-0.287
155.9	45.422	-0.152	28.163	0	-5.18	0	0.242	0.529	-0.287
156	45.497	-0.135	28.676	0	-5.45	0	0.241	0.529	-0.288
156.1	45.534	-0.135	28.354	0	-5.45	0	0.241	0.529	-0.288
156.2	45.565	-0.115	28.718	0	-5.46	0	0.241	0.529	-0.288
156.3	45.596	-0.11	29.565	0	-5.45	0	0.241	0.529	-0.288
156.4	45.627	-0.107	29.746	0	-5.46	0	0.241	0.529	-0.288
156.5	45.627	-0.097	29.502	0	-5.47	0	0.241	0.529	-0.288
156.6	45.696	-0.092	29.919	0	-5.48	0	0.241	0.529	-0.288
156.7	45.733	-0.092	29.594	0	-5.48	0	0.24	0.529	-0.289
156.8	45.764	-0.112	30.307	0	-5.49	0	0.24	0.529	-0.289
156.9	45.764	-0.112	30.445	0	-5.58	0	0.24	0.529	-0.289
157	45.832	-0.095	29.77	0	-5.72	0	0.24	0.529	-0.289
157.1	45.863	-0.102	29.901	0	-5.81	0	0.24	0.529	-0.289
157.2	45.894	-0.105	30.18	0	-5.87	0	0.24	0.529	-0.289
157.3	45.926	-0.1	30.321	0	-5.88	0	0.239	0.529	-0.29
157.4	45.963	-0.095	29.58	0	-5.89	0	0.239	0.529	-0.29
157.5	45.994	-0.085	29.919	0	-5.89	0	0.239	0.529	-0.29
157.6	46.031	-0.085	29.587	0	-5.89	0	0.239	0.529	-0.29
157.7	46.062	-0.092	30.092	0	-5.9	0	0.239	0.529	-0.29
157.8	46.093	-0.105	30.067	0	-5.89	0	0.239	0.529	-0.29
157.9	46.093	-0.105	30.254	0	-5.91	0	0.238	0.529	-0.291
158	46.155	-0.085	30.056	0	-5.93	0	0.238	0.529	-0.291
158.1	46.187	-0.085	29.527	0	-5.88	0	0.238	0.529	-0.291
158.2	46.187	-0.085	29.512	0	-5.89	0	0.238	0.529	-0.291
158.3	46.249	-0.102	30.106	0	-5.91	0	0.238	0.529	-0.291
158.4	46.286	-0.102	30.18	0	-5.91	0	0.238	0.529	-0.291
158.5	46.311	-0.105	29.703	0	-5.91	0	0.237	0.529	-0.291
158.6	46.348	-0.102	29.717	0	-5.93	0	0.237	0.529	-0.292
158.7	46.348	-0.092	29.901	0	-5.92	0	0.237	0.529	-0.292
158.8	46.41	-0.092	30.265	0	-5.93	0	0.237	0.529	-0.292
158.9	46.41	-0.097	30.251	0	-5.93	0	0.237	0.529	-0.292
159	46.472	-0.092	31.07	0	-5.92	0	0.237	0.529	-0.292
159.1	46.503	-0.057	30.713	0	-5.92	0	0.236	0.529	-0.292

159.2	46.541	-0.065	29.399	0	-5.95	0	0.236	0.529	-0.293
159.3	46.541	-0.09	30.212	0	-5.94	0	0.236	0.529	-0.293
159.4	46.603	-0.09	31.462	0	-5.93	0	0.236	0.529	-0.293
159.5	46.634	-0.075	30.851	0	-5.96	0	0.236	0.529	-0.293
159.6	46.671	-0.075	30.417	0	-6.29	0	0.236	0.529	-0.293
159.7	46.702	-0.075	31.006	0	-7.41	0	0.235	0.529	-0.294
159.8	46.733	-0.08	30.717	0	-8.68	0	0.235	0.529	-0.294
159.9	46.733	-0.08	30.579	0	-9.63	0	0.235	0.529	-0.294
160	46.777	-0.092	31.056	0	-9.68	0	0.235	0.529	-0.294
160.1	46.802	-0.095	30.741	0	-9.5	0	0.234	0.529	-0.295
160.2	46.814	-0.127	30.116	0	-10.19	0	0.234	0.529	-0.295
160.3	46.833	-0.127	30.551	0	-10.55	0	0.234	0.529	-0.295
160.4	46.845	-0.115	29.625	0	-10.64	0	0.234	0.529	-0.295
160.5	46.858	-0.127	27.549	0	-9.96	0	0.233	0.529	-0.296
160.6	46.87	-0.127	28.029	0	-9.71	0	0.233	0.529	-0.296
160.7	46.87	-0.145	27.447	0	-9.68	0	0.233	0.529	-0.296
160.8	46.889	-0.165	27.238	0	-8.94	0	0.232	0.529	-0.296
160.9	46.889	-0.165	26.878	0	-8.27	0	0.232	0.529	-0.297
161	46.901	-0.177	26.825	0	-7.74	0	0.232	0.529	-0.297
161.1	46.914	-0.177	25.681	0	-8.15	0	0.232	0.529	-0.297
161.2	46.92	-0.177	24.922	0	-7.87	0	0.232	0.529	-0.297
161.3	46.92	-0.21	24.727	0	-7.55	0	0.231	0.529	-0.298
161.4	46.926	-0.207	24.392	0	-7.29	0	0.231	0.529	-0.298
161.5	46.932	-0.212	23.664	0	-7.02	0	0.231	0.529	-0.298
161.6	46.938	-0.197	23.626	0	-7.13	0	0.231	0.529	-0.298
161.7	46.938	-0.19	23.463	0	-6.8	0	0.231	0.529	-0.298
161.8	46.957	-0.19	23.124	0	-6.67	0	0.23	0.529	-0.299
161.9	46.957	-0.207	23.982	0	-6.57	0	0.23	0.529	-0.299
162	46.976	-0.202	23.904	0	-6.3	0	0.23	0.529	-0.299
162.1	46.982	-0.202	23.29	0	-6.33	0	0.23	0.529	-0.299
162.2	46.982	-0.192	23.488	0	-6.5	0	0.23	0.529	-0.299
162.3	47.007	-0.2	23.735	0	-6.23	0	0.23	0.529	-0.299
162.4	47.019	-0.2	24.049	0	-3.87	0	0.229	0.529	-0.3
162.5	47.038	-0.177	23.806	0	-2.71	0	0.229	0.529	-0.3
162.6	47.056	-0.177	24.035	0	-1.38	0	0.229	0.529	-0.3
162.7	47.088	-0.177	24.636	0	-0.98	0	0.229	0.529	-0.3
162.8	47.112	-0.175	24.911	0	0	0	0.229	0.529	-0.3
162.9	47.112	-0.175	25.465	0	0	0	0.229	0.529	-0.3
163	47.175	-0.16	26.426	0	-1	0	0.229	0.529	-0.3
163.1	47.218	-0.11	26.839	0	-0.76	0	0.229	0.529	-0.3
163.2	47.261	-0.092	27.595	0	0	0	0.229	0.529	-0.3
163.3	47.299	-0.092	28.746	0	-2.84	0	0.229	0.529	-0.3
163.4	47.342	-0.085	29.474	0	-4.51	0	0.229	0.529	-0.3
163.5	47.386	-0.07	30.24	0	-5.72	0	0.229	0.529	-0.3
163.6	47.435	-0.07	30.59	0	-5.74	0	0.229	0.529	-0.3
163.7	47.479	0.003	31.596	0	-5.74	0	0.229	0.529	-0.3
163.8	47.479	-0.005	33.711	0	-5.82	0	0.228	0.529	-0.301

163.9	47.516	-0.005	35.509	0	-5.85	0	0.228	0.529	-0.301
164	47.603	-0.017	36.371	0	-7.32	0	0.228	0.529	-0.301
164.1	47.647	-0.022	35.961	0	-8.78	0	0.228	0.529	-0.301
164.2	47.684	-0.027	35.964	0	-7.19	0	0.228	0.529	-0.301
164.3	47.721	-0.017	35.919	0	-7.03	0	0.227	0.529	-0.302
164.4	47.752	-0.02	35.643	0	-8.28	0	0.227	0.529	-0.302
164.5	47.783	-0.042	35.315	0	-11.75	0	0.227	0.529	-0.302
164.6	47.802	-0.052	35.096	0	-13.22	0	0.226	0.529	-0.303
164.7	47.821	-0.042	33.394	0	-13.4	0	0.226	0.529	-0.303
164.8	47.833	-0.042	32.26	0	-12.04	0	0.226	0.529	-0.303
164.9	47.833	-0.067	31.967	0	-10.66	0	0.225	0.529	-0.304
165	47.864	-0.132	32.108	0	-9.21	0	0.225	0.529	-0.304
165.1	47.877	-0.132	30.335	0	-8.48	0	0.225	0.529	-0.304
165.2	47.889	-0.135	28.827	0	-8.2	0	0.225	0.529	-0.304
165.3	47.902	-0.157	28.266	0	-8.15	0	0.224	0.529	-0.304
165.4	47.92	-0.165	27.846	0	-8.52	0	0.224	0.529	-0.305
165.5	47.926	-0.157	27.199	0	-9	0	0.224	0.529	-0.305
165.6	47.933	-0.162	26.387	0	-9.51	0	0.224	0.529	-0.305
165.7	47.933	-0.162	26.221	0	-9.19	0	0.223	0.529	-0.305
165.8	47.945	-0.17	26.179	0	-8.71	0	0.223	0.529	-0.306
165.9	47.945	-0.17	26.373	0	-8.39	0	0.223	0.529	-0.306
166	47.957	-0.177	25.928	0	-8.09	0	0.223	0.529	-0.306
166.1	47.964	-0.197	25.395	0	-7.81	0	0.223	0.529	-0.306
166.2	47.97	-0.2	25.285	0	-7.59	0	0.222	0.529	-0.307
166.3	47.976	-0.2	24.671	0	-7.44	0	0.222	0.529	-0.307
166.4	47.988	-0.192	24.699	0	-7.4	0	0.222	0.529	-0.307
166.5	47.995	-0.177	24.54	0	-7.4	0	0.222	0.529	-0.307
166.6	48.007	-0.177	24.286	0	-7.39	0	0.222	0.529	-0.307
166.7	48.013	-0.207	24.473	0	-7.92	0	0.221	0.529	-0.308
166.8	48.013	-0.205	24.756	0	-8.25	0	0.221	0.529	-0.308
166.9	48.013	-0.205	24.982	0	-8.69	0	0.221	0.529	-0.308
167	48.026	-0.19	24.325	0	-9.17	0	0.221	0.529	-0.308
167.1	48.026	-0.185	24.395	0	-9.88	0	0.22	0.529	-0.309
167.2	48.026	-0.19	24.71	0	-9.92	0	0.22	0.529	-0.309
167.3	48.026	-0.187	24.572	0	-9.54	0	0.22	0.529	-0.309
167.4	48.026	-0.17	24.766	0	-9.15	0	0.22	0.529	-0.309
167.5	48.026	-0.177	23.876	0	-9.02	0	0.219	0.529	-0.31
167.6	48.026	-0.202	24.159	0	-9.01	0	0.219	0.529	-0.31
167.7	48.026	-0.222	24.515	0	-8.98	0	0.219	0.529	-0.31
167.8	48.026	-0.222	24.392	0	-8.94	0	0.219	0.529	-0.31
167.9	48.026	-0.222	23.463	0	-8.93	0	0.218	0.529	-0.311
168	48.026	-0.222	23.682	0	-9.26	0	0.218	0.529	-0.311
168.1	48.026	-0.222	24.035	0	-10.94	0	0.218	0.529	-0.311
168.2	48.013	-0.205	22.827	0	-12.79	0	0.217	0.529	-0.312
168.3	48.007	-0.215	23.223	0	-13.78	0	0.217	0.529	-0.312
168.4	48.007	-0.225	23.668	0	-15.86	0	0.217	0.529	-0.312
168.5	47.976	-0.215	23.59	0	-18.15	0	0.216	0.529	-0.313

168.6	47.939	-0.212	22.937	0	-19.54	0	0.215	0.529	-0.313
168.7	47.914	-0.212	22.047	0	-21.43	0	0.215	0.529	-0.314
168.8	47.883	-0.235	22.216	0	-21.77	0	0.214	0.529	-0.315
168.9	47.883	-0.235	21.856	0	-21.41	0	0.214	0.529	-0.315
169	47.802	-0.247	21.139	0	-21.26	0	0.213	0.529	-0.316
169.1	47.765	-0.277	21.309	0	-21.25	0	0.212	0.529	-0.316
169.2	47.734	-0.277	20.61	0	-21.18	0	0.212	0.529	-0.317
169.3	47.734	-0.277	19.907	0	-21.44	0	0.211	0.529	-0.318
169.4	47.696	-0.265	19.963	0	-21.65	0	0.211	0.529	-0.318
169.5	47.622	-0.267	19.783	0	-21.64	0	0.21	0.529	-0.319
169.6	47.622	-0.267	19.67	0	-21.84	0	0.21	0.529	-0.319
169.7	47.578	-0.277	20.264	0	-21.87	0	0.209	0.529	-0.32
169.8	47.504	-0.275	20.119	0	-13.97	0	0.209	0.529	-0.32
169.9	47.504	-0.275	19.84	0	-2.96	0	0.208	0.529	-0.321
170	47.411	-0.265	19.755	0	0.61	0	0.208	0.529	-0.321
170.1	47.361	-0.262	19.819	0	0.69	0	0.208	0.529	-0.321
170.2	47.311	-0.262	19.335	0	0.69	0	0.208	0.529	-0.321
170.3	47.311	-0.55	20.525	0	0.69	0	0.208	0.529	-0.321
170.4	47.212	-0.593	15.563	0	0.7	0	0.209	0.529	-0.321
170.5	47.156	-0.588	5.58	0	0.7	0	0.209	0.529	-0.321
170.6	47.106	-0.59	1.667	0	0.71	0	0.209	0.529	-0.321
170.7	47.056	-0.653	1.875	0	0.69	0	0.209	0.529	-0.321
170.8	47.007	-0.653	3.012	0	0.69	0	0.209	0.529	-0.321
170.9	47.007	-0.658	1.204	0	0.69	0	0.209	0.529	-0.321
171	46.901	-0.648	-0.964	0	0.68	0	0.209	0.529	-0.321
171.1	46.851	-0.67	-0.696	0	0.68	0	0.209	0.529	-0.321
171.2	46.808	-0.68	-0.484	0	0.66	0	0.209	0.529	-0.321
171.3	46.808	-0.67	-0.17	0	0.65	0	0.209	0.529	-0.321
171.4	46.752	-0.67	-1.85	0	0.68	0	0.209	0.529	-0.321
171.5	46.653	-0.653	-3.171	0	0.67	0	0.209	0.529	-0.321
171.6	46.609	-0.683	-2.903	0	0.67	0	0.209	0.529	-0.321
171.7	46.553	-0.683	-2.295	0	0.65	0	0.209	0.529	-0.321
171.8	46.503	-0.675	-1.967	0	0.56	0	0.209	0.529	-0.321
171.9	46.46	-0.675	-1.169	0	0	0	0.209	0.529	-0.321
172	46.46	-0.715	-0.826	0	0	0	0.209	0.529	-0.321
172.1	46.367	-0.648	-2.285	0	0	0	0.209	0.529	-0.321
172.2	46.317	-0.655	-2.765	0	0	0	0.209	0.529	-0.321
172.3	46.317	-0.655	-1.225	0	0	0	0.209	0.529	-0.321
172.4	46.218	-0.65	-0.872	0	0	0	0.209	0.529	-0.321
172.5	46.218	-0.64	-0.922	0	0	0	0.209	0.529	-0.321
172.6	46.112	-0.64	-1.48	0	0	0	0.209	0.529	-0.321
172.7	46.068	-0.653	-0.763	0	0.97	0	0.209	0.529	-0.321
172.8	46.025	-0.653	-0.54	0	2.11	0	0.209	0.529	-0.321
172.9	45.981	-0.653	-0.823	0	3.56	0	0.209	0.53	-0.321
173	45.938	-0.648	-0.381	0	4.69	0	0.209	0.53	-0.321
173.1	45.901	-0.655	-0.554	0	5.9	0	0.209	0.53	-0.321
173.2	45.901	-0.655	-0.784	0	6.66	0	0.21	0.53	-0.321

173.3	45.826	-0.673	-0.039	0	7.58	0	0.21	0.53	-0.321
173.4	45.795	-0.658	-0.29	0	9.05	0	0.21	0.531	-0.321
173.5	45.764	-0.66	-0.872	0	9.34	0	0.21	0.531	-0.321
173.6	45.727	-0.67	-0.819	0	9.36	0	0.211	0.531	-0.321
173.7	45.702	-0.683	-0.385	0	9.44	0	0.211	0.531	-0.321
173.8	45.671	-0.683	-0.417	0	10.37	0	0.211	0.532	-0.321
173.9	45.64	-0.68	-0.152	0	10.6	0	0.211	0.532	-0.321
174	45.615	-0.64	-0.749	0	10.53	0	0.212	0.532	-0.321
174.1	45.584	-0.64	-1.144	0	10.56	0	0.212	0.532	-0.321
174.2	45.553	-0.64	-0.162	0	10.8	0	0.212	0.533	-0.321
174.3	45.553	-0.643	-0.332	0	11.93	0	0.213	0.533	-0.321
174.4	45.503	-0.643	-1.035	0	12.76	0	0.213	0.533	-0.321
174.5	45.478	-0.668	0.021	0	13.36	0	0.213	0.534	-0.321
174.6	45.453	-0.668	-0.466	0	13.32	0	0.214	0.534	-0.321
174.7	45.453	-0.678	-0.505	0	14.53	0	0.214	0.535	-0.321
174.8	45.416	-0.683	-0.127	0	15.88	0	0.215	0.535	-0.321
174.9	45.397	-0.683	-0.279	0	16.66	0	0.215	0.536	-0.321
175	45.379	-0.685	-0.491	0	16.99	0	0.215	0.536	-0.321
175.1	45.379	-0.655	-0.59	0	17.02	0	0.216	0.536	-0.321
175.2	45.354	-0.633	-0.883	0	16.98	0	0.216	0.537	-0.321
175.3	45.335	-0.633	-1.377	0	17.96	0	0.217	0.537	-0.321
175.4	45.317	-0.68	-0.127	0	19.17	0	0.217	0.538	-0.321
175.5	45.317	-0.668	0.102	0	19.46	0	0.218	0.539	-0.321
175.6	45.292	-0.66	-0.713	0	20.26	0	0.219	0.539	-0.321
175.7	45.292	-0.663	-0.731	0	20.44	0	0.219	0.54	-0.321
175.8	45.279	-0.658	-0.399	0	21.1	0	0.22	0.54	-0.321
175.9	45.267	-0.658	-0.385	0	21.13	0	0.22	0.541	-0.321
176	45.261	-0.66	-1.098	0	21.09	0	0.221	0.541	-0.321
176.1	45.261	-0.673	-0.388	0	21.15	0	0.221	0.542	-0.321
176.2	45.248	-0.68	0.046	0	20.4	0	0.222	0.543	-0.321
176.3	45.236	-0.695	-0.357	0	19.48	0	0.223	0.543	-0.321
176.4	45.236	-0.695	-0.028	0	18.41	0	0.223	0.544	-0.321
176.5	45.205	-0.68	-0.272	0	16.36	0	0.224	0.544	-0.321
176.6	45.192	-0.683	-0.657	0	11.51	0	0.224	0.544	-0.321
176.7	45.192	-0.68	-0.66	0	6.65	0	0.224	0.545	-0.321
176.8	45.13	-0.68	-0.512	0	4.01	0	0.224	0.545	-0.321
176.9	45.13	-0.685	-0.41	0	2.27	0	0.224	0.545	-0.321
177	45.087	-0.698	-0.332	0	1.12	0	0.224	0.545	-0.321
177.1	45	-0.698	-0.332	0	0	0	0.224	0.545	-0.321
177.2	45	-0.655	-0.735	0	0	0	0.224	0.545	-0.321
177.3	44.894	-0.663	-0.791	0	0	0	0.224	0.545	-0.321
177.4	44.851	-0.678	-0.367	0	0	0	0.224	0.545	-0.321
177.5	44.807	-0.683	-0.131	0	0	0	0.224	0.545	-0.321
177.6	44.757	-0.673	-0.47	0	0	0	0.224	0.545	-0.321
177.7	44.757	-0.673	-0.675	0	0	0	0.224	0.545	-0.321
177.8	44.658	-0.668	-0.717	0	0	0	0.224	0.545	-0.321
177.9	44.614	-0.668	-0.032	0	0	0	0.224	0.545	-0.321

178	44.565	-0.683	-0.759	0	0	0	0.224	0.545	-0.321
178.1	44.515	-0.693	0.049	0	0	0	0.224	0.545	-0.321
178.2	44.472	-0.693	-0.558	0	0	0	0.224	0.545	-0.321
178.3	44.416	-0.69	-0.929	0	0	0	0.224	0.545	-0.321
178.4	44.416	-0.678	-0.117	0	-4.9	0	0.224	0.545	-0.321
178.5	44.273	-0.678	-0.622	0	-6.99	0	0.224	0.545	-0.321
178.6	44.204	-0.678	-0.403	0	-8.5	0	0.224	0.545	-0.321
178.7	44.204	-0.68	-0.622	0	-9.86	0	0.224	0.545	-0.321
178.8	44.136	-0.693	-0.565	0	-10.83	0	0.223	0.545	-0.322
178.9	44.049	-0.693	-0.441	0	-11.74	0	0.223	0.545	-0.322
179	43.894	-0.68	-0.533	0	-13.5	0	0.223	0.545	-0.322
179.1	43.807	-0.678	-0.961	0	-16.39	0	0.222	0.545	-0.323
179.2	43.707	-0.678	-0.989	0	-17.18	0	0.222	0.545	-0.323
179.3	43.707	-0.68	-0.579	0	-17.73	0	0.221	0.545	-0.324
179.4	43.614	-0.678	-0.494	0	-17.94	0	0.221	0.545	-0.324
179.5	43.515	-0.663	-0.833	0	-18.4	0	0.22	0.545	-0.325
179.6	43.421	-0.65	-0.417	0	-18.45	0	0.22	0.545	-0.325
179.7	43.322	-0.663	-1.067	0	-18.4	0	0.219	0.545	-0.326
179.8	43.129	-0.663	-0.918	0	-18.22	0	0.219	0.545	-0.326
179.9	43.03	-0.67	-0.251	0	-18.2	0	0.218	0.545	-0.327
180	42.931	-0.648	-0.904	0	-18.13	0	0.218	0.545	-0.327
180.1	42.837	-0.663	-0.862	0	-18.07	0	0.217	0.545	-0.328
180.2	42.744	-0.685	-0.607	0	-18.05	0	0.217	0.545	-0.328
180.3	42.651	-0.688	-0.078	0	-17.96	0	0.216	0.545	-0.329
180.4	42.551	-0.688	-0.403	0	-17.94	0	0.216	0.545	-0.329
180.5	42.458	-0.673	-0.876	0	-17.84	0	0.215	0.545	-0.33
180.6	42.359	-0.675	-0.922	0	-17.83	0	0.215	0.545	-0.33
180.7	42.359	-0.675	-0.565	0	-17.75	0	0.214	0.545	-0.331
180.8	42.172	-0.673	-0.551	0	-17.3	0	0.214	0.545	-0.331
180.9	42.079	-0.673	-0.466	0	-8.15	0	0.213	0.545	-0.332
181	42.017	-0.675	-0.374	0	0	0	0.213	0.545	-0.332
181.1	41.974	-0.67	-0.682	0	0.63	0	0.213	0.545	-0.332
181.2	41.93	-0.683	-0.876	0	0.63	0	0.213	0.545	-0.332
181.3	41.88	-0.683	-0.237	0	0.63	0	0.213	0.545	-0.332
181.4	41.837	-0.665	-0.636	0	0.61	0	0.213	0.545	-0.332
181.5	41.793	-0.673	-0.84	0	0.63	0	0.213	0.545	-0.332
181.6	41.75	-0.673	-0.724	0	0.63	0	0.213	0.545	-0.332
181.7	41.75	-0.65	-0.134	0	0.64	0	0.213	0.545	-0.332
181.8	41.663	-0.653	-1.056	0	0.64	0	0.214	0.545	-0.332
181.9	41.619	-0.653	-1.197	0	0.64	0	0.214	0.545	-0.332
182	41.57	-0.655	0.113	0	0.64	0	0.214	0.545	-0.332
182.1	41.532	-0.658	-1.038	0	1.21	0	0.214	0.545	-0.332
182.2	41.489	-0.658	-0.456	0	3.51	0	0.214	0.545	-0.332
182.3	41.458	-0.67	-0.526	0	6.74	0	0.214	0.545	-0.332
182.4	41.427	-0.67	-0.244	0	12.18	0	0.214	0.546	-0.332
182.5	41.408	-0.66	-1.098	0	18.02	0	0.215	0.546	-0.332
182.6	41.408	-0.65	-0.699	0	23.92	0	0.215	0.547	-0.332

182.7	41.408	-0.658	-0.989	0	29.8	0	0.216	0.548	-0.332
182.8	41.427	-0.658	-0.48	0	37.56	0	0.217	0.549	-0.332
182.9	41.458	-0.67	-0.198	0	41.3	0	0.218	0.55	-0.332
183	41.495	-0.678	-0.491	0	46.49	0	0.22	0.551	-0.332
183.1	41.545	-0.678	-0.198	0	51.38	0	0.221	0.553	-0.332
183.2	41.607	-0.678	-0.745	0	60.78	0	0.223	0.554	-0.332
183.3	41.669	-0.66	-0.526	0	80.69	0	0.225	0.557	-0.332
183.4	41.75	-0.66	-0.851	0	81.66	0	0.227	0.559	-0.332
183.5	41.824	-0.658	-1.197	0	85.52	0	0.23	0.561	-0.332
183.6	41.911	-0.673	-0.526	0	120.67	0	0.233	0.565	-0.332
183.7	41.911	-0.673	-0.212	0	127.35	0	0.237	0.568	-0.332
183.8	42.067	-0.685	-0.639	0	125.07	0	0.24	0.572	-0.332
183.9	42.067	-0.685	-0.028	0	86.72	0	0.242	0.574	-0.332
184	42.222	-0.53	-0.219	0	48.22	0	0.244	0.575	-0.332
184.1	42.222	0.013	2.702	0	32.91	0	0.245	0.576	-0.332
184.2	42.365	0.005	17.343	0	34.18	0	0.246	0.577	-0.332
184.3	42.421	0.005	33.831	0	31.69	0	0.247	0.578	-0.332
184.4	42.471	-0.56	35.954	0	27.65	0	0.247	0.579	-0.332
184.5	42.471	-0.448	30.409	0	23.96	0	0.248	0.58	-0.332
184.6	42.52	-0.448	11.7	0	20.44	0	0.249	0.58	-0.332
184.7	42.57	-0.312	8.204	0	18.54	0	0.249	0.581	-0.332
184.8	42.67	-0.28	15.249	0	16.33	0	0.25	0.581	-0.332
184.9	42.713	-0.28	18.551	0	14.46	0	0.25	0.581	-0.332
185	42.763	-0.19	19.278	0	13.44	0	0.25	0.582	-0.332
185.1	42.763	-0.197	21.305	0	12.41	0	0.251	0.582	-0.332
185.2	42.868	-0.212	23.777	0	11.37	0	0.251	0.583	-0.332
185.3	42.918	-0.195	24.703	0	10.62	0	0.251	0.583	-0.332
185.4	42.968	-0.182	24.487	0	12.91	0	0.252	0.583	-0.332
185.5	43.024	-0.185	24.307	0	15.77	0	0.252	0.584	-0.332
185.6	43.086	-0.182	24.84	0	15.53	0	0.252	0.584	-0.332
185.7	43.086	-0.18	25.169	0	14.46	0	0.253	0.584	-0.332
185.8	43.223	-0.18	25.031	0	12.67	0	0.253	0.585	-0.332
185.9	43.285	-0.175	25.352	0	8.98	0	0.253	0.585	-0.332
186	43.353	-0.16	25.72	0	6.45	0	0.254	0.585	-0.332
186.1	43.415	-0.16	26.122	0	4.6	0	0.254	0.585	-0.332
186.2	43.484	-0.07	25.953	0	2.92	0	0.254	0.585	-0.332
186.3	43.546	-0.052	27.372	0	0.92	0	0.254	0.585	-0.332
186.4	43.546	-0.047	30.215	0	-1.3	0	0.254	0.585	-0.332
186.5	43.664	-0.025	32.472	0	-2.55	0	0.254	0.585	-0.332
186.6	43.726	-0.007	32.726	0	-4.15	0	0.254	0.585	-0.332
186.7	43.726	-0.007	33.273	0	-6.48	0	0.253	0.585	-0.332
186.8	43.838	-0.017	34.88	0	-10.44	0	0.253	0.585	-0.332
186.9	43.881	-0.017	35.11	0	-15.39	0	0.253	0.585	-0.333
187	43.912	0.008	34.969	0	-22.06	0	0.252	0.585	-0.333
187.1	43.931	0.025	36.028	0	-31.14	0	0.251	0.585	-0.334
187.2	43.931	0.025	36.674	0	-37.46	0	0.25	0.585	-0.335
187.3	43.931	0.025	36.805	0	-38.93	0	0.249	0.585	-0.336

187.4	43.894	0.04	37.363	0	-37.05	0	0.248	0.585	-0.337
187.5	43.863	0.013	37.278	0	-35.47	0	0.247	0.585	-0.338
187.6	43.838	0.013	37.836	0	-36.07	0	0.246	0.585	-0.339
187.7	43.838	-0.075	36.837	0	-37.59	0	0.245	0.585	-0.34
187.8	43.776	-0.09	34.806	0	-40.32	0	0.244	0.585	-0.341
187.9	43.751	-0.09	32.309	0	-41.75	0	0.243	0.585	-0.343
188	43.72	-0.02	30.66	0	-42.79	0	0.242	0.585	-0.344
188.1	43.682	-0.02	31.176	0	-43.33	0	0.24	0.585	-0.345
188.2	43.645	-0.02	33.365	0	-42.69	0	0.239	0.585	-0.346
188.3	43.602	-0.005	35.029	0	-41.01	0	0.238	0.585	-0.347
188.4	43.564	-0.007	34.781	0	-37.15	0	0.237	0.585	-0.348
188.5	43.533	-0.052	34.404	0	-26.7	0	0.236	0.585	-0.349
188.6	43.496	-0.095	34.495	0	-15.34	0	0.236	0.585	-0.35
188.7	43.496	-0.067	33.877	0	-3.87	0	0.236	0.585	-0.35
188.8	43.409	-0.067	31.674	0	3.66	0	0.236	0.586	-0.35
188.9	43.409	-0.102	31.504	0	3.91	0	0.236	0.586	-0.35
189	43.378	-0.4	30.967	0	4.43	0	0.236	0.586	-0.35
189.1	43.303	-0.4	25.635	0	5.67	0	0.236	0.586	-0.35
189.2	43.266	-0.558	17.099	0	8.18	0	0.237	0.586	-0.35
189.3	43.235	-0.545	4.51	0	8.43	0	0.237	0.586	-0.35
189.4	43.21	-0.545	-0.29	0	8.89	0	0.237	0.587	-0.35
189.5	43.185	-0.643	2.324	0	9.17	0	0.237	0.587	-0.35
189.6	43.154	-0.62	1.773	0	9.57	0	0.238	0.587	-0.35
189.7	43.154	-0.62	-1.197	0	11.53	0	0.238	0.587	-0.35
189.8	43.105	-0.683	-1.423	0	15.04	0	0.238	0.588	-0.35
189.9	43.092	-0.683	-0.06	0	18.78	0	0.239	0.588	-0.35
190	43.08	-0.688	-0.833	0	22.6	0	0.239	0.589	-0.35
190.1	43.08	-0.703	-2.677	0	25.16	0	0.24	0.59	-0.35
190.2	43.08	-0.685	-3.221	0	26.16	0	0.241	0.59	-0.35
190.3	43.086	-0.688	-3.941	0	26.27	0	0.242	0.591	-0.35
190.4	43.092	-0.653	-3.267	0	26.73	0	0.242	0.592	-0.35
190.5	43.098	-0.65	-2.154	0	27.47	0	0.243	0.593	-0.35
190.6	43.105	-0.65	-2.557	0	28.73	0	0.244	0.594	-0.35
190.7	43.105	-0.723	-0.328	0	30.66	0	0.245	0.594	-0.35
190.8	43.123	-0.68	-2.204	0	33	0	0.246	0.595	-0.35
190.9	43.142	-0.68	-3.478	0	34.2	0	0.247	0.596	-0.35
191	43.16	-0.665	-2.56	0	35.1	0	0.248	0.597	-0.35
191.1	43.179	-0.67	-1.469	0	35.07	0	0.249	0.598	-0.35
191.2	43.204	-0.67	-1.469	0	35.33	0	0.25	0.599	-0.35
191.3	43.223	-0.678	-1.338	0	36.9	0	0.251	0.6	-0.35
191.4	43.247	-0.675	-1.067	0	39.08	0	0.252	0.601	-0.35
191.5	43.279	-0.673	-1.098	0	44.03	0	0.253	0.602	-0.35
191.6	43.31	-0.67	-1.091	0	57.07	0	0.254	0.604	-0.35
191.7	43.31	-0.655	-0.901	0	62.03	0	0.256	0.606	-0.35
191.8	43.384	-0.655	-1.229	0	61.48	0	0.258	0.608	-0.35
191.9	43.434	-0.648	-1.36	0	86.81	0	0.26	0.61	-0.35
192	43.477	-0.663	-0.547	0	111.19	0	0.263	0.613	-0.35

192.1	43.521	-0.67	-0.848	0	109.17	0	0.266	0.616	-0.35
192.2	43.564	-0.638	-0.194	0	100.18	0	0.269	0.619	-0.35
192.3	43.614	-0.367	-0.35	0	39.76	0	0.27	0.62	-0.35
192.4	43.614	-0.367	0.088	0	28.79	0	0.271	0.621	-0.35
192.5	43.701	-0.122	6.908	0	30.37	0	0.272	0.622	-0.35
192.6	43.738	-0.232	26.214	0	31.7	0	0.273	0.622	-0.35
192.7	43.738	-0.232	29.742	0	26.81	0	0.274	0.623	-0.35
192.8	43.8	-0.603	27.595	0	22.79	0	0.274	0.624	-0.35
192.9	43.825	-0.603	13.038	0	18.4	0	0.275	0.624	-0.35
193	43.85	-0.42	2.373	0	15.51	0	0.275	0.625	-0.35
193.1	43.881	-0.37	9.888	0	13.03	0	0.275	0.625	-0.35
193.2	43.906	-0.3	13.963	0	10.08	0	0.276	0.625	-0.35
193.3	43.937	-0.3	14.168	0	7.18	0	0.276	0.626	-0.35
193.4	43.962	-0.262	17.671	0	5.8	0	0.276	0.626	-0.35
193.5	43.987	-0.265	20.2	0	4.57	0	0.276	0.626	-0.35
193.6	44.012	-0.265	20.839	0	3.19	0	0.276	0.626	-0.35
193.7	44.012	-0.237	22.188	0	2.63	0	0.276	0.626	-0.35
193.8	44.055	-0.227	22.206	0	3.35	0	0.277	0.626	-0.35
193.9	44.055	-0.227	22.559	0	3.7	0	0.277	0.626	-0.35
194	44.08	-0.265	22.693	0	3.17	0	0.277	0.626	-0.35
194.1	44.136	-0.235	23.099	0	2.24	0	0.277	0.626	-0.35
194.2	44.161	-0.215	21.517	0	1.33	0	0.277	0.626	-0.35
194.3	44.186	-0.227	22.163	0	0.57	0	0.277	0.626	-0.35
194.4	44.217	-0.227	23.742	0	0	0	0.277	0.626	-0.35
194.5	44.242	-0.207	24.176	0	-0.65	0	0.277	0.626	-0.35
194.6	44.266	-0.19	23.237	0	-0.89	0	0.277	0.626	-0.35
194.7	44.298	-0.192	23.594	0	-1.17	0	0.277	0.626	-0.35
194.8	44.322	-0.192	24.092	0	-1.51	0	0.277	0.626	-0.35
194.9	44.347	-0.2	24.805	0	0	0	0.277	0.626	-0.35
195	44.347	-0.205	24.897	0	0	0	0.277	0.626	-0.35
195.1	44.378	-0.205	25.165	0	0	0	0.277	0.626	-0.35
195.2	44.447	-0.182	25.038	0	-0.5	0	0.277	0.626	-0.35
195.3	44.478	-0.185	24.943	0	-0.68	0	0.277	0.626	-0.35
195.4	44.509	-0.185	25.497	0	-0.91	0	0.277	0.626	-0.35
195.5	44.54	-0.175	25.522	0	-1.84	0	0.277	0.626	-0.35
195.6	44.577	-0.17	25.511	0	-2.92	0	0.276	0.626	-0.35
195.7	44.608	-0.17	25.554	0	-3.05	0	0.276	0.626	-0.35
195.8	44.633	-0.152	26.034	0	-3.73	0	0.276	0.626	-0.35
195.9	44.664	-0.152	26.073	0	-5.08	0	0.276	0.626	-0.35
196	44.664	-0.172	26.444	0	-6.91	0	0.276	0.626	-0.351
196.1	44.708	-0.16	26.952	0	-10.85	0	0.276	0.626	-0.351
196.2	44.708	-0.155	26.239	0	-15.02	0	0.275	0.626	-0.351
196.3	44.72	-0.155	26.401	0	-19.03	0	0.275	0.626	-0.352
196.4	44.714	-0.177	26.507	0	-21.91	0	0.274	0.626	-0.352
196.5	44.701	-0.182	26.843	0	-22.24	0	0.273	0.626	-0.353
196.6	44.695	-0.182	26.472	0	-23.66	0	0.273	0.626	-0.354
196.7	44.695	-0.167	26.214	0	-24.46	0	0.272	0.626	-0.354

196.8	44.664	-0.162	26.136	0	-26.56	0	0.271	0.626	-0.355
196.9	44.646	-0.162	26.444	0	-28.8	0	0.271	0.626	-0.356
197	44.646	-0.102	26.581	0	-31.03	0	0.27	0.626	-0.357
197.1	44.621	-0.07	26.899	0	-31.08	0	0.269	0.626	-0.358
197.2	44.602	-0.067	27.899	0	-31.15	0	0.268	0.626	-0.358
197.3	44.59	-0.067	30.982	0	-31.27	0	0.267	0.626	-0.359
197.4	44.577	-0.05	32.927	0	-31.74	0	0.266	0.626	-0.36
197.5	44.565	-0.045	32.61	0	-34.06	0	0.265	0.626	-0.361
197.6	44.54	-0.03	33.584	0	-37.6	0	0.264	0.626	-0.362
197.7	44.515	-0.027	33.411	0	-39.42	0	0.263	0.626	-0.363
197.8	44.484	-0.027	33.266	0	-40.47	0	0.262	0.626	-0.364
197.9	44.453	-0.042	33.45	0	-40.9	0	0.261	0.626	-0.366
198	44.416	-0.03	33.362	0	-40.83	0	0.26	0.626	-0.367
198.1	44.416	-0.03	32.977	0	-41.5	0	0.259	0.626	-0.368
198.2	44.385	-0.017	34.082	0	-41.67	0	0.257	0.626	-0.369
198.3	44.353	-0.025	34.294	0	-41.83	0	0.256	0.626	-0.37
198.4	44.279	-0.025	34.266	0	-42.05	0	0.255	0.626	-0.371
198.5	44.242	-0.02	34.46	0	-41.86	0	0.254	0.626	-0.372
198.6	44.242	-0.045	33.542	0	-41.05	0	0.253	0.626	-0.374
198.7	44.155	-0.045	34.209	0	-40.67	0	0.252	0.626	-0.375
198.8	44.111	-0.095	34.396	0	-41.01	0	0.251	0.626	-0.376
198.9	44.061	-0.095	33.478	0	-40.21	0	0.249	0.626	-0.377
199	44.061	-0.085	32.098	0	-40.36	0	0.248	0.626	-0.378
199.1	43.968	-0.08	30.307	0	-40.79	0	0.247	0.626	-0.379
199.2	43.919	-0.095	30.756	0	-40.83	0	0.246	0.626	-0.38
199.3	43.875	-0.1	30.861	0	-40.76	0	0.245	0.626	-0.382
199.4	43.832	-0.09	30.417	0	-40.31	0	0.244	0.626	-0.383
199.5	43.794	-0.08	30.056	0	-40.06	0	0.243	0.626	-0.384
199.6	43.794	-0.08	30.152	0	-40.07	0	0.242	0.626	-0.385
199.7	43.751	-0.065	30.989	0	-40.06	0	0.24	0.626	-0.386
199.8	43.67	-0.067	30.671	0	-36.16	0	0.239	0.626	-0.387
199.9	43.633	-0.067	31.123	0	-24.82	0	0.239	0.626	-0.388
200	43.633	-0.077	30.823	0	-12.36	0	0.238	0.626	-0.388
200.1	43.577	-0.062	30.448	0	0	0	0.238	0.627	-0.388
200.2	43.558	-0.062	30.907	0	4.67	0	0.239	0.627	-0.388
200.3	43.527	-0.23	31.374	0	5.82	0	0.239	0.627	-0.388
200.4	43.496	-0.445	31.292	0	6.56	0	0.239	0.627	-0.388
200.5	43.459	-0.595	25.381	0	6.82	0	0.239	0.627	-0.388
200.6	43.428	-0.648	14.341	0	6.9	0	0.239	0.627	-0.388
200.7	43.397	-0.633	2.26	0	6.89	0	0.239	0.628	-0.388
200.8	43.365	-0.633	-0.724	0	7.02	0	0.24	0.628	-0.388
200.9	43.328	-0.623	0.106	0	7.47	0	0.24	0.628	-0.388
201	43.328	-0.668	0.42	0	7.46	0	0.24	0.628	-0.388
201.1	43.266	-0.668	0.152	0	7.45	0	0.24	0.628	-0.388
201.2	43.266	-0.683	-1.25	0	7.44	0	0.241	0.629	-0.388
201.3	43.235	-0.675	-1.384	0	7.46	0	0.241	0.629	-0.388
201.4	43.204	-0.675	-1.748	0	8.21	0	0.241	0.629	-0.388

201.5	43.142	-0.655	-2.204	0	8.24	0	0.241	0.629	-0.388
201.6	43.111	-0.675	-4.019	0	8.26	0	0.241	0.629	-0.388
201.7	43.08	-0.675	-3.129	0	8.69	0	0.242	0.63	-0.388
201.8	43.08	-0.68	-2.938	0	9.44	0	0.242	0.63	-0.388
201.9	43.024	-0.68	-3.175	0	10.19	0	0.242	0.63	-0.388
202	43.024	-0.693	-2.585	0	11.6	0	0.243	0.631	-0.388
202.1	42.999	-0.683	-2.006	0	12.34	0	0.243	0.631	-0.388
202.2	42.955	-0.66	-2.165	0	12.3	0	0.243	0.631	-0.388
202.3	42.955	-0.66	-2.709	0	13.16	0	0.244	0.632	-0.388
202.4	42.937	-0.66	-1.547	0	14.28	0	0.244	0.632	-0.388
202.5	42.918	-0.658	-1.402	0	16.58	0	0.244	0.632	-0.388
202.6	42.887	-0.658	-1.07	0	17.6	0	0.245	0.633	-0.388
202.7	42.881	-0.678	-0.858	0	18.06	0	0.245	0.633	-0.388
202.8	42.868	-0.698	-0.83	0	18.05	0	0.246	0.634	-0.388
202.9	42.862	-0.698	-0.671	0	18.07	0	0.246	0.634	-0.388
203	42.862	-0.663	-0.233	0	18.08	0	0.247	0.635	-0.388
203.1	42.844	-0.66	-1.536	0	18.08	0	0.247	0.635	-0.388
203.2	42.831	-0.66	-0.908	0	18.18	0	0.248	0.636	-0.388
203.3	42.819	-0.66	-0.523	0	19.52	0	0.248	0.637	-0.388
203.4	42.812	-0.67	-0.982	0	20.69	0	0.249	0.637	-0.388
203.5	42.812	-0.678	-0.851	0	21.36	0	0.25	0.638	-0.388
203.6	42.806	-0.668	-0.314	0	21.32	0	0.25	0.638	-0.388
203.7	42.8	-0.65	-0.791	0	22.07	0	0.251	0.639	-0.388
203.8	42.8	-0.65	-0.851	0	22.15	0	0.251	0.64	-0.388
203.9	42.8	-0.65	-1.014	0	22.15	0	0.252	0.64	-0.388
204	42.8	-0.68	-0.388	0	22.15	0	0.253	0.641	-0.388
204.1	42.8	-0.68	-0.247	0	22.17	0	0.253	0.641	-0.388
204.2	42.794	-0.675	-0.756	0	22.77	0	0.254	0.642	-0.388
204.3	42.794	-0.683	-0.886	0	23.48	0	0.255	0.643	-0.388
204.4	42.794	-0.683	-0.477	0	23.57	0	0.255	0.643	-0.388
204.5	42.8	-0.66	-0.576	0	23.57	0	0.256	0.644	-0.388
204.6	42.8	-0.668	-1.024	0	24.21	0	0.257	0.645	-0.388
204.7	42.8	-0.668	-0.703	0	24.4	0	0.257	0.645	-0.388
204.8	42.8	-0.693	-0.18	0	24.96	0	0.258	0.646	-0.388
204.9	42.806	-0.693	-0.576	0	25.61	0	0.259	0.647	-0.388
205	42.806	-0.68	-0.918	0	25.93	0	0.259	0.647	-0.388
205.1	42.812	-0.665	-0.657	0	26.02	0	0.26	0.648	-0.388
205.2	42.812	-0.675	-0.819	0	27.36	0	0.261	0.649	-0.388
205.3	42.831	-0.675	-0.526	0	28.65	0	0.262	0.65	-0.388
205.4	42.837	-0.675	-0.307	0	29.86	0	0.262	0.651	-0.388
205.5	42.837	-0.65	-0.65	0	31.4	0	0.263	0.651	-0.388
205.6	42.85	-0.65	-1.579	0	33.8	0	0.264	0.652	-0.388
205.7	42.868	-0.673	-1.014	0	35.99	0	0.265	0.653	-0.388
205.8	42.912	-0.673	-0.127	0	36.95	0	0.266	0.654	-0.388
205.9	42.937	-0.673	-0.78	0	37.16	0	0.267	0.655	-0.388
206	42.937	-0.67	-0.696	0	38.06	0	0.268	0.656	-0.388
206.1	42.968	-0.668	-0.579	0	46.35	0	0.27	0.658	-0.388

206.2	43.018	-0.678	-0.727	0	61.82	0	0.271	0.659	-0.388
206.3	43.055	-0.683	-0.484	0	54.12	0	0.273	0.661	-0.388
206.4	43.092	-0.67	-0.551	0	59.7	0	0.275	0.663	-0.388
206.5	43.129	-0.663	-0.576	0	98.68	0	0.277	0.665	-0.388
206.6	43.167	-0.668	-1.215	0	105.82	0	0.28	0.668	-0.388
206.7	43.167	-0.638	-0.597	0	102.66	0	0.283	0.671	-0.388
206.8	43.26	-0.638	-0.759	0	72.7	0	0.285	0.673	-0.388
206.9	43.26	-0.525	-0.124	0	31.61	0	0.286	0.674	-0.388
207	43.347	0.018	3.701	0	22.14	0	0.287	0.675	-0.388
207.1	43.39	0.018	17.304	0	28.16	0	0.287	0.675	-0.388
207.2	43.434	-0.28	34.04	0	30.24	0	0.288	0.676	-0.388
207.3	43.477	-0.57	36.537	0	27.58	0	0.289	0.677	-0.388
207.4	43.527	-0.458	29.272	0	24.13	0	0.29	0.678	-0.388
207.5	43.571	-0.35	10.496	0	21.29	0	0.29	0.678	-0.388
207.6	43.571	-0.317	8.175	0	18.87	0	0.291	0.679	-0.388
207.7	43.664	-0.317	14.977	0	16.57	0	0.291	0.679	-0.388
207.8	43.713	-0.22	18.395	0	13.86	0	0.292	0.68	-0.388
207.9	43.757	-0.22	19.638	0	10.29	0	0.292	0.68	-0.388
208	43.794	-0.207	22.241	0	6.4	0	0.292	0.68	-0.388
208.1	43.832	-0.202	24.173	0	3.46	0	0.292	0.68	-0.388
208.2	43.869	-0.202	24.367	0	3.78	0	0.292	0.68	-0.388
208.3	43.9	-0.202	24.939	0	1.01	0	0.292	0.68	-0.388
208.4	43.925	-0.202	25.773	0	-5.57	0	0.292	0.68	-0.388
208.5	43.943	-0.185	25.059	0	-11.4	0	0.292	0.68	-0.389
208.6	43.943	-0.185	24.233	0	-14.93	0	0.291	0.68	-0.389
208.7	43.937	-0.185	25.363	0	-18.59	0	0.291	0.68	-0.389
208.8	43.925	-0.217	25.363	0	-23.33	0	0.29	0.68	-0.39
208.9	43.894	-0.217	25.363	0	-25.54	0	0.29	0.68	-0.391
209	43.856	-0.222	24.286	0	-26.29	0	0.289	0.68	-0.392
209.1	43.856	-0.227	23.11	0	-26.81	0	0.288	0.68	-0.392
209.2	43.776	-0.227	22.206	0	-26.58	0	0.287	0.68	-0.393
209.3	43.732	-0.215	23.082	0	-24.95	0	0.287	0.68	-0.394
209.4	43.682	-0.245	22.909	0	-22.62	0	0.286	0.68	-0.394
209.5	43.682	-0.3	23.043	0	-20.46	0	0.285	0.68	-0.395
209.6	43.589	-0.327	23.389	0	-18.53	0	0.285	0.68	-0.395
209.7	43.546	-0.35	21.083	0	-17.13	0	0.284	0.68	-0.396
209.8	43.49	-0.35	18.491	0	-16.1	0	0.284	0.68	-0.396
209.9	43.446	-0.377	16.93	0	-11.84	0	0.284	0.68	-0.397
210	43.409	-0.418	15.217	0	-1.73	0	0.284	0.68	-0.397
210.1	43.378	-0.418	14.211	0	0.68	0	0.284	0.68	-0.397
210.2	43.334	-0.403	12.798	0	0	0	0.284	0.68	-0.397
210.3	43.254	-0.518	12.067	0	-8.32	0	0.283	0.68	-0.397
210.4	43.16	-0.518	12.53	0	-14.18	0	0.283	0.68	-0.397
210.5	43.061	-0.718	9.602	0	-16.77	0	0.283	0.68	-0.398
210.6	43.061	-0.698	3.92	0	-16.93	0	0.282	0.68	-0.398
210.7	42.875	-0.698	-2.112	0	-17.02	0	0.282	0.68	-0.399
210.8	42.875	-0.638	-2.74	0	-16.96	0	0.281	0.68	-0.399

210.9	42.682	-0.638	0.208	0	-16.93	0	0.281	0.68	-0.4
211	42.589	-0.638	-0.618	0	-16.4	0	0.28	0.68	-0.4
211.1	42.489	-0.655	-0.448	0	-16.74	0	0.28	0.68	-0.401
211.2	42.39	-0.648	-0.501	0	-19.16	0	0.279	0.68	-0.401
211.3	42.278	-0.663	-1.829	0	-21.3	0	0.279	0.68	-0.402
211.4	42.278	-0.685	-1.759	0	-22.04	0	0.278	0.68	-0.402
211.5	42.061	-0.69	-2.815	0	-22.1	0	0.277	0.68	-0.403
211.6	42.061	-0.69	-2.656	0	-21.8	0	0.277	0.68	-0.404
211.7	41.849	-0.728	-2.172	0	-19.05	0	0.276	0.68	-0.404
211.8	41.756	-0.733	-1.052	0	-15.23	0	0.276	0.68	-0.405
211.9	41.669	-0.733	-3.079	0	-13.32	0	0.276	0.68	-0.405
212	41.588	-0.678	-4.937	0	-12.83	0	0.275	0.68	-0.405
212.1	41.508	-0.693	-2.221	0	-12.83	0	0.275	0.68	-0.406
212.2	41.427	-0.693	-1.649	0	-12.85	0	0.274	0.68	-0.406
212.3	41.346	-0.683	-1.324	0	-13.75	0	0.274	0.68	-0.406
212.4	41.259	-0.668	-1.42	0	-14.32	0	0.274	0.68	-0.407
212.5	41.172	-0.683	-2.034	0	-13.97	0	0.273	0.68	-0.407
212.6	41.085	-0.685	-0.985	0	-13.21	0	0.273	0.68	-0.408
212.7	41.004	-0.673	-0.424	0	-12.73	0	0.273	0.68	-0.408
212.8	40.917	-0.673	-1.271	0	-12.7	0	0.272	0.68	-0.408
212.9	40.837	-0.673	-1.271	0	-12.54	0	0.272	0.68	-0.409
213	40.762	-0.683	-0.918	0	-12.47	0	0.272	0.68	-0.409
213.1	40.675	-0.683	-1.038	0	-12.53	0	0.271	0.68	-0.409
213.2	40.594	-0.683	-0.597	0	-12.47	0	0.271	0.68	-0.41
213.3	40.52	-0.685	-0.713	0	-10.41	0	0.271	0.68	-0.41
213.4	40.451	-0.685	-0.83	0	-2.51	0	0.27	0.68	-0.41
213.5	40.402	-0.68	-0.812	0	0	0	0.27	0.68	-0.41
213.6	40.352	-0.66	-0.805	0	0.58	0	0.27	0.68	-0.41
213.7	40.308	-0.66	-0.968	0	0.62	0	0.27	0.68	-0.41
213.8	40.308	-0.678	-1.261	0	0.63	0	0.271	0.681	-0.41
213.9	40.221	-0.678	-0.201	0	0.64	0	0.271	0.681	-0.41
214	40.178	-0.673	-0.66	0	0.63	0	0.271	0.681	-0.41
214.1	40.134	-0.688	-1.031	0	0.63	0	0.271	0.681	-0.41
214.2	40.085	-0.678	-0.459	0	0.64	0	0.271	0.681	-0.41
214.3	40.047	-0.678	-0.837	0	0.65	0	0.271	0.681	-0.41
214.4	40.004	-0.688	-1.278	0	1.19	0	0.271	0.681	-0.41
214.5	39.96	-0.675	-0.346	0	2.98	0	0.271	0.681	-0.41
214.6	39.96	-0.675	-1.222	0	7.26	0	0.271	0.681	-0.41
214.7	39.904	-0.653	-1.003	0	15.99	0	0.271	0.681	-0.41
214.8	39.898	-0.653	-1.003	0	20.02	0	0.272	0.682	-0.41
214.9	39.898	-0.653	-0.837	0	23.23	0	0.273	0.683	-0.41
215	39.911	-0.67	-0.646	0	26.88	0	0.273	0.683	-0.41
215.1	39.923	-0.678	-0.516	0	30.05	0	0.274	0.684	-0.41
215.2	39.942	-0.678	-0.501	0	33.97	0	0.275	0.685	-0.41
215.3	39.967	-0.67	-0.731	0	36.86	0	0.276	0.686	-0.41
215.4	40.004	-0.655	-0.809	0	42.02	0	0.277	0.687	-0.41
215.5	40.047	-0.655	-0.812	0	44.56	0	0.279	0.689	-0.41

215.6	40.097	-0.668	-0.922	0	46.54	0	0.28	0.69	-0.41
215.7	40.147	-0.668	-0.318	0	46.88	0	0.281	0.691	-0.41
215.8	40.197	-0.67	-0.494	0	46.99	0	0.282	0.692	-0.41
215.9	40.246	-0.67	-0.434	0	55.27	0	0.284	0.694	-0.41
216	40.302	-0.698	-0.632	0	71.19	0	0.286	0.696	-0.41
216.1	40.358	-0.698	-0.293	0	63.59	0	0.288	0.698	-0.41
216.2	40.414	-0.673	-0.173	0	72.13	0	0.29	0.7	-0.41
216.3	40.414	-0.678	-1.264	0	115.56	0	0.293	0.703	-0.41
216.4	40.544	-0.678	-0.636	0	119.96	0	0.296	0.706	-0.41
216.5	40.619	-0.653	-0.417	0	115.35	0	0.299	0.709	-0.41
216.6	40.694	-0.468	-0.614	0	68.57	0	0.301	0.711	-0.41
216.7	40.762	-0.468	-0.279	0	43.43	0	0.303	0.713	-0.41
216.8	40.849	0.018	4.828	0	36.15	0	0.304	0.714	-0.41
216.9	40.911	0.018	20.475	0	41.68	0	0.305	0.715	-0.41
217	40.992	-0.062	34.449	0	40.22	0	0.306	0.716	-0.41
217.1	40.992	-0.538	35.876	0	36.65	0	0.307	0.717	-0.41
217.2	41.135	-0.385	23.177	0	32.26	0	0.308	0.718	-0.41
217.3	41.135	-0.385	7.963	0	29.4	0	0.309	0.719	-0.41
217.4	41.284	-0.305	11.852	0	27.34	0	0.309	0.719	-0.41
217.5	41.358	-0.252	16.898	0	25.84	0	0.31	0.72	-0.41
217.6	41.439	-0.252	18.823	0	24.41	0	0.311	0.721	-0.41
217.7	41.514	-0.215	21.471	0	23.06	0	0.311	0.721	-0.41
217.8	41.588	-0.195	23.551	0	21.76	0	0.312	0.722	-0.41
217.9	41.669	-0.195	24.621	0	21.35	0	0.313	0.723	-0.41
218	41.744	-0.192	25.225	0	21.11	0	0.313	0.723	-0.41
218.1	41.831	-0.192	25.511	0	19.72	0	0.314	0.724	-0.41
218.2	41.911	-0.192	25.628	0	18.99	0	0.314	0.724	-0.41
218.3	41.998	-0.182	25.91	0	16.9	0	0.315	0.725	-0.41
218.4	42.085	-0.16	26.108	0	15.36	0	0.315	0.725	-0.41
218.5	42.172	-0.16	26.797	0	14.04	0	0.316	0.725	-0.41
218.6	42.253	-0.102	27.595	0	12.77	0	0.316	0.726	-0.41
218.7	42.34	-0.102	29.442	0	11.62	0	0.316	0.726	-0.41
218.8	42.34	-0.095	30.71	0	9.5	0	0.316	0.726	-0.41
218.9	42.427	-0.095	30.918	0	5.15	0	0.317	0.727	-0.41
219	42.576	-0.042	31.289	0	-1.05	0	0.317	0.727	-0.41
219.1	42.638	-0.042	32.147	0	-4.09	0	0.316	0.727	-0.41
219.2	42.694	-0.037	33.485	0	-5.06	0	0.316	0.727	-0.41
219.3	42.75	-0.02	33.651	0	-5.76	0	0.316	0.727	-0.41
219.4	42.806	-0.02	33.482	0	-6.48	0	0.316	0.727	-0.411
219.5	42.868	-0.005	34.139	0	-7.14	0	0.316	0.727	-0.411
219.6	42.924	0.01	35.484	0	-7.85	0	0.316	0.727	-0.411
219.7	42.986	0.01	36.007	0	-8.77	0	0.315	0.727	-0.411
219.8	43.042	0.028	35.95	0	-13.54	0	0.315	0.727	-0.412
219.9	43.086	0.028	36.777	0	-18.37	0	0.314	0.727	-0.412
220	43.123	0.03	37.243	0	-21.19	0	0.314	0.727	-0.413
220.1	43.154	0.035	37.758	0	-24.92	0	0.313	0.727	-0.413
220.2	43.179	0.033	38.557	0	-29.99	0	0.312	0.727	-0.414

220.3	43.192	0.033	38.486	0	-33.06	0	0.311	0.727	-0.415
220.4	43.198	0.065	38.733	0	-34.16	0	0.31	0.727	-0.416
220.5	43.204	0.063	38.963	0	-34.74	0	0.309	0.727	-0.417
220.6	43.21	0.063	39.669	0	-36.6	0	0.308	0.727	-0.418
220.7	43.21	0.065	40.054	0	-38.71	0	0.307	0.727	-0.419
220.8	43.204	0.068	39.782	0	-40.17	0	0.306	0.727	-0.42
220.9	43.198	0.068	40.1	0	-40.12	0	0.305	0.727	-0.421
221	43.192	0.08	40.442	0	-40.05	0	0.304	0.727	-0.423
221.1	43.192	0.103	41.05	0	-38.97	0	0.303	0.727	-0.424
221.2	43.185	0.103	41.159	0	-36.58	0	0.302	0.727	-0.425
221.3	43.185	0.088	41.05	0	-33.8	0	0.301	0.727	-0.426
221.4	43.192	0.065	41.198	0	-30.37	0	0.3	0.727	-0.426
221.5	43.21	0.065	41.385	0	-27.33	0	0.299	0.727	-0.427
221.6	43.235	0.078	40.781	0	-25.08	0	0.299	0.727	-0.428
221.7	43.272	0.093	39.651	0	-24.88	0	0.298	0.727	-0.429
221.8	43.303	0.093	39.817	0	-24.53	0	0.297	0.727	-0.429
221.9	43.341	0.083	40.831	0	-24.29	0	0.297	0.727	-0.43
222	43.372	0.103	41.343	0	-23.56	0	0.296	0.727	-0.431
222.1	43.409	0.103	40.509	0	-22.25	0	0.295	0.727	-0.431
222.2	43.44	0.09	40.859	0	-21.29	0	0.295	0.727	-0.432
222.3	43.484	0.088	41.89	0	-20.61	0	0.294	0.727	-0.432
222.4	43.484	0.088	41.403	0	-20.76	0	0.294	0.727	-0.433
222.5	43.558	0.06	41.039	0	-20.68	0	0.293	0.727	-0.434
222.6	43.595	0.055	41.039	0	-17.48	0	0.293	0.727	-0.434
222.7	43.633	0.055	40.34	0	-16.09	0	0.292	0.727	-0.434
222.8	43.676	0.058	39.867	0	-15.61	0	0.292	0.727	-0.435
222.9	43.72	0.058	39.574	0	-15.73	0	0.291	0.727	-0.435
223	43.763	0.063	39.182	0	-15.7	0	0.291	0.727	-0.436
223.1	43.807	0.058	38.966	0	-15.79	0	0.29	0.727	-0.436
223.2	43.85	0.055	39.231	0	-18.62	0	0.29	0.727	-0.437
223.3	43.894	0.055	38.938	0	-18.8	0	0.289	0.727	-0.437
223.4	43.937	0.06	38.941	0	-18.83	0	0.289	0.727	-0.438
223.5	43.981	0.09	39.249	0	-18.74	0	0.288	0.727	-0.438
223.6	44.024	0.09	39.203	0	-17.96	0	0.288	0.727	-0.439
223.7	44.074	0.103	40.506	0	-17.94	0	0.287	0.727	-0.439
223.8	44.124	0.098	41.813	0	-18	0	0.287	0.727	-0.44
223.9	44.161	0.098	41.131	0	-17.99	0	0.286	0.727	-0.44
224	44.211	0.093	41.142	0	-17.97	0	0.286	0.727	-0.441
224.1	44.254	0.09	41.014	0	-17.63	0	0.285	0.727	-0.441
224.2	44.298	0.09	40.619	0	-17.31	0	0.285	0.727	-0.442
224.3	44.341	0.095	40.241	0	-17.35	0	0.284	0.727	-0.442
224.4	44.385	0.098	40.732	0	-16.39	0	0.284	0.727	-0.443
224.5	44.434	0.098	40.714	0	-13.83	0	0.284	0.727	-0.443
224.6	44.478	0.065	40.499	0	-13.88	0	0.283	0.727	-0.443
224.7	44.521	0.065	40.788	0	-14.17	0	0.283	0.727	-0.444
224.8	44.571	0.065	40.442	0	-14.45	0	0.282	0.727	-0.444
224.9	44.608	0.058	39.775	0	-15.72	0	0.282	0.727	-0.445

225	44.608	0.05	38.645	0	-17.48	0	0.281	0.727	-0.445
225.1	44.683	0.05	38.73	0	-17.93	0	0.281	0.727	-0.446
225.2	44.72	0.073	38.864	0	-17.87	0	0.28	0.727	-0.446
225.3	44.751	0.078	38.207	0	-18.07	0	0.28	0.727	-0.447
225.4	44.788	0.078	38.786	0	-18.42	0	0.279	0.727	-0.447
225.5	44.82	0.09	39.503	0	-18.5	0	0.279	0.727	-0.448
225.6	44.857	0.09	39.39	0	-18.86	0	0.278	0.727	-0.448
225.7	44.894	0.09	39.588	0	-20.4	0	0.278	0.727	-0.449
225.8	44.938	0.075	40.404	0	-21.19	0	0.277	0.727	-0.449
225.9	44.969	0.075	40.22	0	-20.43	0	0.277	0.727	-0.45
226	45.018	0.09	39.549	0	-19.56	0	0.276	0.727	-0.45
226.1	45.062	0.131	39.899	0	-19.2	0	0.276	0.727	-0.451
226.2	45.105	0.151	41.039	0	-18.83	0	0.275	0.727	-0.452
226.3	45.149	0.151	42.6	0	-18.43	0	0.275	0.727	-0.452
226.4	45.192	0.136	43.395	0	-17.54	0	0.274	0.727	-0.453
226.5	45.236	0.123	44.341	0	-13.44	0	0.274	0.727	-0.453
226.6	45.279	0.123	43.96	0	-10.48	0	0.273	0.727	-0.453
226.7	45.317	0.083	43.275	0	-8.38	0	0.273	0.727	-0.453
226.8	45.366	0.003	42.42	0	-7.26	0	0.273	0.727	-0.454
226.9	45.404	0.003	40.69	0	-6.33	0	0.273	0.727	-0.454
227	45.447	-0.065	36.95	0	-5.63	0	0.273	0.727	-0.454
227.1	45.491	-0.08	33.055	0	-5.51	0	0.272	0.727	-0.454
227.2	45.528	-0.08	32.352	0	-5.5	0	0.272	0.727	-0.454
227.3	45.571	-0.082	31.402	0	-5.85	0	0.272	0.727	-0.454
227.4	45.615	-0.085	30.886	0	-6.06	0	0.272	0.727	-0.455
227.5	45.658	-0.085	30.847	0	-5.41	0	0.272	0.727	-0.455
227.6	45.702	-0.022	30.399	0	-5.32	0	0.272	0.727	-0.455
227.7	45.758	0.005	30.812	0	-5.11	0	0.272	0.727	-0.455
227.8	45.801	0.005	32.553	0	-5.38	0	0.271	0.727	-0.455
227.9	45.851	-0.005	33.771	0	-5.3	0	0.271	0.727	-0.455
228	45.901	-0.027	35.152	0	-5.13	0	0.271	0.727	-0.455
228.1	45.957	-0.027	35.004	0	-5.23	0	0.271	0.727	-0.456
228.2	46.006	0	35.657	0	-4.96	0	0.271	0.727	-0.456
228.3	46.062	0.013	35.343	0	-4.21	0	0.271	0.727	-0.456
228.4	46.118	0.013	35.7	0	-4.37	0	0.271	0.727	-0.456
228.5	46.174	0.015	36.462	0	-4.47	0	0.27	0.727	-0.456
228.6	46.236	0.005	36.544	0	-4.05	0	0.27	0.727	-0.456
228.7	46.292	0.005	37.172	0	-4.21	0	0.27	0.727	-0.456
228.8	46.348	0.02	36.597	0	-4.34	0	0.27	0.727	-0.456
228.9	46.404	0.02	37.116	0	-4.57	0	0.27	0.727	-0.457
229	46.466	0.033	36.787	0	-4.63	0	0.27	0.727	-0.457
229.1	46.522	0.035	37.066	0	-4.71	0	0.27	0.727	-0.457
229.2	46.584	0.05	37.769	0	-4.88	0	0.27	0.727	-0.457
229.3	46.64	0.05	37.289	0	-5.9	0	0.269	0.727	-0.457
229.4	46.696	0.068	37.388	0	-8.83	0	0.269	0.727	-0.457
229.5	46.74	0.055	37.571	0	-11.13	0	0.269	0.727	-0.458
229.6	46.777	0.055	37.875	0	-9	0	0.269	0.727	-0.458

229.7	46.82	0.03	37.79	0	-8.59	0	0.268	0.727	-0.458
229.8	46.858	-0.02	37.875	0	-8.81	0	0.268	0.727	-0.458
229.9	46.895	-0.02	37.871	0	-8.64	0	0.268	0.727	-0.459
230	46.926	-0.032	36.339	0	-7.97	0	0.268	0.727	-0.459
230.1	46.963	-0.037	33.468	0	-7.44	0	0.267	0.727	-0.459
230.2	46.994	-0.037	32.761	0	-7.46	0	0.267	0.727	-0.459
230.3	47.032	-0.072	32.687	0	-7.41	0	0.267	0.727	-0.46
230.4	47.063	-0.085	32.26	0	-7.18	0	0.267	0.727	-0.46
230.5	47.094	-0.085	31.713	0	-6.87	0	0.267	0.727	-0.46
230.6	47.125	-0.082	30.643	0	-6.74	0	0.266	0.727	-0.46
230.7	47.156	-0.085	31.063	0	-6.57	0	0.266	0.727	-0.46
230.8	47.187	-0.085	31.02	0	-6.56	0	0.266	0.727	-0.46
230.9	47.218	-0.092	30.286	0	-7.01	0	0.266	0.727	-0.461
231	47.243	-0.097	30.643	0	-7.86	0	0.266	0.727	-0.461
231.1	47.268	-0.097	30.261	0	-7.7	0	0.265	0.727	-0.461
231.2	47.293	-0.1	30.261	0	-7.49	0	0.265	0.727	-0.461
231.3	47.317	-0.09	30.085	0	-8.07	0	0.265	0.727	-0.462
231.4	47.342	-0.09	29.791	0	-9.72	0	0.265	0.727	-0.462
231.5	47.361	-0.1	29.844	0	-11.01	0	0.264	0.727	-0.462
231.6	47.38	-0.11	30.046	0	-13.06	0	0.264	0.727	-0.462
231.7	47.392	-0.11	30.159	0	-14.8	0	0.264	0.727	-0.463
231.8	47.398	-0.125	29.509	0	-16.62	0	0.263	0.727	-0.463
231.9	47.392	-0.125	29.795	0	-17.66	0	0.263	0.727	-0.464
232	47.386	-0.13	29.385	0	-18.41	0	0.262	0.727	-0.464
232.1	47.38	-0.145	27.595	0	-17.76	0	0.262	0.727	-0.465
232.2	47.361	-0.177	27.757	0	-17.2	0	0.261	0.727	-0.465
232.3	47.342	-0.177	27.496	0	-16.5	0	0.261	0.727	-0.466
232.4	47.324	-0.22	26.055	0	-15.49	0	0.26	0.727	-0.466
232.5	47.311	-0.24	24.113	0	-14.79	0	0.26	0.727	-0.467
232.6	47.286	-0.24	23.011	0	-14.49	0	0.26	0.727	-0.467
232.7	47.268	-0.277	22.22	0	-13.67	0	0.259	0.727	-0.467
232.8	47.249	-0.265	21.849	0	-13.23	0	0.259	0.727	-0.468
232.9	47.237	-0.265	20.698	0	-12.98	0	0.258	0.727	-0.468
233	47.224	-0.27	20.454	0	-12.16	0	0.258	0.727	-0.468
233.1	47.206	-0.257	20.62	0	-11.91	0	0.258	0.727	-0.469
233.2	47.199	-0.257	20.345	0	-11.58	0	0.257	0.727	-0.469
233.3	47.187	-0.255	20.115	0	-11	0	0.257	0.727	-0.469
233.4	47.175	-0.24	20.666	0	-10.92	0	0.257	0.727	-0.47
233.5	47.168	-0.24	20.525	0	-10.92	0	0.257	0.727	-0.47
233.6	47.156	-0.257	20.822	0	-10.9	0	0.256	0.727	-0.47
233.7	47.15	-0.25	21.457	0	-10.94	0	0.256	0.727	-0.471
233.8	47.143	-0.25	21.069	0	-10.94	0	0.256	0.727	-0.471
233.9	47.131	-0.25	21.376	0	-10.92	0	0.255	0.727	-0.471
234	47.119	-0.235	21.319	0	-10.87	0	0.255	0.727	-0.472
234.1	47.112	-0.235	21.238	0	-10.73	0	0.255	0.727	-0.472
234.2	47.1	-0.235	21.171	0	-10.81	0	0.254	0.727	-0.472
234.3	47.088	-0.257	21.157	0	-10.87	0	0.254	0.727	-0.472

234.4	47.075	-0.257	21.824	0	-10.98	0	0.254	0.727	-0.473
234.5	47.069	-0.247	21.609	0	-10.86	0	0.254	0.727	-0.473
234.6	47.063	-0.25	20.917	0	-10.9	0	0.253	0.727	-0.473
234.7	47.05	-0.25	21.549	0	-10.78	0	0.253	0.727	-0.474
234.8	47.044	-0.262	21.295	0	-10.48	0	0.253	0.727	-0.474
234.9	47.038	-0.262	21.457	0	-9.95	0	0.252	0.727	-0.474
235	47.025	-0.272	21.372	0	-9.37	0	0.252	0.727	-0.474
235.1	47.025	-0.27	21.309	0	-8.9	0	0.252	0.727	-0.475
235.2	47.019	-0.265	21.182	0	-9.02	0	0.252	0.727	-0.475
235.3	47.013	-0.265	21.577	0	-8.33	0	0.251	0.727	-0.475
235.4	47.013	-0.232	21.291	0	-7.34	0	0.251	0.727	-0.475
235.5	47.013	-0.222	21.118	0	-8.03	0	0.251	0.727	-0.476
235.6	47.013	-0.222	21.697	0	-7.69	0	0.251	0.727	-0.476
235.7	47.019	-0.222	21.832	0	-7.63	0	0.251	0.727	-0.476
235.8	47.019	-0.227	22.368	0	-7.63	0	0.25	0.727	-0.476
235.9	47.025	-0.227	22.658	0	-7.87	0	0.25	0.727	-0.477
236	47.025	-0.235	23.209	0	-7.63	0	0.25	0.727	-0.477
236.1	47.032	-0.205	23.41	0	-7.98	0	0.25	0.727	-0.477
236.2	47.032	-0.205	22.965	0	-7.75	0	0.249	0.727	-0.477
236.3	47.038	-0.22	23.117	0	-7.64	0	0.249	0.727	-0.477
236.4	47.038	-0.21	23.505	0	-7.82	0	0.249	0.727	-0.478
236.5	47.05	-0.21	23.304	0	-8.21	0	0.249	0.727	-0.478
236.6	47.05	-0.215	23.032	0	-8.23	0	0.249	0.727	-0.478
236.7	47.056	-0.217	23.117	0	-8.46	0	0.248	0.727	-0.478
236.8	47.056	-0.217	23.975	0	-8.93	0	0.248	0.727	-0.479
236.9	47.056	-0.212	23.128	0	-8.91	0	0.248	0.727	-0.479
237	47.056	-0.215	23.304	0	-9.34	0	0.248	0.727	-0.479
237.1	47.056	-0.215	23.52	0	-9.39	0	0.247	0.727	-0.479
237.2	47.056	-0.202	23.046	0	-9.27	0	0.247	0.727	-0.48
237.3	47.056	-0.212	22.947	0	-9.26	0	0.247	0.727	-0.48
237.4	47.056	-0.212	23.149	0	-9.28	0	0.247	0.727	-0.48
237.5	47.056	-0.23	23.145	0	-9.18	0	0.246	0.727	-0.48
237.6	47.05	-0.232	23.071	0	-9.18	0	0.246	0.727	-0.481
237.7	47.056	-0.232	23.092	0	-9.21	0	0.246	0.727	-0.481
237.8	47.056	-0.22	23.015	0	-9.06	0	0.245	0.727	-0.481
237.9	47.056	-0.22	22.485	0	-9.15	0	0.245	0.727	-0.481
238	47.056	-0.217	22.623	0	-8.96	0	0.245	0.727	-0.482
238.1	47.05	-0.222	23.417	0	-8.83	0	0.245	0.727	-0.482
238.2	47.056	-0.23	22.789	0	-9.21	0	0.244	0.727	-0.482
238.3	47.05	-0.23	22.552	0	-9.26	0	0.244	0.727	-0.482
238.4	47.05	-0.232	23.272	0	-9.32	0	0.244	0.727	-0.483
238.5	47.044	-0.217	22.88	0	-9.66	0	0.244	0.727	-0.483
238.6	47.044	-0.217	21.87	0	-9.64	0	0.243	0.727	-0.483
238.7	47.038	-0.232	22.69	0	-9.83	0	0.243	0.727	-0.483
238.8	47.032	-0.227	22.647	0	-9.64	0	0.243	0.727	-0.484
238.9	47.032	-0.227	21.616	0	-9.54	0	0.243	0.727	-0.484
239	47.019	-0.25	22.28	0	-9.51	0	0.242	0.727	-0.484

239.1	47.013	-0.23	22.167	0	-9.51	0	0.242	0.727	-0.484
239.2	47.007	-0.23	21.411	0	-9.43	0	0.242	0.727	-0.485
239.3	47.001	-0.255	20.885	0	-9.29	0	0.242	0.727	-0.485
239.4	46.994	-0.26	21.602	0	-9.29	0	0.241	0.727	-0.485
239.5	46.988	-0.26	21.719	0	-9.28	0	0.241	0.727	-0.486
239.6	46.982	-0.247	21.058	0	-9.28	0	0.241	0.727	-0.486
239.7	46.982	-0.247	21.288	0	-9.29	0	0.241	0.727	-0.486
239.8	46.976	-0.247	21.683	0	-9.28	0	0.24	0.727	-0.486
239.9	46.969	-0.242	21.584	0	-9.28	0	0.24	0.727	-0.487
240	46.963	-0.255	21.192	0	-9.27	0	0.24	0.727	-0.487
240.1	46.957	-0.255	22.082	0	-9.29	0	0.24	0.727	-0.487
240.2	46.951	-0.255	21.817	0	-9.28	0	0.239	0.727	-0.487
240.3	46.945	-0.265	21.655	0	-9.27	0	0.239	0.727	-0.488
240.4	46.945	-0.265	21.683	0	-9.3	0	0.239	0.727	-0.488
240.5	46.938	-0.25	22.185	0	-9.28	0	0.238	0.727	-0.488
240.6	46.932	-0.232	21.072	0	-9.27	0	0.238	0.727	-0.488
240.7	46.926	-0.232	20.843	0	-9.27	0	0.238	0.727	-0.489
240.8	46.926	-0.255	21.274	0	-9.28	0	0.238	0.727	-0.489
240.9	46.92	-0.255	22.005	0	-8.91	0	0.237	0.727	-0.489
241	46.914	-0.247	21.913	0	-8.72	0	0.237	0.727	-0.489
241.1	46.907	-0.222	21.143	0	-8.67	0	0.237	0.727	-0.49
241.2	46.907	-0.242	21.348	0	-8.48	0	0.237	0.727	-0.49
241.3	46.907	-0.242	21.803	0	-8.49	0	0.237	0.727	-0.49
241.4	46.901	-0.242	22.149	0	-8.39	0	0.236	0.727	-0.49
241.5	46.901	-0.252	21.832	0	-8.24	0	0.236	0.727	-0.491
241.6	46.895	-0.252	22.008	0	-8.14	0	0.236	0.727	-0.491
241.7	46.895	-0.245	22.195	0	-8.01	0	0.236	0.727	-0.491
241.8	46.895	-0.232	22.075	0	-7.99	0	0.235	0.727	-0.491
241.9	46.895	-0.232	21.779	0	-7.77	0	0.235	0.727	-0.491
242	46.895	-0.237	22.7	0	-7.59	0	0.235	0.727	-0.492
242.1	46.895	-0.23	22.563	0	-7.46	0	0.235	0.727	-0.492
242.2	46.901	-0.23	22.132	0	-7.36	0	0.235	0.727	-0.492
242.3	46.901	-0.217	22.358	0	-7.22	0	0.234	0.727	-0.492
242.4	46.907	-0.225	22.7	0	-7.22	0	0.234	0.727	-0.492
242.5	46.907	-0.225	23.096	0	-7.22	0	0.234	0.727	-0.493
242.6	46.914	-0.23	22.88	0	-7.22	0	0.234	0.727	-0.493
242.7	46.914	-0.222	23.424	0	-7.15	0	0.234	0.727	-0.493
242.8	46.92	-0.222	22.951	0	-6.75	0	0.233	0.727	-0.493
242.9	46.92	-0.225	23.11	0	-6.2	0	0.233	0.727	-0.493
243	46.932	-0.21	22.88	0	-4.06	0	0.233	0.727	-0.494
243.1	46.945	-0.21	23.152	0	-3.87	0	0.233	0.727	-0.494
243.2	46.963	-0.2	23.163	0	-3.92	0	0.233	0.727	-0.494
243.3	46.976	-0.197	23.068	0	-5.29	0	0.233	0.727	-0.494
243.4	46.988	-0.197	23.583	0	-6.17	0	0.233	0.727	-0.494
243.5	47.001	-0.195	24.311	0	-6.27	0	0.232	0.727	-0.494
243.6	47.013	-0.195	24.699	0	-6.35	0	0.232	0.727	-0.494
243.7	47.019	-0.195	24.879	0	-4.35	0	0.232	0.727	-0.495

243.8	47.019	-0.182	25.37	0	-4.16	0	0.232	0.727	-0.495
243.9	47.063	-0.182	25.024	0	-4.02	0	0.232	0.727	-0.495
244	47.081	-0.182	25.285	0	-4.27	0	0.232	0.727	-0.495
244.1	47.1	-0.15	25.37	0	-4.66	0	0.232	0.727	-0.495
244.2	47.119	-0.16	25.271	0	-5.97	0	0.231	0.727	-0.495
244.3	47.143	-0.16	26.32	0	-6.86	0	0.231	0.727	-0.495
244.4	47.156	-0.147	27.048	0	-6.87	0	0.231	0.727	-0.496
244.5	47.181	-0.142	26.525	0	-6.89	0	0.231	0.727	-0.496
244.6	47.199	-0.142	27.072	0	-6.87	0	0.231	0.727	-0.496
244.7	47.218	-0.147	27.379	0	-6.89	0	0.23	0.727	-0.496
244.8	47.237	-0.137	27.708	0	-6.89	0	0.23	0.727	-0.496
244.9	47.261	-0.137	27.786	0	-6.89	0	0.23	0.727	-0.496
245	47.28	-0.127	27.839	0	-6.92	0	0.23	0.727	-0.497
245.1	47.299	-0.13	27.697	0	-6.89	0	0.23	0.727	-0.497
245.2	47.317	-0.13	28.52	0	-5.88	0	0.23	0.727	-0.497
245.3	47.342	-0.14	28.086	0	-6.19	0	0.229	0.727	-0.497
245.4	47.367	-0.147	28.608	0	-5.76	0	0.229	0.727	-0.497
245.5	47.392	-0.147	28.478	0	-4.29	0	0.229	0.727	-0.497
245.6	47.423	-0.142	28.308	0	-5.68	0	0.229	0.727	-0.498
245.7	47.448	-0.135	28.284	0	-6.62	0	0.229	0.727	-0.498
245.8	47.479	-0.135	28.813	0	-6.56	0	0.229	0.727	-0.498
245.9	47.516	-0.107	28.312	0	-6.87	0	0.228	0.727	-0.498
246	47.554	-0.02	29.036	0	-7.54	0	0.228	0.727	-0.498
246.1	47.591	-0.02	30.964	0	-8	0	0.228	0.727	-0.499
246.2	47.628	-0.015	33.418	0	-7.96	0	0.228	0.727	-0.499
246.3	47.659	-0.03	34.457	0	-7.73	0	0.228	0.727	-0.499
246.4	47.696	-0.03	34.414	0	-7.61	0	0.227	0.727	-0.499
246.5	47.734	-0.045	34.527	0	-7.53	0	0.227	0.727	-0.499
246.6	47.765	-0.032	33.771	0	-8.42	0	0.227	0.727	-0.5
246.7	47.796	-0.032	33.429	0	-9.52	0	0.227	0.727	-0.5
246.8	47.796	-0.027	33.888	0	-8.51	0	0.226	0.727	-0.5
246.9	47.852	-0.027	33.673	0	-9.13	0	0.226	0.727	-0.5
247	47.877	-0.042	33.549	0	-10.9	0	0.226	0.727	-0.501
247.1	47.895	-0.097	33.33	0	-11.51	0	0.225	0.727	-0.501
247.2	47.908	-0.082	32.295	0	-12.13	0	0.225	0.727	-0.501
247.3	47.926	-0.082	30.911	0	-11.44	0	0.225	0.727	-0.502
247.4	47.939	-0.112	30.54	0	-10.61	0	0.225	0.727	-0.502
247.5	47.951	-0.127	30.402	0	-10.09	0	0.224	0.727	-0.502
247.6	47.964	-0.127	29.647	0	-9.39	0	0.224	0.727	-0.503
247.7	47.982	-0.125	28.344	0	-8.91	0	0.224	0.727	-0.503
247.8	47.982	-0.152	27.658	0	-8.45	0	0.224	0.727	-0.503
247.9	48.001	-0.152	27.605	0	-8.52	0	0.223	0.727	-0.503
248	48.013	-0.167	27.362	0	-10.25	0	0.223	0.727	-0.504
248.1	48.013	-0.167	26.281	0	-10.84	0	0.223	0.727	-0.504
248.2	48.02	-0.167	25.935	0	-10.27	0	0.222	0.727	-0.504
248.3	48.02	-0.185	25.769	0	-9.7	0	0.222	0.727	-0.504
248.4	48.02	-0.195	25.54	0	-9.27	0	0.222	0.727	-0.505

248.5	48.026	-0.195	25.183	0	-8.91	0	0.222	0.727	-0.505
248.6	48.032	-0.205	25.197	0	-8.54	0	0.221	0.727	-0.505
248.7	48.032	-0.21	24.3	0	-8.64	0	0.221	0.727	-0.505
248.8	48.032	-0.21	24.176	0	-9.84	0	0.221	0.727	-0.506
248.9	48.038	-0.207	23.809	0	-10.56	0	0.221	0.727	-0.506
249	48.038	-0.192	24.148	0	-11.74	0	0.22	0.727	-0.506
249.1	48.032	-0.192	23.565	0	-12.47	0	0.22	0.727	-0.507
249.2	48.026	-0.222	23.198	0	-12.01	0	0.22	0.727	-0.507
249.3	48.02	-0.235	24.498	0	-11.59	0	0.219	0.727	-0.507
249.4	48.013	-0.235	24.12	0	-11.18	0	0.219	0.727	-0.508
249.5	48.001	-0.23	23.255	0	-10.71	0	0.219	0.727	-0.508
249.6	47.995	-0.24	22.626	0	-10.14	0	0.218	0.727	-0.508
249.7	47.988	-0.24	22.503	0	-9.82	0	0.218	0.727	-0.508
249.8	47.976	-0.24	22.612	0	-9.46	0	0.218	0.727	-0.509
249.9	47.976	-0.24	21.86	0	-9.13	0	0.218	0.727	-0.509
250	47.97	-0.23	21.288	0	-8.83	0	0.217	0.727	-0.509
250.1	47.97	-0.222	21.616	0	-7.39	0	0.217	0.727	-0.509
250.2	47.964	-0.227	21.817	0	-7.93	0	0.217	0.727	-0.51
250.3	47.964	-0.227	21.821	0	-5.92	0	0.217	0.727	-0.51
250.4	47.97	-0.212	22.001	0	-5.06	0	0.217	0.727	-0.51
250.5	47.982	-0.2	22.012	0	-4.68	0	0.216	0.727	-0.51
250.6	47.995	-0.2	22.796	0	-4.31	0	0.216	0.727	-0.51
250.7	48.007	-0.202	23.103	0	-5.32	0	0.216	0.727	-0.51
250.8	48.013	-0.212	24.01	0	-5.12	0	0.216	0.727	-0.511
250.9	48.013	-0.212	24.367	0	-7.01	0	0.216	0.727	-0.511
251	48.032	-0.175	24.597	0	-7.04	0	0.216	0.727	-0.511
251.1	48.044	-0.167	23.88	0	-7.05	0	0.215	0.727	-0.511
251.2	48.057	-0.167	24.685	0	-7.05	0	0.215	0.727	-0.511
251.3	48.063	-0.172	25.843	0	-7.03	0	0.215	0.727	-0.512
251.4	48.082	-0.152	25.85	0	-7.03	0	0.215	0.727	-0.512
251.5	48.088	-0.152	25.854	0	-7.02	0	0.215	0.727	-0.512
251.6	48.094	-0.155	25.826	0	-7.05	0	0.214	0.727	-0.512
251.7	48.107	-0.17	26.32	0	-7.03	0	0.214	0.727	-0.512
251.8	48.119	-0.17	26.857	0	-7.15	0	0.214	0.727	-0.512
251.9	48.131	-0.167	26.405	0	-7.17	0	0.214	0.727	-0.513
252	48.138	-0.157	25.706	0	-7.42	0	0.214	0.727	-0.513
252.1	48.15	-0.157	26.002	0	-7.41	0	0.213	0.727	-0.513
252.2	48.162	-0.15	26.239	0	-7.29	0	0.213	0.727	-0.513
252.3	48.169	-0.155	25.868	0	-7.28	0	0.213	0.727	-0.514
252.4	48.175	-0.155	25.723	0	-7.27	0	0.213	0.727	-0.514
252.5	48.187	-0.175	26.324	0	-7.27	0	0.213	0.727	-0.514
252.6	48.2	-0.17	26.143	0	-7.31	0	0.212	0.727	-0.514
252.7	48.206	-0.17	25.642	0	-7.69	0	0.212	0.727	-0.514
252.8	48.212	-0.15	25.427	0	-7.95	0	0.212	0.727	-0.515
252.9	48.225	-0.15	25.349	0	-7.96	0	0.212	0.727	-0.515
253	48.231	-0.155	25.571	0	-7.98	0	0.212	0.727	-0.515
253.1	48.243	-0.152	26.352	0	-8.04	0	0.211	0.727	-0.515

253.2	48.249	-0.145	26.002	0	-8.02	0	0.211	0.727	-0.515
253.3	48.262	-0.145	26.242	0	-8.03	0	0.211	0.727	-0.516
253.4	48.274	-0.18	26.652	0	-8.02	0	0.211	0.727	-0.516
253.5	48.281	-0.167	27.139	0	-8.05	0	0.21	0.727	-0.516
253.6	48.293	-0.167	26.475	0	-8.41	0	0.21	0.727	-0.516
253.7	48.299	-0.16	25.882	0	-8.33	0	0.21	0.727	-0.517
253.8	48.299	-0.155	26.543	0	-8.25	0	0.21	0.727	-0.517
253.9	48.318	-0.155	25.872	0	-8.61	0	0.21	0.727	-0.517
254	48.324	-0.172	25.787	0	-9.36	0	0.209	0.727	-0.517
254.1	48.33	-0.18	25.893	0	-10.8	0	0.209	0.727	-0.518
254.2	48.336	-0.18	25.773	0	-11.28	0	0.209	0.727	-0.518
254.3	48.336	-0.162	25.427	0	-11.37	0	0.208	0.727	-0.518
254.4	48.33	-0.182	25.374	0	-11.54	0	0.208	0.727	-0.519
254.5	48.33	-0.182	25.582	0	-11.64	0	0.208	0.727	-0.519
254.6	48.324	-0.195	25.797	0	-12.04	0	0.207	0.727	-0.519
254.7	48.318	-0.19	24.724	0	-12.31	0	0.207	0.727	-0.52
254.8	48.318	-0.19	24.166	0	-13.28	0	0.207	0.727	-0.52
254.9	48.305	-0.2	24.205	0	-14.26	0	0.206	0.727	-0.52
255	48.293	-0.212	24.152	0	-14.82	0	0.206	0.727	-0.521
255.1	48.274	-0.212	23.703	0	-14.51	0	0.205	0.727	-0.521
255.2	48.262	-0.227	23.089	0	-13.91	0	0.205	0.727	-0.522
255.3	48.262	-0.232	22.88	0	-13.67	0	0.205	0.727	-0.522
255.4	48.231	-0.232	22.428	0	-13	0	0.204	0.727	-0.522
255.5	48.218	-0.237	22.012	0	-12.45	0	0.204	0.727	-0.523
255.6	48.206	-0.227	21.888	0	-11.56	0	0.204	0.727	-0.523
255.7	48.206	-0.227	21.535	0	-8.79	0	0.203	0.727	-0.523
255.8	48.194	-0.24	21.316	0	-5.31	0	0.203	0.727	-0.523
255.9	48.2	-0.24	22.199	0	-6.02	0	0.203	0.727	-0.523
256	48.2	-0.23	21.711	0	-7.88	0	0.203	0.727	-0.524
256.1	48.2	-0.212	21.591	0	-6	0	0.203	0.727	-0.524
256.2	48.206	-0.207	21.888	0	-4.29	0	0.203	0.727	-0.524
256.3	48.218	-0.207	22.866	0	-4.01	0	0.202	0.727	-0.524
256.4	48.237	-0.2	23.308	0	-3.87	0	0.202	0.727	-0.524
256.5	48.249	-0.18	23.986	0	-4.76	0	0.202	0.727	-0.524
256.6	48.274	-0.18	23.876	0	-4.5	0	0.202	0.727	-0.524
256.7	48.287	-0.165	24.809	0	-4.12	0	0.202	0.727	-0.525
256.8	48.312	-0.162	25.543	0	-4.27	0	0.202	0.727	-0.525
256.9	48.33	-0.162	26.338	0	-4.31	0	0.202	0.727	-0.525
257	48.349	-0.137	26.832	0	-4.25	0	0.202	0.727	-0.525
257.1	48.374	-0.112	27.1	0	-4.3	0	0.202	0.727	-0.525
257.2	48.399	-0.112	27.415	0	-4.59	0	0.201	0.727	-0.525
257.3	48.423	-0.12	27.263	0	-4.22	0	0.201	0.727	-0.525
257.4	48.448	-0.115	28.668	0	-3.9	0	0.201	0.727	-0.525
257.5	48.473	-0.115	28.665	0	-6.47	0	0.201	0.727	-0.526
257.6	48.492	-0.117	28.531	0	-7.53	0	0.201	0.727	-0.526
257.7	48.523	-0.107	28.594	0	-8.39	0	0.201	0.727	-0.526
257.8	48.554	-0.107	29.068	0	-8.84	0	0.2	0.727	-0.526

257.9	48.579	-0.067	29.993	0	-8.75	0	0.2	0.727	-0.527
258	48.61	-0.035	31.483	0	-7.99	0	0.2	0.727	-0.527
258.1	48.641	-0.035	33.683	0	-8.05	0	0.2	0.727	-0.527
258.2	48.666	-0.035	34.047	0	-8.41	0	0.199	0.727	-0.527
258.3	48.697	-0.015	33.895	0	-8.68	0	0.199	0.727	-0.527
258.4	48.728	-0.015	33.143	0	-9.21	0	0.199	0.727	-0.528
258.5	48.759	-0.022	33.298	0	-9.28	0	0.199	0.727	-0.528
258.6	48.778	-0.032	34.418	0	-8.31	0	0.198	0.727	-0.528
258.7	48.802	-0.032	34.375	0	-8.61	0	0.198	0.727	-0.528
258.8	48.827	-0.082	34.072	0	-8.47	0	0.198	0.727	-0.529
258.9	48.827	-0.082	33.694	0	-8.31	0	0.198	0.727	-0.529
259	48.871	-0.087	32.313	0	-8.24	0	0.197	0.727	-0.529
259.1	48.896	-0.075	30.78	0	-8.07	0	0.197	0.727	-0.529
259.2	48.921	-0.085	30.593	0	-9.53	0	0.197	0.727	-0.53
259.3	48.933	-0.085	31.119	0	-12.02	0	0.197	0.727	-0.53
259.4	48.945	-0.087	30.741	0	-12.4	0	0.196	0.727	-0.53
259.5	48.952	-0.097	30.498	0	-11.47	0	0.196	0.727	-0.531
259.6	48.964	-0.097	30.424	0	-10.68	0	0.196	0.727	-0.531
259.7	48.976	-0.125	30.544	0	-10.07	0	0.195	0.727	-0.531
259.8	48.976	-0.122	29.721	0	-9.28	0	0.195	0.727	-0.531
259.9	49.001	-0.122	28.319	0	-8.94	0	0.195	0.727	-0.532
260	49.008	-0.13	28.291	0	-8.71	0	0.195	0.727	-0.532
260.1	49.02	-0.125	27.376	0	-8.52	0	0.194	0.727	-0.532
260.2	49.026	-0.125	27.447	0	-8.55	0	0.194	0.727	-0.532
260.3	49.039	-0.13	27.553	0	-8.47	0	0.194	0.727	-0.533
260.4	49.045	-0.135	27.129	0	-8.33	0	0.194	0.727	-0.533
260.5	49.057	-0.135	26.504	0	-8.14	0	0.193	0.727	-0.533
260.6	49.063	-0.155	26.864	0	-8.02	0	0.193	0.727	-0.533
260.7	49.076	-0.152	27.122	0	-8.17	0	0.193	0.727	-0.534
260.8	49.076	-0.152	26.906	0	-8.66	0	0.193	0.727	-0.534
260.9	49.088	-0.16	26.723	0	-9.86	0	0.193	0.727	-0.534
261	49.095	-0.155	27.03	0	-10.31	0	0.192	0.727	-0.534
261.1	49.101	-0.155	26.518	0	-9.91	0	0.192	0.727	-0.535
261.2	49.107	-0.15	26.341	0	-9.55	0	0.192	0.727	-0.535
261.3	49.107	-0.14	26.797	0	-9.82	0	0.191	0.727	-0.535
261.4	49.113	-0.14	26.588	0	-10.45	0	0.191	0.727	-0.535
261.5	49.119	-0.167	26.92	0	-10.61	0	0.191	0.727	-0.536
261.6	49.119	-0.17	26.518	0	-10.01	0	0.191	0.727	-0.536
261.7	49.119	-0.17	26.066	0	-9.69	0	0.19	0.727	-0.536
261.8	49.119	-0.18	26.161	0	-9.52	0	0.19	0.727	-0.537
261.9	49.126	-0.18	25.437	0	-9.42	0	0.19	0.727	-0.537
262	49.126	-0.185	25.119	0	-9.44	0	0.19	0.727	-0.537
262.1	49.126	-0.187	24.812	0	-9.42	0	0.189	0.727	-0.537
262.2	49.132	-0.182	24.844	0	-9.45	0	0.189	0.727	-0.538
262.3	49.132	-0.182	24.816	0	-9.43	0	0.189	0.727	-0.538
262.4	49.132	-0.177	24.59	0	-9.43	0	0.188	0.727	-0.538
262.5	49.132	-0.172	24.816	0	-9.43	0	0.188	0.727	-0.538

262.6	49.132	-0.172	24.731	0	-9.43	0	0.188	0.727	-0.539
262.7	49.138	-0.197	24.936	0	-9.44	0	0.188	0.727	-0.539
262.8	49.132	-0.18	24.844	0	-9.43	0	0.187	0.727	-0.539
262.9	49.138	-0.18	24.565	0	-9.53	0	0.187	0.727	-0.539
263	49.138	-0.16	24.392	0	-10.05	0	0.187	0.727	-0.54
263.1	49.138	-0.172	24.579	0	-11.02	0	0.187	0.727	-0.54
263.2	49.138	-0.172	25.292	0	-11.59	0	0.186	0.727	-0.54
263.3	49.132	-0.177	25.077	0	-11.43	0	0.186	0.727	-0.541
263.4	49.126	-0.167	25.02	0	-11.21	0	0.186	0.727	-0.541
263.5	49.119	-0.167	24.759	0	-10.82	0	0.185	0.727	-0.541
263.6	49.119	-0.197	25.02	0	-10.81	0	0.185	0.727	-0.542
263.7	49.119	-0.195	25.367	0	-10.72	0	0.185	0.727	-0.542
263.8	49.113	-0.195	24.417	0	-10.66	0	0.184	0.727	-0.542
263.9	49.107	-0.185	23.647	0	-11.53	0	0.184	0.727	-0.542
264	49.101	-0.207	24.046	0	-12.91	0	0.184	0.727	-0.543
264.1	49.101	-0.207	24.445	0	-13.85	0	0.183	0.727	-0.543
264.2	49.076	-0.237	24.046	0	-14.89	0	0.183	0.727	-0.544
264.3	49.063	-0.237	24.032	0	-16.34	0	0.182	0.727	-0.544
264.4	49.045	-0.237	23.689	0	-17.68	0	0.182	0.727	-0.545
264.5	49.02	-0.237	23.375	0	-19.15	0	0.181	0.727	-0.545
264.6	48.995	-0.25	23.29	0	-19.89	0	0.181	0.727	-0.546
264.7	48.958	-0.25	23.555	0	-20.93	0	0.18	0.727	-0.546
264.8	48.927	-0.22	22.337	0	-20.85	0	0.18	0.727	-0.547
264.9	48.889	-0.22	21.549	0	-20.6	0	0.179	0.727	-0.547
265	48.865	-0.23	21.884	0	-20.39	0	0.179	0.727	-0.548
265.1	48.865	-0.25	22.52	0	-20.29	0	0.178	0.727	-0.549
265.2	48.802	-0.24	21.372	0	-20.45	0	0.177	0.727	-0.549
265.3	48.765	-0.24	20.772	0	-21.34	0	0.177	0.727	-0.55
265.4	48.728	-0.252	21.146	0	-21.53	0	0.176	0.727	-0.55
265.5	48.691	-0.235	21.454	0	-22.2	0	0.176	0.727	-0.551
265.6	48.653	-0.235	20.885	0	-23.24	0	0.175	0.727	-0.552
265.7	48.616	-0.25	20.889	0	-23.26	0	0.174	0.727	-0.552
265.8	48.573	-0.282	21.372	0	-20.08	0	0.174	0.727	-0.553
265.9	48.529	-0.282	20.945	0	-8.7	0	0.174	0.727	-0.553
266	48.492	-0.292	21.496	0	0.68	0	0.174	0.727	-0.553
266.1	48.455	-0.287	19.787	0	0.74	0	0.174	0.727	-0.553
266.2	48.405	-0.287	19.865	0	0.61	0	0.174	0.727	-0.553
266.3	48.355	-0.508	19.307	0	0.62	0	0.174	0.727	-0.553
266.4	48.299	-0.635	20.094	0	0.63	0	0.174	0.727	-0.553
266.5	48.256	-0.635	10.372	0	0.62	0	0.174	0.727	-0.553
266.6	48.206	-0.593	0.417	0	0.63	0	0.174	0.727	-0.553
266.7	48.156	-0.655	0.629	0	0.62	0	0.174	0.727	-0.553
266.8	48.107	-0.655	1.85	0	0.63	0	0.174	0.727	-0.553
266.9	48.057	-0.65	0.018	0	0.62	0	0.174	0.727	-0.553
267	48.007	-0.63	-1.663	0	0.6	0	0.174	0.727	-0.553
267.1	48.007	-0.63	-1.335	0	0.62	0	0.174	0.727	-0.553
267.2	47.908	-0.648	-0.946	0	0.6	0	0.174	0.727	-0.553

267.3	47.852	-0.66	-0.865	0	0.6	0	0.174	0.727	-0.553
267.4	47.808	-0.66	-1.102	0	0.62	0	0.174	0.727	-0.553
267.5	47.752	-0.668	-1.589	0	0.61	0	0.174	0.727	-0.553
267.6	47.703	-0.68	-2.712	0	0.6	0	0.174	0.727	-0.553
267.7	47.653	-0.68	-2.045	0	0.61	0	0.174	0.727	-0.553
267.8	47.609	-0.633	-1.077	0	0.56	0	0.174	0.727	-0.553
267.9	47.56	-0.633	-2.405	0	0.56	0	0.174	0.727	-0.553
268	47.51	-0.678	-0.392	0	1.22	0	0.174	0.727	-0.553
268.1	47.46	-0.678	-1.024	0	2.02	0	0.174	0.727	-0.553
268.2	47.417	-0.648	-2.137	0	3.38	0	0.174	0.727	-0.553
268.3	47.373	-0.648	-2.631	0	4.54	0	0.174	0.727	-0.553
268.4	47.336	-0.658	-1.458	0	4.77	0	0.174	0.727	-0.553
268.5	47.293	-0.648	-0.724	0	5.09	0	0.175	0.728	-0.553
268.6	47.255	-0.648	-1.434	0	5.08	0	0.175	0.728	-0.553
268.7	47.212	-0.658	-0.918	0	5.1	0	0.175	0.728	-0.553
268.8	47.175	-0.655	-0.431	0	5.33	0	0.175	0.728	-0.553
268.9	47.131	-0.655	-0.89	0	5.31	0	0.175	0.728	-0.553
269	47.094	-0.673	-0.459	0	5.31	0	0.175	0.728	-0.553
269.1	47.056	-0.663	-0.208	0	5.04	0	0.175	0.728	-0.553
269.2	47.013	-0.663	-0.706	0	4.84	0	0.176	0.729	-0.553
269.3	46.976	-0.663	-0.554	0	4.4	0	0.176	0.729	-0.553
269.4	46.976	-0.663	-0.261	0	3.11	0	0.176	0.729	-0.553
269.5	46.895	-0.663	-0.113	0	1.63	0	0.176	0.729	-0.553
269.6	46.839	-0.673	-0.653	0	0.63	0	0.176	0.729	-0.553
269.7	46.795	-0.673	-0.24	0	0	0	0.176	0.729	-0.553
269.8	46.746	-0.673	0.032	0	0	0	0.176	0.729	-0.553
269.9	46.69	-0.66	-0.699	0	0	0	0.176	0.729	-0.553
270	46.69	-0.683	-0.268	0	0	0	0.176	0.729	-0.553
270.1	46.597	-0.683	0.057	0	0	0	0.176	0.729	-0.553
270.2	46.553	-0.658	-0.731	0	0	0	0.176	0.729	-0.553
270.3	46.503	-0.668	-0.731	0	0	0	0.176	0.729	-0.553
270.4	46.454	-0.668	-0.074	0	0	0	0.176	0.729	-0.553
270.5	46.404	-0.665	0.283	0	0	0	0.176	0.729	-0.553
270.6	46.361	-0.663	-0.417	0	0	0	0.176	0.729	-0.553
270.7	46.361	-0.663	-0.498	0	0.95	0	0.176	0.729	-0.553
270.8	46.261	-0.658	-0.205	0	1.76	0	0.176	0.729	-0.553
270.9	46.218	-0.658	-0.06	0	2.91	0	0.176	0.729	-0.553
271	46.18	-0.65	-0.233	0	4.05	0	0.176	0.729	-0.553
271.1	46.137	-0.675	-0.562	0	4.78	0	0.176	0.729	-0.553
271.2	46.1	-0.66	0.212	0	6	0	0.176	0.729	-0.553
271.3	46.062	-0.66	-0.611	0	7.82	0	0.177	0.73	-0.553
271.4	46.031	-0.633	-0.448	0	8.8	0	0.177	0.73	-0.553
271.5	46.031	-0.638	-0.576	0	9.15	0	0.177	0.73	-0.553
271.6	45.969	-0.638	-0.095	0	9.15	0	0.177	0.73	-0.553
271.7	45.938	-0.66	0.032	0	9.15	0	0.178	0.731	-0.553
271.8	45.907	-0.665	-0.297	0	9.15	0	0.178	0.731	-0.553
271.9	45.87	-0.665	-0.314	0	9.15	0	0.178	0.731	-0.553

272	45.845	-0.638	-0.353	0	9.15	0	0.178	0.731	-0.553
272.1	45.814	-0.663	-0.597	0	9.14	0	0.179	0.732	-0.553
272.2	45.783	-0.663	0.304	0	9.14	0	0.179	0.732	-0.553
272.3	45.752	-0.65	0.54	0	9.54	0	0.179	0.732	-0.553
272.4	45.72	-0.643	-0.83	0	10.35	0	0.179	0.733	-0.553
272.5	45.696	-0.643	-0.703	0	10.64	0	0.18	0.733	-0.553
272.6	45.671	-0.67	-0.244	0	11.38	0	0.18	0.733	-0.553
272.7	45.646	-0.675	0.085	0	12.49	0	0.18	0.733	-0.553
272.8	45.621	-0.675	-0.3	0	13.53	0	0.181	0.734	-0.553
272.9	45.602	-0.67	-0.215	0	13.54	0	0.181	0.734	-0.553
273	45.578	-0.653	-0.544	0	13.56	0	0.182	0.735	-0.553
273.1	45.559	-0.653	-0.385	0	13.56	0	0.182	0.735	-0.553
273.2	45.534	-0.665	-0.201	0	13.58	0	0.182	0.735	-0.553
273.3	45.509	-0.673	-0.032	0	13.54	0	0.183	0.736	-0.553
273.4	45.491	-0.673	-0.237	0	13.57	0	0.183	0.736	-0.553
273.5	45.466	-0.67	-0.004	0	13.55	0	0.183	0.736	-0.553
273.6	45.447	-0.663	-0.519	0	13.55	0	0.184	0.737	-0.553
273.7	45.422	-0.663	-0.403	0	13.68	0	0.184	0.737	-0.553
273.8	45.404	-0.653	-0.519	0	13.78	0	0.185	0.738	-0.553
273.9	45.379	-0.653	-0.491	0	13.77	0	0.185	0.738	-0.553
274	45.36	-0.663	-0.162	0	13.76	0	0.185	0.738	-0.553
274.1	45.335	-0.675	0.095	0	13.76	0	0.186	0.739	-0.553
274.2	45.317	-0.675	-0.332	0	13.74	0	0.186	0.739	-0.553
274.3	45.292	-0.675	-0.332	0	13.76	0	0.187	0.74	-0.553
274.4	45.273	-0.648	-0.491	0	13.73	0	0.187	0.74	-0.553
274.5	45.248	-0.648	-0.809	0	13.75	0	0.187	0.74	-0.553
274.6	45.23	-0.648	-0.18	0	13.72	0	0.188	0.741	-0.553
274.7	45.211	-0.663	-0.307	0	13.74	0	0.188	0.741	-0.553
274.8	45.192	-0.668	-0.35	0	13.71	0	0.188	0.741	-0.553
274.9	45.167	-0.668	-0.219	0	13.73	0	0.189	0.742	-0.553
275	45.149	-0.675	-0.48	0	13.7	0	0.189	0.742	-0.553
275.1	45.124	-0.66	-0.258	0	13.73	0	0.19	0.743	-0.553
275.2	45.105	-0.66	-0.678	0	13.68	0	0.19	0.743	-0.553
275.3	45.087	-0.695	-0.908	0	13.7	0	0.19	0.743	-0.553
275.4	45.062	-0.678	0.519	0	13.68	0	0.191	0.744	-0.553
275.5	45.043	-0.678	-0.604	0	13.7	0	0.191	0.744	-0.553
275.6	45.025	-0.668	-1.24	0	13.68	0	0.191	0.744	-0.553
275.7	45.006	-0.638	0.007	0	13.68	0	0.192	0.745	-0.553
275.8	44.981	-0.638	-0.886	0	13.76	0	0.192	0.745	-0.553
275.9	44.956	-0.648	-0.682	0	14.03	0	0.193	0.746	-0.553
276	44.944	-0.663	-0.109	0	14.75	0	0.193	0.746	-0.553
276.1	44.925	-0.663	-0.809	0	15.07	0	0.193	0.746	-0.553
276.2	44.906	-0.65	0.035	0	15.8	0	0.194	0.747	-0.553
276.3	44.888	-0.67	-1.112	0	15.89	0	0.194	0.747	-0.553
276.4	44.875	-0.67	-0.254	0	16.23	0	0.195	0.748	-0.553
276.5	44.857	-0.665	0.046	0	16.8	0	0.195	0.748	-0.553
276.6	44.844	-0.663	-0.738	0	17	0	0.196	0.749	-0.553

276.7	44.832	-0.663	-0.752	0	16.97	0	0.196	0.749	-0.553
276.8	44.813	-0.673	-0.424	0	16.97	0	0.197	0.75	-0.553
276.9	44.801	-0.673	-0.339	0	16.86	0	0.197	0.75	-0.553
277	44.782	-0.685	-0.057	0	16.58	0	0.198	0.751	-0.553
277.1	44.77	-0.65	-0.413	0	16.13	0	0.198	0.751	-0.553
277.2	44.757	-0.66	-1.229	0	14.54	0	0.198	0.751	-0.553
277.3	44.733	-0.66	0.102	0	12.63	0	0.199	0.752	-0.553
277.4	44.708	-0.66	-0.576	0	10	0	0.199	0.752	-0.553
277.5	44.677	-0.68	-0.78	0	8.27	0	0.199	0.752	-0.553
277.6	44.646	-0.68	-0.042	0	7.36	0	0.2	0.753	-0.553
277.7	44.614	-0.695	-0.311	0	7.26	0	0.2	0.753	-0.553
277.8	44.583	-0.685	-0.385	0	7.67	0	0.2	0.753	-0.553
277.9	44.552	-0.685	-0.682	0	7.72	0	0.2	0.753	-0.553
278	44.521	-0.693	-1.017	0	7.71	0	0.2	0.753	-0.553
278.1	44.49	-0.7	-0.456	0	7.7	0	0.201	0.754	-0.553
278.2	44.453	-0.7	-0.057	0	7.72	0	0.201	0.754	-0.553
278.3	44.428	-0.665	-0.798	0	8.22	0	0.201	0.754	-0.553
278.4	44.397	-0.665	-1.052	0	8.12	0	0.201	0.754	-0.553
278.5	44.366	-0.665	-0.812	0	8.11	0	0.201	0.754	-0.553
278.6	44.335	-0.713	-0.057	0	8.27	0	0.202	0.755	-0.553
278.7	44.304	-0.68	0.117	0	8.31	0	0.202	0.755	-0.553
278.8	44.273	-0.68	-0.858	0	8.3	0	0.202	0.755	-0.553
278.9	44.248	-0.66	-1.469	0	8.3	0	0.202	0.755	-0.553
279	44.217	-0.688	-0.385	0	8.3	0	0.203	0.756	-0.553
279.1	44.186	-0.688	-0.113	0	8.28	0	0.203	0.756	-0.553
279.2	44.155	-0.678	-0.639	0	8.29	0	0.203	0.756	-0.553
279.3	44.13	-0.653	-0.117	0	8.26	0	0.203	0.756	-0.553
279.4	44.099	-0.653	-1.356	0	8.21	0	0.204	0.757	-0.553
279.5	44.061	-0.673	-0.844	0	8.17	0	0.204	0.757	-0.553
279.6	44.03	-0.683	-0.328	0	7.47	0	0.204	0.757	-0.553
279.7	44.006	-0.683	-0.028	0	6.69	0	0.204	0.757	-0.553
279.8	43.968	-0.668	-0.484	0	5.53	0	0.204	0.757	-0.553
279.9	43.931	-0.668	-0.597	0	4.29	0	0.204	0.757	-0.553
280	43.894	-0.67	-0.509	0	3.04	0	0.205	0.758	-0.553
280.1	43.856	-0.675	-0.685	0	2.05	0	0.205	0.758	-0.553
280.2	43.813	-0.66	-0.346	0	1.29	0	0.205	0.758	-0.553
280.3	43.769	-0.66	-0.858	0	1.22	0	0.205	0.758	-0.553
280.4	43.726	-0.663	-0.717	0	1.12	0	0.205	0.758	-0.553
280.5	43.682	-0.67	-0.667	0	0.51	0	0.205	0.758	-0.553
280.6	43.639	-0.67	0.046	0	0	0	0.205	0.758	-0.553
280.7	43.595	-0.663	-0.579	0	0	0	0.205	0.758	-0.553
280.8	43.546	-0.673	-0.901	0	0	0	0.205	0.758	-0.553
280.9	43.496	-0.673	-0.23	0	0	0	0.205	0.758	-0.553
281	43.459	-0.678	-0.985	0	0	0	0.205	0.758	-0.553
281.1	43.415	-0.675	-0.357	0	0	0	0.205	0.758	-0.553
281.2	43.372	-0.675	-0.512	0	0	0	0.205	0.758	-0.553
281.3	43.322	-0.655	-0.512	0	0	0	0.205	0.758	-0.553

281.4	43.279	-0.653	-0.59	0	0	0	0.205	0.758	-0.553
281.5	43.235	-0.653	-0.441	0	0	0	0.205	0.758	-0.553
281.6	43.185	-0.655	-0.187	0	0	0	0.205	0.758	-0.553
281.7	43.142	-0.67	-0.632	0	0	0	0.205	0.758	-0.553
281.8	43.092	-0.67	-0.378	0	0.53	0	0.205	0.758	-0.553
281.9	43.03	-0.675	-0.088	0	-3.47	0	0.205	0.758	-0.553
282	42.955	-0.663	-0.819	0	-8.61	0	0.204	0.758	-0.553
282.1	42.868	-0.663	-0.706	0	-12.72	0	0.204	0.758	-0.554
282.2	42.775	-0.665	0.064	0	-15.88	0	0.204	0.758	-0.554
282.3	42.682	-0.653	-0.604	0	-16.31	0	0.203	0.758	-0.555
282.4	42.583	-0.653	-0.999	0	-17.85	0	0.203	0.758	-0.555
282.5	42.471	-0.668	-0.36	0	-21.01	0	0.202	0.758	-0.556
282.6	42.353	-0.673	-0.187	0	-24.65	0	0.201	0.758	-0.556
282.7	42.222	-0.673	-0.879	0	-29.45	0	0.201	0.758	-0.557
282.8	42.085	-0.683	-0.261	0	-31.67	0	0.2	0.758	-0.558
282.9	41.936	-0.683	-0.614	0	-31.96	0	0.199	0.758	-0.559
283	41.818	-0.69	-0.304	0	-31.87	0	0.198	0.758	-0.56
283.1	41.682	-0.7	-0.961	0	-32.61	0	0.197	0.758	-0.561
283.2	41.545	-0.698	-0.456	0	-33.07	0	0.196	0.758	-0.562
283.3	41.408	-0.698	0.155	0	-33.82	0	0.195	0.758	-0.563
283.4	41.265	-0.658	-1.303	0	-35.2	0	0.194	0.758	-0.564
283.5	41.116	-0.65	-1.119	0	-35.77	0	0.193	0.758	-0.565
283.6	40.973	-0.65	-0.72	0	-35.16	0	0.192	0.758	-0.566
283.7	40.824	-0.65	-0.516	0	-31.59	0	0.191	0.758	-0.566
283.8	40.669	-0.655	-0.646	0	-27.28	0	0.191	0.758	-0.567
283.9	40.52	-0.655	-0.512	0	-26.44	0	0.19	0.758	-0.568
284	40.383	-0.66	-0.484	0	-31.23	0	0.189	0.758	-0.569
284.1	40.246	-0.66	-0.706	0	-31.98	0	0.188	0.758	-0.57
284.2	40.11	-0.66	-0.646	0	-34.09	0	0.187	0.758	-0.571
284.3	39.96	-0.653	-0.484	0	-35.6	0	0.186	0.758	-0.572
284.4	39.817	-0.67	-0.805	0	-35.89	0	0.185	0.758	-0.573
284.5	39.675	-0.67	-0.484	0	-35.89	0	0.184	0.758	-0.574
284.6	39.525	-0.668	0.155	0	-35.73	0	0.183	0.758	-0.575
284.7	39.376	-0.66	-0.646	0	-35.57	0	0.182	0.758	-0.576
284.8	39.227	-0.66	-1.303	0	-35.44	0	0.181	0.758	-0.577
284.9	39.084	-0.675	-0.159	0	-35.3	0	0.18	0.758	-0.578
285	38.941	-0.673	-0.886	0	-35.16	0	0.179	0.758	-0.579
285.1	38.792	-0.673	-0.791	0	-34.42	0	0.178	0.758	-0.579
285.2	38.656	-0.663	-0.646	0	-29.65	0	0.178	0.758	-0.58
285.3	38.531	-0.648	-0.971	0	-27.3	0	0.177	0.758	-0.581
285.4	38.413	-0.648	-0.675	0	-27.5	0	0.176	0.758	-0.582
285.5	38.289	-0.66	-0.865	0	-29.29	0	0.175	0.758	-0.583
285.6	38.158	-0.66	-0.396	0	-31.66	0	0.174	0.758	-0.584
285.7	38.015	-0.66	-0.805	0	-33.81	0	0.173	0.758	-0.584
285.8	37.866	-0.668	-0.311	0	-34.93	0	0.172	0.758	-0.585
285.9	37.717	-0.668	-0.706	0	-35.4	0	0.171	0.758	-0.586
286	37.568	-0.683	-0.646	0	-35.35	0	0.17	0.758	-0.587

286.1	37.419	-0.663	0.007	0	-35.28	0	0.169	0.758	-0.588
286.2	37.27	-0.653	-1.204	0	-36.13	0	0.168	0.758	-0.589
286.3	37.115	-0.653	-1.218	0	-37.76	0	0.167	0.758	-0.59
286.4	36.953	-0.683	-0.244	0	-38.63	0	0.166	0.758	-0.591
286.5	36.791	-0.648	0.007	0	-38.51	0	0.165	0.758	-0.593
286.6	36.63	-0.648	-1.321	0	-38.89	0	0.164	0.758	-0.594
286.7	36.63	-0.668	-1.18	0	-39.83	0	0.163	0.758	-0.595
286.8	36.294	-0.673	-0.35	0	-40.33	0	0.162	0.758	-0.596
286.9	36.127	-0.673	-0.244	0	-40.22	0	0.161	0.758	-0.597
287	35.959	-0.658	-0.805	0	-40	0	0.16	0.758	-0.598
287.1	35.791	-0.68	-0.939	0	-39.73	0	0.159	0.758	-0.599
287.2	35.623	-0.68	-0.484	0	-37.88	0	0.158	0.758	-0.6
287.3	35.462	-0.675	-0.032	0	-35.93	0	0.157	0.758	-0.601
287.4	35.319	-0.66	-0.971	0	-31.3	0	0.156	0.758	-0.602
287.5	35.182	-0.66	-1.342	0	-22.21	0	0.155	0.758	-0.603
287.6	35.083	-0.685	-0.777	0	-15.11	0	0.155	0.758	-0.603
287.7	35.002	-0.67	-0.201	0	-14.3	0	0.154	0.758	-0.604
287.8	34.909	-0.67	-0.53	0	-13.87	0	0.154	0.758	-0.604
287.9	34.828	-0.648	-1.73	0	-11.78	0	0.154	0.758	-0.604
288	34.753	-0.688	-0.505	0	-9.75	0	0.153	0.758	-0.605
288.1	34.679	-0.688	0.117	0	-7.91	0	0.153	0.758	-0.605
288.2	34.61	-0.67	-0.583	0	-7.17	0	0.153	0.758	-0.605
288.3	34.548	-0.678	-1.056	0	-7.14	0	0.153	0.758	-0.605
288.4	34.474	-0.678	-0.498	0	-7.13	0	0.152	0.758	-0.605
288.5	34.412	-0.665	-0.66	0	-7.23	0	0.152	0.758	-0.606
288.6	34.343	-0.66	-0.964	0	-8.22	0	0.152	0.758	-0.606
288.7	34.269	-0.66	-0.893	0	-8.79	0	0.152	0.758	-0.606
288.8	34.194	-0.658	-0.851	0	-8.77	0	0.152	0.758	-0.606
288.9	34.126	-0.658	-0.777	0	-8.73	0	0.151	0.758	-0.607
289	34.051	-0.648	-0.879	0	-8.71	0	0.151	0.758	-0.607
289.1	33.977	-0.66	-0.456	0	-8.95	0	0.151	0.758	-0.607
289.2	33.902	-0.675	-0.307	0	-9.65	0	0.151	0.758	-0.607
289.3	33.827	-0.675	-0.731	0	-9.89	0	0.15	0.758	-0.608
289.4	33.747	-0.675	-0.279	0	-9.87	0	0.15	0.758	-0.608
289.5	33.672	-0.65	-0.636	0	-9.8	0	0.15	0.758	-0.608
289.6	33.598	-0.65	-1.289	0	-9.8	0	0.149	0.758	-0.608
289.7	33.523	-0.668	-1.165	0	-9.78	0	0.149	0.758	-0.609
289.8	33.442	-0.668	0.053	0	-9.75	0	0.149	0.758	-0.609
289.9	33.368	-0.668	-0.554	0	-9.74	0	0.149	0.758	-0.609
290	33.293	-0.675	-0.961	0	-9.65	0	0.148	0.758	-0.609
290.1	33.219	-0.66	-0.473	0	-9.57	0	0.148	0.758	-0.61
290.2	33.144	-0.66	-0.946	0	-9.52	0	0.148	0.758	-0.61
290.3	33.069	-0.678	-0.946	0	-9.49	0	0.148	0.758	-0.61
290.4	32.995	-0.683	-0.307	0	-9.46	0	0.147	0.758	-0.611
290.5	32.914	-0.683	-0.456	0	-9.44	0	0.147	0.758	-0.611
290.6	32.839	-0.655	-0.777	0	-9.41	0	0.147	0.758	-0.611
290.7	32.771	-0.663	-1.423	0	-9.37	0	0.147	0.758	-0.611

290.8	32.69	-0.663	-0.622	0	-9.35	0	0.146	0.758	-0.612
290.9	32.616	-0.665	-0.533	0	-9.37	0	0.146	0.758	-0.612
291	32.535	-0.653	-0.798	0	-9.55	0	0.146	0.758	-0.612
291.1	32.454	-0.653	-0.537	0	-10.27	0	0.145	0.758	-0.612
291.2	32.373	-0.673	-0.636	0	-11.13	0	0.145	0.758	-0.613
291.3	32.286	-0.653	0.148	0	-11.96	0	0.145	0.758	-0.613
291.4	32.199	-0.653	-0.717	0	-12.05	0	0.145	0.758	-0.613
291.5	32.112	-0.665	-1.529	0	-11.98	0	0.144	0.758	-0.614
291.6	32.032	-0.655	-0.148	0	-11.94	0	0.144	0.758	-0.614
291.7	31.945	-0.655	-0.622	0	-11.9	0	0.144	0.758	-0.614
291.8	31.858	-0.69	-0.964	0	-11.93	0	0.143	0.758	-0.615
291.9	31.771	-0.69	-0.148	0	-12.4	0	0.143	0.758	-0.615
292	31.678	-0.693	-0.717	0	-13.32	0	0.142	0.758	-0.615
292.1	31.591	-0.688	-1.028	0	-14.36	0	0.142	0.758	-0.616
292.2	31.491	-0.693	-0.59	0	-14.51	0	0.142	0.758	-0.616
292.3	31.398	-0.693	-0.862	0	-14.73	0	0.141	0.758	-0.617
292.4	31.305	-0.68	-0.473	0	-15.6	0	0.141	0.758	-0.617
292.5	31.193	-0.673	-0.798	0	-16.9	0	0.14	0.758	-0.617
292.6	31.087	-0.673	-1.119	0	-17.5	0	0.14	0.758	-0.618
292.7	30.982	-0.658	-0.636	0	-17.57	0	0.139	0.758	-0.618
292.8	30.876	-0.668	-0.795	0	-18	0	0.139	0.758	-0.619
292.9	30.764	-0.668	-0.632	0	-19.56	0	0.138	0.758	-0.62
293	30.652	-0.66	-0.47	0	-18.19	0	0.138	0.758	-0.62
293.1	30.503	-0.663	-0.915	0	-16.5	0	0.137	0.758	-0.62
293.2	30.348	-0.663	-0.879	0	-18.86	0	0.137	0.758	-0.621
293.3	30.211	-0.68	-0.798	0	-24.45	0	0.136	0.758	-0.622
293.4	30.081	-0.67	-0.456	0	-24.33	0	0.135	0.758	-0.622
293.5	29.95	-0.67	-0.544	0	-23.58	0	0.135	0.758	-0.623
293.6	29.82	-0.668	-1.119	0	-19.86	0	0.134	0.758	-0.624
293.7	29.708	-0.668	-0.682	0	-17.88	0	0.134	0.758	-0.624
293.8	29.708	-0.668	-0.473	0	-13.44	0	0.133	0.758	-0.624
293.9	29.515	-0.663	-0.798	0	-10.7	0	0.133	0.758	-0.625
294	29.447	-0.67	-0.893	0	-10.12	0	0.133	0.758	-0.625
294.1	29.366	-0.67	-0.752	0	-10.02	0	0.133	0.758	-0.625
294.2	29.291	-0.673	-0.35	0	-10.29	0	0.132	0.758	-0.626
294.3	29.217	-0.663	-0.879	0	-10.16	0	0.132	0.758	-0.626
294.4	29.136	-0.663	-1.561	0	-9.58	0	0.132	0.758	-0.626
294.5	29.062	-0.668	-0.293	0	-8.93	0	0.131	0.758	-0.626
294.6	28.987	-0.673	-0.636	0	-8.46	0	0.131	0.758	-0.627
294.7	28.912	-0.673	-0.682	0	-7.51	0	0.131	0.758	-0.627
294.8	28.85	-0.675	-0.473	0	-5.6	0	0.131	0.758	-0.627
294.9	28.794	-0.675	-0.964	0	-1.11	0	0.131	0.758	-0.627
295	28.751	-0.673	-0.304	0	0	0	0.131	0.758	-0.627
295.1	28.707	-0.66	-0.879	0	0	0	0.131	0.758	-0.627
295.2	28.67	-0.673	-0.749	0	0	0	0.131	0.758	-0.627
295.3	28.639	-0.673	-0.434	0	0	0	0.131	0.758	-0.627
295.4	28.608	-0.665	-0.54	0	0	0	0.131	0.758	-0.627

295.5	28.571	-0.67	-1.123	0	0	0	0.131	0.758	-0.627
295.6	28.533	-0.67	-0.265	0	0	0	0.131	0.758	-0.627
295.7	28.496	-0.69	-0.717	0	0	0	0.131	0.758	-0.627
295.8	28.465	-0.668	-0.618	0	0	0	0.131	0.758	-0.627
295.9	28.428	-0.668	-1.045	0	0	0	0.131	0.758	-0.627
296	28.397	-0.68	-1.444	0	0.92	0	0.131	0.758	-0.627
296.1	28.366	-0.683	-0.265	0	2.76	0	0.131	0.758	-0.627
296.2	28.335	-0.683	-0.798	0	5.23	0	0.131	0.758	-0.627
296.3	28.322	-0.683	-0.918	0	9.3	0	0.131	0.758	-0.627
296.4	28.316	-0.683	-0.431	0	13.39	0	0.132	0.759	-0.627
296.5	28.322	-0.683	-0.936	0	16	0	0.132	0.759	-0.627
296.6	28.335	-0.673	-0.47	0	19.02	0	0.133	0.76	-0.627
296.7	28.359	-0.68	-0.936	0	24.64	0	0.133	0.76	-0.627
296.8	28.403	-0.68	-0.798	0	28.46	0	0.134	0.761	-0.627
296.9	28.446	-0.688	-0.388	0	30.3	0	0.135	0.762	-0.627
297	28.502	-0.66	-0.89	0	33.11	0	0.136	0.763	-0.627
297.1	28.564	-0.66	-1.448	0	33.03	0	0.137	0.764	-0.627
297.2	28.627	-0.68	-0.134	0	33.22	0	0.138	0.765	-0.627
297.3	28.689	-0.67	-0.364	0	34.99	0	0.139	0.766	-0.627
297.4	28.751	-0.67	-1.095	0	36.52	0	0.14	0.767	-0.627
297.5	28.819	-0.675	-0.636	0	37.85	0	0.141	0.768	-0.627
297.6	28.9	-0.678	-0.547	0	41.12	0	0.142	0.769	-0.627
297.7	28.975	-0.678	-0.607	0	44.41	0	0.143	0.77	-0.627
297.8	29.068	-0.68	-0.12	0	49.71	0	0.145	0.772	-0.627
297.9	29.18	-0.68	-0.752	0	65.23	0	0.146	0.773	-0.627
298	29.31	-0.668	-1.095	0	90.58	0	0.149	0.776	-0.627
298.1	29.459	-0.673	-0.77	0	81.92	0	0.151	0.778	-0.627
298.2	29.608	-0.668	-0.607	0	94.93	0	0.154	0.781	-0.627
298.3	29.764	-0.668	-0.876	0	141.73	0	0.158	0.785	-0.627
298.4	29.938	-0.678	-0.738	0	150.9	0	0.162	0.789	-0.627
298.5	30.124	-0.643	-0.307	0	129.05	0	0.166	0.793	-0.627
298.6	30.323	-0.643	-0.544	0	75.68	0	0.168	0.795	-0.627
298.7	30.516	0.005	0.004	0	57.32	0	0.169	0.796	-0.627
298.8	30.708	0.206	4.718	0	56.57	0	0.171	0.798	-0.627
298.9	30.888	0.206	21.761	0	58.51	0	0.173	0.799	-0.627
299	31.069	-0.483	47.396	0	52.8	0	0.174	0.801	-0.627
299.1	31.255	-0.307	35.173	0	45.6	0	0.175	0.802	-0.627
299.2	31.435	-0.307	13.896	0	41.12	0	0.176	0.803	-0.627
299.3	31.609	-0.167	17.057	0	38.51	0	0.177	0.804	-0.627
299.4	31.789	-0.097	23.975	0	36.7	0	0.178	0.805	-0.627
299.5	31.97	-0.097	26.165	0	35.61	0	0.179	0.806	-0.627
299.6	32.15	-0.052	29.025	0	34.25	0	0.18	0.807	-0.627
299.7	32.336	-0.035	32.447	0	33.17	0	0.181	0.808	-0.627
299.8	32.336	-0.035	33.16	0	29.89	0	0.182	0.809	-0.627
299.9	32.721	-0.02	33.747	0	30.52	0	0.183	0.81	-0.627
300	32.92	0.045	35.223	0	40.93	0	0.184	0.811	-0.627
300.1	33.119	0.045	35.756	0	53.09	0	0.186	0.813	-0.627

300.2	33.324	0.09	37.246	0	54.48	0	0.187	0.814	-0.627
300.3	33.542	0.113	39.856	0	14.1	0	0.188	0.815	-0.627
300.4	33.753	0.113	41.173	0	36.39	0	0.189	0.816	-0.627
300.5	33.958	0.138	41.929	0	32	0	0.189	0.816	-0.627
300.6	34.151	0.05	43.621	0	30.17	0	0.19	0.817	-0.627
300.7	34.343	0.05	45.062	0	28.58	0	0.191	0.818	-0.627
300.8	34.536	0.055	41.689	0	30.39	0	0.192	0.819	-0.627
300.9	34.728	0.055	38.006	0	31.16	0	0.193	0.82	-0.627
301	34.933	0.073	39.775	0	32.2	0	0.194	0.821	-0.627
301.1	35.139	0.123	40.527	0	28.53	0	0.194	0.821	-0.627
301.2	35.337	0.128	40.661	0	23.47	0	0.195	0.822	-0.627
301.3	35.524	0.128	42.6	0	18.47	0	0.196	0.823	-0.627
301.4	35.704	0.163	43.833	0	14.9	0	0.196	0.823	-0.627
301.5	35.878	0.161	44.186	0	14.35	0	0.196	0.823	-0.627
301.6	36.046	0.161	44.747	0	13.67	0	0.197	0.824	-0.627
301.7	36.214	0.156	45.457	0	12.58	0	0.197	0.824	-0.627
301.8	36.387	0.181	45.732	0	11.98	0	0.197	0.825	-0.627
301.9	36.555	0.181	45.199	0	11.51	0	0.198	0.825	-0.627
302	36.555	0.206	45.637	0	11.18	0	0.198	0.825	-0.627
302.1	36.897	0.206	46.682	0	10.94	0	0.198	0.825	-0.627
302.2	37.077	0.206	47.685	0	10.66	0	0.199	0.826	-0.627
302.3	37.239	0.231	48.54	0	10.26	0	0.199	0.826	-0.627
302.4	37.407	0.218	48.833	0	9.72	0	0.199	0.826	-0.627
302.5	37.581	0.218	49.289	0	8.92	0	0.2	0.827	-0.627
302.6	37.742	0.268	50.405	0	8.25	0	0.2	0.827	-0.627
302.7	37.916	0.278	49.49	0	7.94	0	0.2	0.827	-0.627
302.8	37.916	0.278	50.228	0	7.37	0	0.2	0.827	-0.627
302.9	38.258	0.266	51.386	0	6.85	0	0.2	0.827	-0.627
303	38.419	0.268	52.573	0	6.6	0	0.201	0.828	-0.627
303.1	38.587	0.268	52.181	0	6.31	0	0.201	0.828	-0.627
303.2	38.755	0.308	51.814	0	5.47	0	0.201	0.828	-0.627
303.3	38.916	0.286	52.386	0	4.94	0	0.201	0.828	-0.627
303.4	39.084	0.286	53.247	0	4.73	0	0.201	0.828	-0.627
303.5	39.252	0.336	54.095	0	4.21	0	0.201	0.828	-0.627
303.6	39.414	0.326	53.481	0	3.54	0	0.201	0.828	-0.627
303.7	39.581	0.326	54.554	0	3.25	0	0.201	0.828	-0.627
303.8	39.743	0.323	56.345	0	-1.55	0	0.201	0.829	-0.627
303.9	39.892	0.323	55.614	0	-12.89	0	0.201	0.829	-0.627
304	40.023	0.341	55.19	0	-17.42	0	0.201	0.829	-0.628
304.1	40.141	0.348	56.546	0	-15.05	0	0.2	0.829	-0.628
304.2	40.252	0.361	56.994	0	-11.6	0	0.2	0.829	-0.629
304.3	40.364	0.361	57.609	0	-8.03	0	0.2	0.829	-0.629
304.4	40.476	0.246	58.573	0	-4.64	0	0.199	0.829	-0.629
304.5	40.588	0.168	57.069	0	-2.78	0	0.199	0.829	-0.629
304.6	40.694	0.168	53.858	0	-1.26	0	0.199	0.829	-0.629
304.7	40.805	0.131	49.158	0	0	0	0.199	0.829	-0.629
304.8	40.924	0.133	45.722	0	6.1	0	0.2	0.829	-0.629

304.9	41.029	0.133	43.66	0	11.89	0	0.2	0.829	-0.629
305	41.135	0.133	43.458	0	14.95	0	0.2	0.829	-0.629
305.1	41.247	0.113	42.773	0	-6.93	0	0.2	0.829	-0.629
305.2	41.358	0.113	42.332	0	1.38	0	0.2	0.83	-0.629
305.3	41.458	0.113	42.18	0	2.92	0	0.2	0.83	-0.629
305.4	41.551	0.083	41.555	0	-1.83	0	0.2	0.83	-0.629
305.5	41.632	0.083	41.601	0	-6.51	0	0.2	0.83	-0.63
305.6	41.706	0.028	40.714	0	-10.92	0	0.2	0.83	-0.63
305.7	41.769	0.058	38.048	0	-9.05	0	0.199	0.83	-0.63
305.8	41.824	0.058	36.6	0	-8.81	0	0.199	0.83	-0.63
305.9	41.88	0.06	37.222	0	-6.59	0	0.199	0.83	-0.631
306	41.93	-0.047	37.61	0	-5.38	0	0.199	0.83	-0.631
306.1	41.98	-0.047	36.777	0	-4.43	0	0.199	0.83	-0.631
306.2	42.03	-0.102	34.421	0	-3.85	0	0.199	0.83	-0.631
306.3	42.079	-0.12	32.398	0	-3.42	0	0.199	0.83	-0.631
306.4	42.129	-0.12	30.473	0	-3.48	0	0.198	0.83	-0.631
306.5	42.179	-0.132	29.283	0	-3.3	0	0.198	0.83	-0.631
306.6	42.228	-0.11	29.007	0	-3.99	0	0.198	0.83	-0.631
306.7	42.272	-0.11	28.259	0	-4.5	0	0.198	0.83	-0.632
306.8	42.322	-0.087	27.962	0	-5.25	0	0.198	0.83	-0.632
306.9	42.371	-0.087	28.474	0	-6.35	0	0.198	0.83	-0.632
307	42.409	-0.077	28.623	0	-6.53	0	0.198	0.83	-0.632
307.1	42.446	-0.095	29.749	0	-7.71	0	0.197	0.83	-0.632
307.2	42.477	-0.125	30.138	0	-8.46	0	0.197	0.83	-0.632
307.3	42.508	-0.125	30.756	0	-7.48	0	0.197	0.83	-0.633
307.4	42.539	-0.137	29.258	0	-6.37	0	0.197	0.83	-0.633
307.5	42.564	-0.152	27.814	0	-4.36	0	0.197	0.83	-0.633
307.6	42.601	-0.152	27.757	0	-2.62	0	0.197	0.83	-0.633
307.7	42.638	-0.165	27.033	0	0	0	0.197	0.83	-0.633
307.8	42.682	-0.162	26.592	0	-0.96	0	0.197	0.83	-0.633
307.9	42.725	-0.162	25.886	0	-1.62	0	0.197	0.83	-0.633
308	42.781	-0.125	25.653	0	-3.35	0	0.196	0.83	-0.633
308.1	42.825	-0.092	25.988	0	-3.93	0	0.196	0.83	-0.633
308.2	42.875	-0.092	27.189	0	-3.87	0	0.196	0.83	-0.633
308.3	42.924	-0.047	28.728	0	-3.66	0	0.196	0.83	-0.634
308.4	42.98	-0.057	30.572	0	-3.23	0	0.196	0.83	-0.634
308.5	43.036	-0.057	31.992	0	-2.85	0	0.196	0.83	-0.634
308.6	43.092	-0.027	32.299	0	-2.54	0	0.196	0.83	-0.634
308.7	43.148	-0.027	32.101	0	-2.55	0	0.196	0.83	-0.634
308.8	43.204	-0.027	32.61	0	-2.62	0	0.196	0.83	-0.634
308.9	43.266	-0.042	33.443	0	-2.82	0	0.196	0.83	-0.634
309	43.322	-0.01	33.432	0	-2.88	0	0.196	0.83	-0.634
309.1	43.384	-0.01	32.832	0	-2.54	0	0.195	0.83	-0.634
309.2	43.452	-0.02	33.362	0	-2.3	0	0.195	0.83	-0.634
309.3	43.515	-0.002	34.527	0	-2.65	0	0.195	0.83	-0.634
309.4	43.577	-0.002	34.76	0	-4.37	0	0.195	0.83	-0.634
309.5	43.639	-0.02	34.407	0	-7.7	0	0.195	0.83	-0.635

309.6	43.689	-0.012	35.297	0	-10.07	0	0.195	0.83	-0.635
309.7	43.726	-0.012	35.011	0	-8.66	0	0.194	0.83	-0.635
309.8	43.763	0.005	34.774	0	-8.38	0	0.194	0.83	-0.635
309.9	43.8	0.005	35.071	0	-7.59	0	0.194	0.83	-0.636
310	43.838	-0.065	35.601	0	-6.35	0	0.194	0.83	-0.636
310.1	43.875	-0.11	33.411	0	-5.14	0	0.194	0.83	-0.636
310.2	43.912	-0.11	30.025	0	-4.87	0	0.194	0.83	-0.636
310.3	43.95	-0.11	29.428	0	-4.85	0	0.193	0.83	-0.636
310.4	43.987	-0.13	29.474	0	-4.68	0	0.193	0.83	-0.636
310.5	44.018	-0.122	28.524	0	-4.71	0	0.193	0.83	-0.636
310.6	44.055	-0.122	27.768	0	-4.7	0	0.193	0.83	-0.637
310.7	44.086	-0.15	27.542	0	-4.71	0	0.193	0.83	-0.637
310.8	44.086	-0.135	28.333	0	-4.69	0	0.193	0.83	-0.637
310.9	44.161	-0.135	27.447	0	-4.71	0	0.193	0.83	-0.637
311	44.198	-0.125	27.309	0	-4.71	0	0.193	0.83	-0.637
311.1	44.229	-0.125	27.658	0	-4.69	0	0.192	0.83	-0.637
311.2	44.266	-0.125	28.156	0	-4.71	0	0.192	0.83	-0.637
311.3	44.298	-0.14	28.308	0	-4.71	0	0.192	0.83	-0.637
311.4	44.335	-0.125	28.22	0	-4.71	0	0.192	0.83	-0.638
311.5	44.372	-0.125	27.514	0	-4.74	0	0.192	0.83	-0.638
311.6	44.409	-0.137	27.948	0	-4.72	0	0.192	0.83	-0.638
311.7	44.44	-0.117	28.499	0	-4.74	0	0.192	0.83	-0.638
311.8	44.478	-0.117	27.93	0	-4.73	0	0.191	0.83	-0.638
311.9	44.515	-0.107	28.153	0	-4.74	0	0.191	0.83	-0.638
312	44.546	-0.107	28.711	0	-4.75	0	0.191	0.83	-0.638
312.1	44.583	-0.107	28.711	0	-4.76	0	0.191	0.83	-0.639
312.2	44.614	-0.102	28.305	0	-4.93	0	0.191	0.83	-0.639
312.3	44.652	-0.107	28.305	0	-5.05	0	0.191	0.83	-0.639
312.4	44.689	-0.107	28.552	0	-5.34	0	0.191	0.83	-0.639
312.5	44.726	-0.102	29.279	0	-5.33	0	0.191	0.83	-0.639
312.6	44.757	-0.107	28.739	0	-5.33	0	0.19	0.83	-0.639
312.7	44.795	-0.107	28.916	0	-5.37	0	0.19	0.83	-0.639
312.8	44.826	-0.11	29.226	0	-5.22	0	0.19	0.83	-0.64
312.9	44.863	-0.11	28.502	0	-5.22	0	0.19	0.83	-0.64
313	44.894	-0.117	28.697	0	-5.22	0	0.19	0.83	-0.64
313.1	44.925	-0.112	29.265	0	-5.45	0	0.19	0.83	-0.64
313.2	44.956	-0.112	28.902	0	-5.73	0	0.189	0.83	-0.64
313.3	44.993	-0.112	29.053	0	-6.23	0	0.189	0.83	-0.64
313.4	45.018	-0.107	29.304	0	-6.08	0	0.189	0.83	-0.64
313.5	45.049	-0.107	29.117	0	-6.81	0	0.189	0.83	-0.641
313.6	45.08	-0.107	28.721	0	-7.15	0	0.189	0.83	-0.641
313.7	45.105	-0.117	28.902	0	-7.03	0	0.189	0.83	-0.641
313.8	45.13	-0.115	28.764	0	-7.42	0	0.188	0.83	-0.641
313.9	45.155	-0.115	28.527	0	-7.65	0	0.188	0.83	-0.641
314	45.155	-0.14	28.174	0	-8.41	0	0.188	0.83	-0.642
314.1	45.199	-0.142	28.538	0	-8.07	0	0.188	0.83	-0.642
314.2	45.223	-0.142	28.22	0	-7.91	0	0.187	0.83	-0.642

314.3	45.236	-0.167	27.623	0	-7.32	0	0.187	0.83	-0.642
314.4	45.261	-0.177	27.312	0	-6.9	0	0.187	0.83	-0.643
314.5	45.279	-0.177	26.843	0	-6.65	0	0.187	0.83	-0.643
314.6	45.298	-0.177	25.783	0	-7.05	0	0.187	0.83	-0.643
314.7	45.31	-0.19	25.603	0	-6.93	0	0.186	0.83	-0.643
314.8	45.31	-0.19	25.702	0	-6.67	0	0.186	0.83	-0.643
314.9	45.341	-0.192	25.702	0	-6.39	0	0.186	0.83	-0.644
315	45.354	-0.197	25.038	0	-6.09	0	0.186	0.83	-0.644
315.1	45.366	-0.197	24.561	0	-5.96	0	0.186	0.83	-0.644
315.2	45.379	-0.197	24.561	0	-5.7	0	0.186	0.83	-0.644
315.3	45.397	-0.197	24.392	0	-5.43	0	0.185	0.83	-0.644
315.4	45.41	-0.197	23.912	0	-5.43	0	0.185	0.83	-0.644
315.5	45.422	-0.195	23.721	0	-5.44	0	0.185	0.83	-0.644
315.6	45.422	-0.2	23.763	0	-5.46	0	0.185	0.83	-0.645
315.7	45.453	-0.2	23.873	0	-5.47	0	0.185	0.83	-0.645
315.8	45.466	-0.207	23.502	0	-5.47	0	0.185	0.83	-0.645
315.9	45.466	-0.207	23.82	0	-5.47	0	0.185	0.83	-0.645
316	45.497	-0.21	23.834	0	-5.47	0	0.184	0.83	-0.645
316.1	45.515	-0.217	23.788	0	-5.48	0	0.184	0.83	-0.645
316.2	45.528	-0.21	23.965	0	-5.47	0	0.184	0.83	-0.646
316.3	45.54	-0.21	23.382	0	-5.48	0	0.184	0.83	-0.646
316.4	45.559	-0.21	24.145	0	-5.49	0	0.184	0.83	-0.646
316.5	45.571	-0.212	23.76	0	-5.49	0	0.184	0.83	-0.646
316.6	45.584	-0.212	24.131	0	-5.49	0	0.184	0.83	-0.646
316.7	45.602	-0.202	24.183	0	-5.5	0	0.183	0.83	-0.646
316.8	45.615	-0.202	23.721	0	-5.5	0	0.183	0.83	-0.646
316.9	45.615	-0.202	23.996	0	-5.49	0	0.183	0.83	-0.647
317	45.646	-0.195	24.3	0	-5.52	0	0.183	0.83	-0.647
317.1	45.646	-0.207	23.774	0	-5.51	0	0.183	0.83	-0.647
317.2	45.677	-0.207	23.731	0	-5.51	0	0.183	0.83	-0.647
317.3	45.689	-0.205	24.816	0	-5.52	0	0.182	0.83	-0.647
317.4	45.702	-0.187	24.441	0	-5.52	0	0.182	0.83	-0.647
317.5	45.72	-0.187	23.816	0	-5.51	0	0.182	0.83	-0.648
317.6	45.733	-0.21	24.021	0	-5.52	0	0.182	0.83	-0.648
317.7	45.745	-0.222	24.47	0	-5.78	0	0.182	0.83	-0.648
317.8	45.764	-0.222	24.53	0	-5.54	0	0.182	0.83	-0.648
317.9	45.776	-0.2	23.883	0	-5.54	0	0.182	0.83	-0.648
318	45.776	-0.19	23.226	0	-5.52	0	0.181	0.83	-0.648
318.1	45.807	-0.19	24.653	0	-5.53	0	0.181	0.83	-0.648
318.2	45.826	-0.2	24.498	0	-5.54	0	0.181	0.83	-0.649
318.3	45.845	-0.195	24.724	0	-5.55	0	0.181	0.83	-0.649
318.4	45.857	-0.195	24.455	0	-5.72	0	0.181	0.83	-0.649
318.5	45.876	-0.19	24.049	0	-5.9	0	0.181	0.83	-0.649
318.6	45.888	-0.195	24.339	0	-6.08	0	0.18	0.83	-0.649
318.7	45.901	-0.195	24.681	0	-6.11	0	0.18	0.83	-0.649
318.8	45.901	-0.207	24.385	0	-4.99	0	0.18	0.83	-0.65
318.9	45.932	-0.207	24.155	0	-5.56	0	0.18	0.83	-0.65

319	45.95	-0.207	24.325	0	-5.61	0	0.18	0.83	-0.65
319.1	45.969	-0.18	24.455	0	-5.9	0	0.18	0.83	-0.65
319.2	45.988	-0.18	24.706	0	-2.78	0	0.18	0.83	-0.65
319.3	46.019	-0.18	24.897	0	-0.91	0	0.18	0.83	-0.65
319.4	46.05	-0.162	25.285	0	-1.15	0	0.179	0.83	-0.65
319.5	46.081	-0.157	25.681	0	-2.12	0	0.179	0.83	-0.65
319.6	46.081	-0.157	25.78	0	-3.03	0	0.179	0.83	-0.65
319.7	46.143	-0.107	26.412	0	-3.64	0	0.179	0.83	-0.65
319.8	46.18	-0.115	26.726	0	-3.64	0	0.179	0.83	-0.65
319.9	46.211	-0.115	27.98	0	-3.23	0	0.179	0.83	-0.651
320	46.249	-0.11	29.237	0	-2.79	0	0.179	0.83	-0.651
320.1	46.286	-0.105	28.587	0	-3.49	0	0.179	0.83	-0.651
320.2	46.323	-0.105	29.276	0	-4.27	0	0.179	0.83	-0.651
320.3	46.361	-0.082	29.601	0	-5.76	0	0.179	0.83	-0.651
320.4	46.361	-0.07	30.494	0	-5.83	0	0.178	0.83	-0.651
320.5	46.435	-0.07	29.964	0	-5.83	0	0.178	0.83	-0.651
320.6	46.479	-0.042	30.71	0	-5.79	0	0.178	0.83	-0.652
320.7	46.516	-0.04	31.939	0	-5.75	0	0.178	0.83	-0.652
320.8	46.559	-0.04	32.422	0	-5.76	0	0.178	0.83	-0.652
320.9	46.559	-0.04	32.521	0	-5.82	0	0.178	0.83	-0.652
321	46.646	-0.02	32.991	0	-5.8	0	0.177	0.83	-0.652
321.1	46.69	-0.02	33.164	0	-5.71	0	0.177	0.83	-0.652
321.2	46.69	-0.012	33.531	0	-5.68	0	0.177	0.83	-0.652
321.3	46.783	-0.022	34.714	0	-5.57	0	0.177	0.83	-0.653
321.4	46.833	-0.022	34.725	0	-4.86	0	0.177	0.83	-0.653
321.5	46.882	-0.02	34.683	0	-4.24	0	0.177	0.83	-0.653
321.6	46.938	0.003	34.923	0	-4.17	0	0.177	0.83	-0.653
321.7	46.994	0.003	34.785	0	-4.21	0	0.177	0.83	-0.653
321.8	47.05	0.033	35.576	0	-3.71	0	0.176	0.83	-0.653
321.9	47.05	0.033	36.424	0	-3.75	0	0.176	0.83	-0.653
322	47.156	0.028	37.426	0	-3.86	0	0.176	0.83	-0.653
322.1	47.212	0.038	37.462	0	-4	0	0.176	0.83	-0.654
322.2	47.268	0.03	36.77	0	-4.21	0	0.176	0.83	-0.654
322.3	47.324	0.03	37.14	0	-4.38	0	0.176	0.83	-0.654
322.4	47.38	0.018	37.557	0	-4.42	0	0.176	0.83	-0.654
322.5	47.435	0.03	37.716	0	-4.6	0	0.176	0.83	-0.654
322.6	47.491	0.03	37.656	0	-4.7	0	0.175	0.83	-0.654
322.7	47.541	0.048	37.582	0	-4.67	0	0.175	0.83	-0.654
322.8	47.541	0.045	37.801	0	-4.78	0	0.175	0.83	-0.654
322.9	47.597	0.045	38.313	0	-4.85	0	0.175	0.83	-0.655
323	47.703	0.058	38.288	0	-4.79	0	0.175	0.83	-0.655
323.1	47.759	0.058	37.737	0	-4.26	0	0.175	0.83	-0.655
323.2	47.821	0.058	37.889	0	-4.33	0	0.175	0.83	-0.655
323.3	47.877	0.05	37.992	0	-4.48	0	0.175	0.83	-0.655
323.4	47.933	0.053	38.486	0	-3.98	0	0.174	0.83	-0.655
323.5	47.988	0.053	38.426	0	-3.59	0	0.174	0.83	-0.655
323.6	47.988	0.04	38.041	0	-3.09	0	0.174	0.83	-0.655

323.7	48.051	0.045	38.606	0	-3.3	0	0.174	0.83	-0.655
323.8	48.162	0.045	38.61	0	-3.37	0	0.174	0.83	-0.656
323.9	48.225	0.058	37.995	0	-3.27	0	0.174	0.83	-0.656
324	48.274	0.06	38.097	0	-2.52	0	0.174	0.83	-0.656
324.1	48.336	0.06	38.825	0	-1.66	0	0.174	0.83	-0.656
324.2	48.399	0.055	38.931	0	-1.04	0	0.174	0.83	-0.656
324.3	48.467	0.073	38.92	0	-0.87	0	0.174	0.83	-0.656
324.4	48.467	0.073	38.444	0	-0.89	0	0.174	0.83	-0.656
324.5	48.529	0.073	38.68	0	0	0	0.174	0.83	-0.656
324.6	48.66	0.083	39.107	0	-1.07	0	0.174	0.83	-0.656
324.7	48.66	0.083	38.684	0	-1.01	0	0.174	0.83	-0.656
324.8	48.796	0.093	39.22	0	-0.99	0	0.174	0.83	-0.656
324.9	48.865	0.093	39.552	0	-0.66	0	0.174	0.83	-0.656
325	48.939	0.09	39.899	0	0.52	0	0.174	0.83	-0.656
325.1	49.008	0.11	40.361	0	2.29	0	0.174	0.83	-0.656
325.2	49.008	0.12	40.181	0	3.35	0	0.174	0.83	-0.656
325.3	49.169	0.12	40.803	0	3.9	0	0.174	0.83	-0.656
325.4	49.256	0.11	42.046	0	3.76	0	0.174	0.83	-0.656
325.5	49.337	0.123	42.378	0	4.57	0	0.174	0.83	-0.656
325.6	49.418	0.123	41.858	0	4.69	0	0.174	0.83	-0.656
325.7	49.505	0.146	42.003	0	4.05	0	0.174	0.83	-0.656
325.8	49.592	0.158	42.399	0	3	0	0.175	0.83	-0.656
325.9	49.592	0.158	42.551	0	2.17	0	0.175	0.831	-0.656
326	49.766	0.166	43.543	0	0	0	0.175	0.831	-0.656
326.1	49.846	0.178	44.609	0	-0.74	0	0.175	0.831	-0.656
326.2	49.927	0.178	44.885	0	-0.71	0	0.175	0.831	-0.656
326.3	50.008	0.206	45.189	0	-0.71	0	0.175	0.831	-0.656
326.4	50.095	0.196	46.047	0	-0.74	0	0.175	0.831	-0.656
326.5	50.176	0.196	46.725	0	-0.74	0	0.174	0.831	-0.656
326.6	50.263	0.168	47.173	0	-0.73	0	0.174	0.831	-0.656
326.7	50.343	0.196	48.137	0	-1.2	0	0.174	0.831	-0.656
326.8	50.343	0.196	46.863	0	-2	0	0.174	0.831	-0.656
326.9	50.437	0.196	47.357	0	-3.13	0	0.174	0.831	-0.656
327	50.586	0.203	47.95	0	-6.07	0	0.174	0.831	-0.656
327.1	50.586	0.203	47.795	0	-9.14	0	0.174	0.831	-0.657
327.2	50.716	0.208	47.131	0	-11.56	0	0.174	0.831	-0.657
327.3	50.772	0.208	48.095	0	-11.66	0	0.173	0.831	-0.657
327.4	50.828	0.208	47.777	0	-10.78	0	0.173	0.831	-0.658
327.5	50.884	0.188	47.092	0	-9.63	0	0.173	0.831	-0.658
327.6	50.94	0.141	46.629	0	-7.87	0	0.172	0.831	-0.658
327.7	50.996	0.141	46.644	0	-6.4	0	0.172	0.831	-0.658
327.8	51.046	0.136	45.28	0	-5.32	0	0.172	0.831	-0.658
327.9	51.046	0.136	42.925	0	-4.65	0	0.172	0.831	-0.659
328	51.164	0.128	42.424	0	-3.91	0	0.172	0.831	-0.659
328.1	51.226	0.1	41.957	0	-3.81	0	0.172	0.831	-0.659
328.2	51.276	0.098	41.226	0	-3.82	0	0.172	0.831	-0.659
328.3	51.338	0.098	41.202	0	-3.83	0	0.172	0.831	-0.659

328.4	51.394	0.115	41.18	0	-3.94	0	0.171	0.831	-0.659
328.5	51.45	0.113	41.029	0	-4.64	0	0.171	0.831	-0.659
328.6	51.505	0.113	41.057	0	-4.54	0	0.171	0.831	-0.659
328.7	51.561	0.128	41.346	0	-4.51	0	0.171	0.831	-0.659
328.8	51.617	0.12	41.431	0	-4.53	0	0.171	0.831	-0.66
328.9	51.617	0.12	41.064	0	-4.22	0	0.171	0.831	-0.66
329	51.723	0.098	41.537	0	-3.66	0	0.171	0.831	-0.66
329.1	51.779	0.085	41.597	0	-2.99	0	0.171	0.831	-0.66
329.2	51.835	0.085	41.632	0	-2.9	0	0.171	0.831	-0.66
329.3	51.897	0.105	41.512	0	-2.07	0	0.171	0.831	-0.66
329.4	51.953	0.113	41.368	0	-1.69	0	0.17	0.831	-0.66
329.5	52.015	0.113	41.318	0	-1.76	0	0.17	0.831	-0.66
329.6	52.077	0.118	41.325	0	-1.22	0	0.17	0.831	-0.66
329.7	52.139	0.125	41.742	0	-0.8	0	0.17	0.831	-0.66
329.8	52.201	0.125	41.569	0	-0.8	0	0.17	0.831	-0.66
329.9	52.201	0.136	42.123	0	0.82	0	0.17	0.831	-0.66
330	52.332	0.113	42.402	0	1.99	0	0.17	0.831	-0.66
330.1	52.406	0.113	42.791	0	0	0	0.17	0.831	-0.66
330.2	52.475	0.161	42.678	0	0	0	0.17	0.831	-0.66
330.3	52.543	0.168	42.974	0	0	0	0.17	0.831	-0.66
330.4	52.624	0.168	43.712	0	0	0	0.17	0.831	-0.66
330.5	52.686	0.171	44.468	0	0	0	0.17	0.831	-0.66
330.6	52.761	0.181	44.553	0	0	0	0.17	0.831	-0.66
330.7	52.829	0.181	45.086	0	0	0	0.17	0.831	-0.66
330.8	52.91	0.176	45.33	0	0	0	0.17	0.831	-0.66
330.9	52.984	0.176	46.287	0	0	0	0.17	0.831	-0.66
331	53.059	0.186	46.449	0	0	0	0.17	0.831	-0.66
331.1	53.133	0.183	45.983	0	0	0	0.17	0.831	-0.66
331.2	53.214	0.168	46.757	0	0	0	0.17	0.831	-0.66
331.3	53.289	0.168	48.547	0	-0.77	0	0.17	0.831	-0.66
331.4	53.289	0.166	47.647	0	-0.76	0	0.17	0.831	-0.66
331.5	53.438	0.211	48.618	0	-0.77	0	0.17	0.831	-0.66
331.6	53.519	0.211	47.477	0	-0.8	0	0.17	0.831	-0.66
331.7	53.599	0.233	47.851	0	-0.82	0	0.17	0.831	-0.66
331.8	53.674	0.268	49.306	0	-1.41	0	0.17	0.831	-0.661
331.9	53.674	0.268	48.999	0	-2.95	0	0.17	0.831	-0.661
332	53.823	0.281	49.052	0	-4.94	0	0.17	0.831	-0.661
332.1	53.892	0.258	49.97	0	-7.54	0	0.17	0.831	-0.661
332.2	53.96	0.258	50.846	0	-9.43	0	0.169	0.831	-0.661
332.3	54.016	0.211	50.228	0	-8.58	0	0.169	0.831	-0.661
332.4	54.078	0.163	50.172	0	-7.89	0	0.169	0.831	-0.662
332.5	54.14	0.163	51.835	0	-6.99	0	0.169	0.831	-0.662
332.6	54.196	0.196	49.864	0	-6.1	0	0.169	0.831	-0.662
332.7	54.258	0.171	48.586	0	-5.27	0	0.169	0.831	-0.662
332.8	54.314	0.171	48.865	0	-3.52	0	0.168	0.831	-0.662
332.9	54.314	0.148	48.402	0	-2.19	0	0.168	0.831	-0.662
333	54.432	0.131	46.824	0	-1.3	0	0.168	0.831	-0.662

333.1	54.5	0.131	46.46	0	-1.13	0	0.168	0.831	-0.662
333.2	54.563	0.186	44.542	0	-0.78	0	0.168	0.831	-0.662
333.3	54.625	0.168	44.383	0	-1.19	0	0.168	0.831	-0.662
333.4	54.681	0.168	45.019	0	-1.33	0	0.168	0.831	-0.662
333.5	54.749	0.141	45.249	0	-1.35	0	0.168	0.831	-0.663
333.6	54.817	0.118	44.832	0	-1.37	0	0.168	0.831	-0.663
333.7	54.88	0.118	45.955	0	-1.82	0	0.168	0.831	-0.663
333.8	54.88	0.166	45.895	0	-2.02	0	0.168	0.831	-0.663
333.9	54.942	0.166	46.096	0	-2.1	0	0.168	0.831	-0.663
334	55.072	0.191	46.096	0	-2.29	0	0.168	0.831	-0.663
334.1	55.134	0.191	46.4	0	-2.32	0	0.168	0.831	-0.663
334.2	55.203	0.216	47.498	0	-2.38	0	0.168	0.831	-0.663
334.3	55.265	0.216	47.315	0	-2.42	0	0.168	0.831	-0.663
334.4	55.327	0.221	47.11	0	-2.17	0	0.168	0.831	-0.663
334.5	55.395	0.223	47.986	0	-1.57	0	0.168	0.831	-0.663
334.6	55.464	0.223	48.208	0	-0.92	0	0.168	0.831	-0.663
334.7	55.532	0.216	47.943	0	-0.75	0	0.168	0.831	-0.663
334.8	55.6	0.213	48.897	0	0	0	0.168	0.831	-0.663
334.9	55.669	0.213	48.526	0	0	0	0.168	0.831	-0.663
335	55.737	0.183	48.717	0	-0.64	0	0.167	0.831	-0.663
335.1	55.805	0.223	48.526	0	-1.11	0	0.167	0.831	-0.663
335.2	55.874	0.223	47.745	0	-2.2	0	0.167	0.831	-0.663
335.3	55.942	0.258	47.212	0	-2.48	0	0.167	0.831	-0.663
335.4	56.004	0.246	49.031	0	-2.68	0	0.167	0.831	-0.663
335.5	56.073	0.246	49.614	0	-2.68	0	0.167	0.831	-0.664
335.6	56.141	0.253	48.886	0	-2.91	0	0.167	0.831	-0.664
335.7	56.203	0.228	49.504	0	-2.93	0	0.167	0.831	-0.664
335.8	56.271	0.228	50.726	0	-2.83	0	0.167	0.831	-0.664
335.9	56.271	0.216	50.977	0	-2.95	0	0.167	0.831	-0.664
336	56.402	0.223	50.03	0	-2.98	0	0.167	0.831	-0.664
336.1	56.47	0.223	50.03	0	-3.71	0	0.167	0.831	-0.664
336.2	56.532	0.256	50.115	0	-3.73	0	0.167	0.831	-0.664
336.3	56.601	0.268	49.748	0	-5.19	0	0.166	0.831	-0.664
336.4	56.657	0.268	50.281	0	-8.65	0	0.166	0.831	-0.664
336.5	56.706	0.268	50.475	0	-12.61	0	0.166	0.831	-0.665
336.6	56.75	0.283	50.242	0	-13.43	0	0.165	0.831	-0.665
336.7	56.75	0.283	49.628	0	-16.06	0	0.165	0.831	-0.666
336.8	56.8	0.151	49.758	0	-16.54	0	0.165	0.831	-0.666
336.9	56.8	0.151	50.479	0	-17.28	0	0.164	0.831	-0.667
337	56.837	0.058	48.957	0	-17.15	0	0.164	0.831	-0.667
337.1	56.855	0.105	42.953	0	-17.19	0	0.163	0.831	-0.668
337.2	56.868	0.048	40.259	0	-17.41	0	0.163	0.831	-0.668
337.3	56.88	0.048	41.466	0	-17.37	0	0.162	0.831	-0.669
337.4	56.887	0.075	41.618	0	-16.7	0	0.162	0.831	-0.669
337.5	56.905	0.075	38.006	0	-15.95	0	0.161	0.831	-0.669
337.6	56.905	0.075	38.006	0	-15.31	0	0.161	0.831	-0.67
337.7	56.918	0.065	38.486	0	-14.96	0	0.16	0.831	-0.67

337.8	56.93	0.048	37.547	0	-14.85	0	0.16	0.831	-0.671
337.9	56.93	0.048	37.603	0	-14.64	0	0.16	0.831	-0.671
338	56.949	0.035	36.879	0	-14.5	0	0.159	0.831	-0.671
338.1	56.961	0.045	36.717	0	-14.37	0	0.159	0.831	-0.672
338.2	56.967	0.045	36.777	0	-14.08	0	0.158	0.831	-0.672
338.3	56.974	0.038	36.424	0	-13.93	0	0.158	0.831	-0.673
338.4	56.986	0.06	36.974	0	-13.98	0	0.158	0.831	-0.673
338.5	56.998	0.06	36.6	0	-14.24	0	0.157	0.831	-0.673
338.6	57.011	0.05	36.364	0	-14.4	0	0.157	0.831	-0.674
338.7	57.023	0.06	37.229	0	-13.92	0	0.156	0.831	-0.674
338.8	57.036	0.06	37.193	0	-12.69	0	0.156	0.831	-0.675
338.9	57.054	0.058	37.992	0	-10.8	0	0.156	0.831	-0.675
339	57.067	0.075	38.196	0	-10.01	0	0.156	0.831	-0.675
339.1	57.079	0.075	37.896	0	-8.81	0	0.155	0.831	-0.675
339.2	57.092	0.03	38.38	0	-7.12	0	0.155	0.831	-0.676
339.3	57.11	0.03	38.398	0	-4.77	0	0.155	0.831	-0.676
339.4	57.123	0.03	36.685	0	-2.81	0	0.155	0.831	-0.676
339.5	57.135	-0.03	35.477	0	-0.89	0	0.155	0.831	-0.676
339.6	57.148	-0.072	35.205	0	0.75	0	0.155	0.831	-0.676
339.7	57.16	-0.072	33.584	0	2.05	0	0.155	0.831	-0.676
339.8	57.166	-0.117	31.024	0	2.64	0	0.155	0.831	-0.676
339.9	57.166	-0.117	29.636	0	3.27	0	0.155	0.831	-0.676
340	57.197	-0.125	28.209	0	3.4	0	0.155	0.831	-0.676
340.1	57.21	-0.117	27.68	0	3.54	0	0.155	0.831	-0.676
340.2	57.222	-0.117	26.839	0	3.5	0	0.155	0.831	-0.676
340.3	57.235	-0.117	26.74	0	3.55	0	0.155	0.831	-0.676
340.4	57.247	-0.122	27.086	0	3.52	0	0.156	0.831	-0.676
340.5	57.259	-0.12	26.79	0	3.56	0	0.156	0.832	-0.676
340.6	57.272	-0.12	26.719	0	3.53	0	0.156	0.832	-0.676
340.7	57.29	-0.12	27.111	0	3.57	0	0.156	0.832	-0.676
340.8	57.29	-0.107	27.528	0	3.54	0	0.156	0.832	-0.676
340.9	57.309	-0.107	27.507	0	3.58	0	0.156	0.832	-0.676
341	57.34	-0.08	28.058	0	3.54	0	0.156	0.832	-0.676
341.1	57.365	-0.072	28.905	0	3.59	0	0.156	0.832	-0.676
341.2	57.39	-0.072	29.435	0	3.55	0	0.156	0.832	-0.676
341.3	57.415	-0.03	29.979	0	3.59	0	0.156	0.832	-0.676
341.4	57.446	-0.005	31.063	0	3.55	0	0.157	0.832	-0.676
341.5	57.471	-0.005	32.122	0	3.6	0	0.157	0.833	-0.676
341.6	57.471	0.023	33.323	0	3.57	0	0.157	0.833	-0.676
341.7	57.527	0.015	33.644	0	3.61	0	0.157	0.833	-0.676
341.8	57.551	0.015	34.072	0	3.57	0	0.157	0.833	-0.676
341.9	57.551	-0.017	34.976	0	3.61	0	0.157	0.833	-0.676
342	57.614	-0.017	35.205	0	3.57	0	0.157	0.833	-0.676
342.1	57.645	-0.017	34.262	0	3.61	0	0.157	0.833	-0.676
342.2	57.676	0	33.976	0	3.59	0	0.157	0.833	-0.676
342.3	57.707	0.015	34.665	0	3.6	0	0.157	0.833	-0.676
342.4	57.732	0.015	34.442	0	3.41	0	0.158	0.833	-0.676

342.5	57.732	0.008	34.608	0	3.43	0	0.158	0.833	-0.676
342.6	57.8	0.003	35.58	0	3.42	0	0.158	0.834	-0.676
342.7	57.831	0.003	35.806	0	3.4	0	0.158	0.834	-0.676
342.8	57.862	0.015	35.057	0	3.43	0	0.158	0.834	-0.676
342.9	57.893	0.015	35.248	0	3.4	0	0.158	0.834	-0.676
343	57.924	0.005	35.618	0	3.41	0	0.158	0.834	-0.676
343.1	57.955	-0.015	35.244	0	3.4	0	0.158	0.834	-0.676
343.2	57.98	-0.042	35.841	0	3.43	0	0.158	0.834	-0.676
343.3	58.011	-0.042	36.226	0	3.4	0	0.158	0.834	-0.676
343.4	58.042	0.033	36.335	0	3.41	0	0.158	0.834	-0.676
343.5	58.073	0.043	34.841	0	3.42	0	0.159	0.834	-0.676
343.6	58.104	0.043	35.082	0	3.4	0	0.159	0.835	-0.676
343.7	58.135	0.008	36.141	0	3.43	0	0.159	0.835	-0.676
343.8	58.167	0.013	36.014	0	3.38	0	0.159	0.835	-0.676
343.9	58.198	0.013	35.396	0	3.43	0	0.159	0.835	-0.676
344	58.222	0.03	35.95	0	3.42	0	0.159	0.835	-0.676
344.1	58.254	0.033	35.555	0	3.41	0	0.159	0.835	-0.676
344.2	58.285	0.033	35.272	0	3.43	0	0.159	0.835	-0.676
344.3	58.316	0.01	35.728	0	3.36	0	0.159	0.835	-0.676
344.4	58.347	0.01	35.643	0	3.37	0	0.159	0.835	-0.676
344.5	58.378	0.003	34.986	0	3.35	0	0.16	0.835	-0.676
344.6	58.409	0.018	35.286	0	3	0	0.16	0.835	-0.676
344.7	58.434	0.008	34.859	0	2.32	0	0.16	0.836	-0.676
344.8	58.465	0.008	35.541	0	2.01	0	0.16	0.836	-0.676
344.9	58.49	-0.002	35.696	0	2.07	0	0.16	0.836	-0.676
345	58.521	0.008	35.191	0	2.45	0	0.16	0.836	-0.676
345.1	58.552	0.008	34.859	0	2.67	0	0.16	0.836	-0.676
345.2	58.577	0.005	35.611	0	2.92	0	0.16	0.836	-0.676
345.3	58.602	0.005	34.697	0	3.31	0	0.16	0.836	-0.676
345.4	58.626	0.005	34.841	0	3.4	0	0.16	0.836	-0.676
345.5	58.657	0	35.11	0	3.43	0	0.16	0.836	-0.676
345.6	58.682	-0.01	34.396	0	3.41	0	0.16	0.836	-0.676
345.7	58.707	-0.01	34.841	0	3.2	0	0.16	0.836	-0.676
345.8	58.732	-0.02	34.396	0	2.45	0	0.161	0.836	-0.676
345.9	58.757	-0.02	34.301	0	1.69	0	0.161	0.836	-0.676
346	58.776	-0.012	34.043	0	1.23	0	0.161	0.836	-0.676
346.1	58.776	-0.01	33.983	0	0	0	0.161	0.837	-0.676
346.2	58.819	-0.02	34.223	0	0	0	0.161	0.837	-0.676
346.3	58.831	-0.02	33.899	0	0	0	0.161	0.837	-0.676
346.4	58.85	-0.045	34.202	0	0	0	0.161	0.837	-0.676
346.5	58.862	-0.035	33.528	0	0	0	0.161	0.837	-0.676
346.6	58.869	-0.035	32.119	0	1.29	0	0.161	0.837	-0.676
346.7	58.881	-0.06	31.723	0	2.02	0	0.161	0.837	-0.676
346.8	58.894	-0.08	31.917	0	2.76	0	0.161	0.837	-0.676
346.9	58.9	-0.08	31.176	0	3.05	0	0.161	0.837	-0.676
347	58.918	-0.08	30.191	0	3.31	0	0.161	0.837	-0.676
347.1	58.925	-0.07	29.237	0	3.38	0	0.161	0.837	-0.676

347.2	58.937	-0.07	28.269	0	3.33	0	0.161	0.837	-0.676
347.3	58.949	-0.09	29.17	0	3.43	0	0.161	0.837	-0.676
347.4	58.962	-0.085	29.018	0	3.41	0	0.161	0.837	-0.676
347.5	58.974	-0.085	28.894	0	3.43	0	0.161	0.837	-0.676
347.6	58.987	-0.102	29.198	0	3.45	0	0.162	0.837	-0.676
347.7	59.005	-0.095	29.248	0	3.43	0	0.162	0.838	-0.676
347.8	59.005	-0.095	29.283	0	3.43	0	0.162	0.838	-0.676
347.9	59.024	-0.08	29.036	0	3.46	0	0.162	0.838	-0.676
348	59.024	-0.082	29.237	0	3.22	0	0.162	0.838	-0.676
348.1	59.055	-0.082	29.657	0	2.43	0	0.162	0.838	-0.676
348.2	59.068	-0.067	29.505	0	2.65	0	0.162	0.838	-0.676
348.3	59.08	-0.065	29.339	0	2.05	0	0.162	0.838	-0.676
348.4	59.086	-0.065	29.53	0	1.97	0	0.162	0.838	-0.676
348.5	59.099	-0.08	30.455	0	1.57	0	0.162	0.838	-0.676
348.6	59.105	-0.082	30.243	0	2.07	0	0.162	0.838	-0.676
348.7	59.111	-0.082	29.587	0	1.6	0	0.162	0.838	-0.676
348.8	59.123	-0.12	29.354	0	1.93	0	0.162	0.838	-0.676
348.9	59.13	-0.12	29.237	0	1.75	0	0.162	0.838	-0.676
349	59.13	-0.117	29.346	0	2.24	0	0.162	0.838	-0.676
349.1	59.142	-0.115	28.231	0	1.71	0	0.163	0.838	-0.676
349.2	59.148	-0.127	27.803	0	1.39	0	0.163	0.838	-0.676
349.3	59.148	-0.127	28.322	0	0	0	0.163	0.838	-0.676
349.4	59.148	-0.14	28.209	0	0	0	0.163	0.838	-0.676
349.5	59.148	-0.147	27.549	0	-0.76	0	0.163	0.838	-0.676
349.6	59.142	-0.147	27.288	0	-1.22	0	0.163	0.838	-0.676
349.7	59.136	-0.15	26.701	0	-1.56	0	0.162	0.838	-0.676
349.8	59.123	-0.172	26.094	0	-0.76	0	0.162	0.838	-0.676
349.9	59.111	-0.172	25.928	0	0	0	0.162	0.838	-0.676
350	59.092	-0.19	25.282	0	0	0	0.162	0.838	-0.676
350.1	59.092	-0.212	23.788	0	0.71	0	0.162	0.838	-0.676
350.2	59.061	-0.212	22.729	0	1.33	0	0.163	0.839	-0.676
350.3	59.043	-0.267	22.937	0	2.01	0	0.163	0.839	-0.676
350.4	59.024	-0.28	21.365	0	2.5	0	0.163	0.839	-0.676
350.5	59.005	-0.28	20.009	0	2.63	0	0.163	0.839	-0.676
350.6	58.993	-0.29	19.564	0	1.57	0	0.163	0.839	-0.676
350.7	58.974	-0.277	19.211	0	1.15	0	0.163	0.839	-0.676
350.8	58.956	-0.277	18.763	0	1.36	0	0.163	0.839	-0.676
350.9	58.937	-0.267	18.674	0	1.55	0	0.163	0.839	-0.676
351	58.912	-0.282	19.024	0	1.62	0	0.163	0.839	-0.676
351.1	58.894	-0.282	19.024	0	1.02	0	0.163	0.839	-0.676
351.2	58.869	-0.297	18.717	0	0.79	0	0.163	0.839	-0.676
351.3	58.844	-0.302	17.965	0	0.95	0	0.163	0.839	-0.676
351.4	58.819	-0.302	17.731	0	0.96	0	0.163	0.839	-0.676
351.5	58.788	-0.312	17.873	0	1.85	0	0.163	0.839	-0.676
351.6	58.763	-0.31	17.237	0	2.45	0	0.163	0.839	-0.676
351.7	58.738	-0.31	16.721	0	3.23	0	0.163	0.839	-0.676
351.8	58.707	-0.337	16.029	0	3.41	0	0.163	0.839	-0.676

351.9	58.682	-0.337	16.245	0	3.4	0	0.163	0.839	-0.676
352	58.657	-0.355	15.63	0	3.39	0	0.164	0.84	-0.676
352.1	58.633	-0.367	15.259	0	3.4	0	0.164	0.84	-0.676
352.2	58.608	-0.362	15.245	0	3.41	0	0.164	0.84	-0.676
352.3	58.583	-0.362	15.005	0	3.39	0	0.164	0.84	-0.676
352.4	58.558	-0.327	14.596	0	3.4	0	0.164	0.84	-0.676
352.5	58.533	-0.33	14.942	0	3.39	0	0.164	0.84	-0.676
352.6	58.502	-0.33	15.298	0	3.41	0	0.164	0.84	-0.676
352.7	58.477	-0.345	16.178	0	3.41	0	0.164	0.84	-0.676
352.8	58.452	-0.335	16.121	0	3.38	0	0.164	0.84	-0.676
352.9	58.428	-0.335	15.517	0	3.4	0	0.164	0.84	-0.676
353	58.403	-0.32	15.888	0	3.4	0	0.164	0.84	-0.676
353.1	58.378	-0.315	15.846	0	3.36	0	0.165	0.841	-0.676
353.2	58.353	-0.315	16.015	0	3.4	0	0.165	0.841	-0.676
353.3	58.334	-0.317	16.739	0	3.39	0	0.165	0.841	-0.676
353.4	58.316	-0.307	16.923	0	3.39	0	0.165	0.841	-0.676
353.5	58.297	-0.307	16.997	0	3.41	0	0.165	0.841	-0.676
353.6	58.285	-0.25	17.407	0	3.37	0	0.165	0.841	-0.676
353.7	58.266	-0.252	17.936	0	3.4	0	0.165	0.841	-0.676
353.8	58.254	-0.252	18.939	0	3.37	0	0.165	0.841	-0.676
353.9	58.241	-0.252	20.154	0	3.39	0	0.165	0.841	-0.676
354	58.229	-0.232	19.653	0	3.39	0	0.165	0.841	-0.676
354.1	58.216	-0.232	19.907	0	3.38	0	0.165	0.842	-0.676
354.2	58.204	-0.252	20.843	0	3.4	0	0.166	0.842	-0.676
354.3	58.191	-0.257	21.129	0	3.36	0	0.166	0.842	-0.676
354.4	58.185	-0.257	20.867	0	3.41	0	0.166	0.842	-0.676
354.5	58.173	-0.232	20.761	0	3.39	0	0.166	0.842	-0.676
354.6	58.16	-0.237	20.8	0	3.4	0	0.166	0.842	-0.676
354.7	58.154	-0.237	21.111	0	3.41	0	0.166	0.842	-0.676
354.8	58.142	-0.252	21.507	0	3.38	0	0.166	0.842	-0.676
354.9	58.129	-0.252	21.372	0	3.41	0	0.166	0.842	-0.676
355	58.123	-0.247	21.182	0	3.38	0	0.166	0.842	-0.676
355.1	58.117	-0.24	21.312	0	3.4	0	0.166	0.842	-0.676
355.2	58.111	-0.242	21.517	0	3.4	0	0.167	0.843	-0.676
355.3	58.104	-0.242	21.923	0	3.38	0	0.167	0.843	-0.676
355.4	58.098	-0.22	21.397	0	3.4	0	0.167	0.843	-0.676
355.5	58.086	-0.225	21.528	0	3.38	0	0.167	0.843	-0.676
355.6	58.08	-0.225	22.05	0	3.4	0	0.167	0.843	-0.676
355.7	58.067	-0.237	22.086	0	3.37	0	0.167	0.843	-0.676
355.8	58.061	-0.235	22.365	0	3.41	0	0.167	0.843	-0.676
355.9	58.055	-0.235	22.266	0	3.4	0	0.167	0.843	-0.676
356	58.042	-0.24	21.726	0	3.38	0	0.167	0.843	-0.676
356.1	58.042	-0.252	22.001	0	3.4	0	0.167	0.843	-0.676
356.2	58.03	-0.252	22.072	0	3.38	0	0.167	0.843	-0.676
356.3	58.017	-0.235	22.195	0	3.41	0	0.168	0.844	-0.676
356.4	58.011	-0.237	21.132	0	3.38	0	0.168	0.844	-0.676
356.5	58.005	-0.237	21.913	0	3.4	0	0.168	0.844	-0.676

356.6	57.999	-0.215	21.881	0	3.39	0	0.168	0.844	-0.676
356.7	57.993	-0.225	21.185	0	3.38	0	0.168	0.844	-0.676
356.8	57.98	-0.225	21.821	0	3.4	0	0.168	0.844	-0.676
356.9	57.974	-0.225	21.881	0	3.38	0	0.168	0.844	-0.676
357	57.968	-0.252	21.613	0	3.4	0	0.168	0.844	-0.676
357.1	57.962	-0.252	22.527	0	3.38	0	0.168	0.844	-0.676
357.2	57.955	-0.222	21.775	0	3.41	0	0.168	0.844	-0.676
357.3	57.949	-0.21	21.245	0	3.38	0	0.169	0.845	-0.676
357.4	57.943	-0.21	21.369	0	3.37	0	0.169	0.845	-0.676
357.5	57.93	-0.235	21.471	0	2.62	0	0.169	0.845	-0.676
357.6	57.924	-0.247	22.333	0	1.16	0	0.169	0.845	-0.676
357.7	57.918	-0.247	22.28	0	-1.05	0	0.169	0.845	-0.676
357.8	57.906	-0.23	21.203	0	0	0	0.169	0.845	-0.676
357.9	57.887	-0.23	21.369	0	1.11	0	0.169	0.845	-0.676
358	57.875	-0.232	22.029	0	0.51	0	0.169	0.845	-0.676
358.1	57.856	-0.26	21.655	0	-0.62	0	0.169	0.845	-0.676
358.2	57.831	-0.282	20.56	0	-2.95	0	0.169	0.845	-0.676
358.3	57.8	-0.282	20.112	0	-2.63	0	0.169	0.845	-0.676
358.4	57.775	-0.297	19.088	0	-1.63	0	0.169	0.845	-0.676
358.5	57.744	-0.302	18.254	0	0	0	0.169	0.845	-0.676
358.6	57.713	-0.302	18.169	0	1.04	0	0.169	0.845	-0.676
358.7	57.682	-0.377	17.968	0	1.7	0	0.169	0.845	-0.676
358.8	57.645	-0.39	17.661	0	2.91	0	0.169	0.845	-0.676
358.9	57.62	-0.39	15.606	0	3.56	0	0.169	0.845	-0.676
359	57.589	-0.393	12.3	0	3.56	0	0.169	0.845	-0.676
359.1	57.558	-0.408	12.996	0	3.56	0	0.169	0.845	-0.676
359.2	57.527	-0.408	12.95	0	3.56	0	0.169	0.845	-0.676
359.3	57.502	-0.393	12.254	0	3.56	0	0.169	0.845	-0.676
359.4	57.471	-0.395	12.47	0	3.57	0	0.169	0.846	-0.676
359.5	57.446	-0.395	12.629	0	3.57	0	0.169	0.846	-0.676
359.6	57.421	-0.383	13.402	0	3.58	0	0.169	0.846	-0.676
359.7	57.396	-0.362	13.677	0	3.57	0	0.17	0.846	-0.676
359.8	57.377	-0.362	13.222	0	3.58	0	0.17	0.846	-0.676
359.9	57.359	-0.342	13.533	0	3.58	0	0.17	0.846	-0.676
360	57.34	-0.287	14.606	0	3.58	0	0.17	0.846	-0.676
360.1	57.321	-0.287	15.245	0	3.58	0	0.17	0.846	-0.676
360.2	57.309	-0.302	16.93	0	3.54	0	0.17	0.846	-0.676
360.3	57.29	-0.305	18.455	0	3.41	0	0.17	0.846	-0.676
360.4	57.272	-0.305	18.572	0	3.4	0	0.17	0.847	-0.676
360.5	57.272	-0.277	18.134	0	3.4	0	0.17	0.847	-0.676
360.6	57.253	-0.267	18.48	0	3.39	0	0.17	0.847	-0.676
360.7	57.235	-0.267	18.318	0	3.4	0	0.171	0.847	-0.676
360.8	57.228	-0.26	19.292	0	3.38	0	0.171	0.847	-0.676
360.9	57.216	-0.26	19.511	0	3.4	0	0.171	0.847	-0.676
361	57.203	-0.245	19.621	0	3.37	0	0.171	0.847	-0.676
361.1	57.197	-0.255	20.016	0	3.4	0	0.171	0.847	-0.676
361.2	57.191	-0.27	20.295	0	3.37	0	0.171	0.847	-0.676

361.3	57.179	-0.27	20.726	0	3.4	0	0.171	0.847	-0.676
361.4	57.172	-0.242	20.751	0	3.37	0	0.171	0.847	-0.676
361.5	57.16	-0.26	20.497	0	3.4	0	0.171	0.848	-0.676
361.6	57.154	-0.26	21.012	0	3.37	0	0.171	0.848	-0.676
361.7	57.141	-0.237	20.377	0	3.39	0	0.171	0.848	-0.676
361.8	57.129	-0.235	20.592	0	3.38	0	0.172	0.848	-0.676
361.9	57.129	-0.235	20.85	0	3.38	0	0.172	0.848	-0.676
362	57.123	-0.255	21.012	0	3.38	0	0.172	0.848	-0.676
362.1	57.11	-0.262	20.988	0	3.37	0	0.172	0.848	-0.676
362.2	57.104	-0.262	21.528	0	3.4	0	0.172	0.848	-0.676
362.3	57.104	-0.237	20.401	0	3.37	0	0.172	0.848	-0.676
362.4	57.092	-0.242	19.875	0	3.41	0	0.172	0.848	-0.676
362.5	57.085	-0.242	21.203	0	3.38	0	0.172	0.849	-0.676
362.6	57.085	-0.227	21.104	0	3.39	0	0.172	0.849	-0.676
362.7	57.079	-0.235	21.376	0	3.37	0	0.172	0.849	-0.676
362.8	57.073	-0.235	21.821	0	3.33	0	0.173	0.849	-0.676
362.9	57.073	-0.232	21.5	0	3.32	0	0.173	0.849	-0.676
363	57.061	-0.237	21.676	0	3.37	0	0.173	0.849	-0.676
363.1	57.061	-0.237	21.556	0	3.37	0	0.173	0.849	-0.676
363.2	57.054	-0.24	21.429	0	3.36	0	0.173	0.849	-0.676
363.3	57.048	-0.242	21.634	0	3.39	0	0.173	0.849	-0.676
363.4	57.048	-0.242	21.906	0	3.37	0	0.173	0.849	-0.676
363.5	57.042	-0.227	21.701	0	3.4	0	0.173	0.849	-0.676
363.6	57.036	-0.237	21.305	0	3.37	0	0.173	0.85	-0.676
363.7	57.029	-0.237	21.69	0	3.4	0	0.173	0.85	-0.676
363.8	57.029	-0.237	21.694	0	3.38	0	0.173	0.85	-0.676
363.9	57.023	-0.237	21.747	0	3.4	0	0.174	0.85	-0.676
364	57.017	-0.245	21.694	0	3.38	0	0.174	0.85	-0.676
364.1	57.017	-0.222	21.517	0	3.4	0	0.174	0.85	-0.676
364.2	57.011	-0.22	21.164	0	3.38	0	0.174	0.85	-0.676
364.3	57.005	-0.22	21.175	0	3.39	0	0.174	0.85	-0.676
364.4	57.005	-0.24	21.796	0	3.39	0	0.174	0.85	-0.676
364.5	57.005	-0.26	21.828	0	3.34	0	0.174	0.85	-0.676
364.6	56.986	-0.26	21.888	0	2.89	0	0.174	0.85	-0.676
364.7	56.986	-0.255	21.351	0	2.98	0	0.174	0.851	-0.676
364.8	56.98	-0.262	21.531	0	3.15	0	0.174	0.851	-0.676
364.9	56.967	-0.262	21.881	0	2.87	0	0.174	0.851	-0.676
365	56.967	-0.262	21.489	0	2.74	0	0.175	0.851	-0.676
365.1	56.961	-0.27	21.238	0	2.5	0	0.175	0.851	-0.676
365.2	56.949	-0.27	21.62	0	1.9	0	0.175	0.851	-0.676
365.3	56.942	-0.27	21.256	0	1.39	0	0.175	0.851	-0.676
365.4	56.93	-0.27	20.959	0	1.79	0	0.175	0.851	-0.676
365.5	56.924	-0.26	20.624	0	2.16	0	0.175	0.851	-0.676
365.6	56.918	-0.27	20.889	0	2.33	0	0.175	0.851	-0.676
365.7	56.899	-0.29	20.539	0	2.55	0	0.175	0.851	-0.676
365.8	56.893	-0.29	20.903	0	2.78	0	0.175	0.851	-0.676
365.9	56.88	-0.285	19.865	0	2.94	0	0.175	0.851	-0.676

366	56.868	-0.295	19.607	0	3.39	0	0.175	0.851	-0.676
366.1	56.855	-0.295	19.511	0	3.38	0	0.175	0.852	-0.676
366.2	56.849	-0.305	19.469	0	3.41	0	0.175	0.852	-0.676
366.3	56.843	-0.3	19.307	0	3.38	0	0.175	0.852	-0.676
366.4	56.831	-0.3	19.727	0	3.39	0	0.176	0.852	-0.676
366.5	56.831	-0.28	18.943	0	3.38	0	0.176	0.852	-0.676
366.6	56.818	-0.282	18.77	0	3.44	0	0.176	0.852	-0.676
366.7	56.818	-0.282	19.921	0	3.52	0	0.176	0.852	-0.676
366.8	56.806	-0.287	20.161	0	3.53	0	0.176	0.852	-0.676
366.9	56.8	-0.287	20.391	0	3.54	0	0.176	0.852	-0.676
367	56.787	-0.29	20.175	0	3.53	0	0.176	0.852	-0.676
367.1	56.787	-0.252	20.214	0	3.57	0	0.176	0.852	-0.676
367.2	56.775	-0.247	19.473	0	3.54	0	0.176	0.853	-0.676
367.3	56.768	-0.247	20.359	0	3.56	0	0.176	0.853	-0.676
367.4	56.768	-0.26	20.889	0	3.57	0	0.177	0.853	-0.676
367.5	56.756	-0.245	21.323	0	3.57	0	0.177	0.853	-0.676
367.6	56.756	-0.245	20.973	0	3.59	0	0.177	0.853	-0.676
367.7	56.756	-0.237	20.825	0	3.55	0	0.177	0.853	-0.676
367.8	56.75	-0.23	21.15	0	3.59	0	0.177	0.853	-0.676
367.9	56.75	-0.23	21.312	0	3.58	0	0.177	0.853	-0.676
368	56.75	-0.215	21.461	0	3.57	0	0.177	0.853	-0.676
368.1	56.744	-0.21	21.892	0	3.59	0	0.177	0.853	-0.676
368.2	56.744	-0.21	22.559	0	3.58	0	0.177	0.854	-0.676
368.3	56.744	-0.19	22.781	0	3.6	0	0.177	0.854	-0.676
368.4	56.75	-0.19	23.301	0	3.57	0	0.178	0.854	-0.676
368.5	56.75	-0.175	23.226	0	3.59	0	0.178	0.854	-0.676
368.6	56.756	-0.157	24.286	0	3.58	0	0.178	0.854	-0.676
368.7	56.762	-0.167	24.049	0	3.51	0	0.178	0.854	-0.676
368.8	56.762	-0.167	24.816	0	3.01	0	0.178	0.854	-0.676
368.9	56.768	-0.167	25.218	0	2.95	0	0.178	0.854	-0.676
369	56.775	-0.17	24.628	0	3.32	0	0.178	0.854	-0.676
369.1	56.775	-0.17	25.391	0	3.5	0	0.178	0.854	-0.676
369.2	56.781	-0.192	25.723	0	3.44	0	0.178	0.855	-0.676
369.3	56.781	-0.19	24.914	0	3.42	0	0.178	0.855	-0.676
369.4	56.787	-0.19	24.544	0	3.41	0	0.178	0.855	-0.676
369.5	56.793	-0.202	24.159	0	3.39	0	0.179	0.855	-0.676
369.6	56.793	-0.192	24.187	0	3.39	0	0.179	0.855	-0.676
369.7	56.8	-0.192	23.929	0	3.27	0	0.179	0.855	-0.676
369.8	56.8	-0.207	23.65	0	1.88	0	0.179	0.855	-0.676
369.9	56.8	-0.207	24.159	0	0.92	0	0.179	0.855	-0.676
370	56.793	-0.215	23.76	0	0.6	0	0.179	0.855	-0.676
370.1	56.793	-0.205	23.597	0	0.68	0	0.179	0.855	-0.676
370.2	56.793	-0.21	23.587	0	1.62	0	0.179	0.855	-0.676
370.3	56.781	-0.21	23.901	0	2.18	0	0.179	0.855	-0.676
370.4	56.781	-0.21	23.746	0	2.27	0	0.179	0.855	-0.676
370.5	56.781	-0.245	22.739	0	2.78	0	0.179	0.855	-0.676
370.6	56.781	-0.245	23.149	0	3.05	0	0.179	0.855	-0.676

370.7	56.768	-0.225	21.8	0	3.42	0	0.179	0.856	-0.676
370.8	56.768	-0.235	21.556	0	3.52	0	0.179	0.856	-0.676
370.9	56.768	-0.235	22.319	0	3.56	0	0.179	0.856	-0.676
371	56.762	-0.23	21.923	0	3.53	0	0.18	0.856	-0.676
371.1	56.762	-0.25	21.408	0	3.55	0	0.18	0.856	-0.676
371.2	56.756	-0.25	21.726	0	3.51	0	0.18	0.856	-0.676
371.3	56.75	-0.24	21.937	0	3.56	0	0.18	0.856	-0.676
371.4	56.75	-0.237	20.867	0	3.56	0	0.18	0.856	-0.676
371.5	56.744	-0.237	20.62	0	3.53	0	0.18	0.856	-0.676
371.6	56.744	-0.235	22.181	0	3.57	0	0.18	0.856	-0.676
371.7	56.737	-0.22	21.588	0	3.55	0	0.18	0.857	-0.676
371.8	56.731	-0.22	21.235	0	3.56	0	0.18	0.857	-0.676
371.9	56.731	-0.217	21.627	0	3.56	0	0.18	0.857	-0.676
372	56.725	-0.23	21.542	0	3.56	0	0.181	0.857	-0.676
372.1	56.719	-0.23	21.365	0	3.58	0	0.181	0.857	-0.676
372.2	56.719	-0.247	21.722	0	3.56	0	0.181	0.857	-0.676
372.3	56.719	-0.24	21.757	0	3.6	0	0.181	0.857	-0.676
372.4	56.713	-0.24	21.503	0	3.48	0	0.181	0.857	-0.676
372.5	56.713	-0.237	21.108	0	3.42	0	0.181	0.857	-0.676
372.6	56.713	-0.24	21.775	0	3.42	0	0.181	0.857	-0.676
372.7	56.713	-0.24	21.941	0	3.38	0	0.181	0.858	-0.676
372.8	56.713	-0.232	21.284	0	3.42	0	0.181	0.858	-0.676
372.9	56.713	-0.232	22.16	0	3.37	0	0.181	0.858	-0.676
373	56.713	-0.217	22.319	0	3.4	0	0.182	0.858	-0.676
373.1	56.713	-0.2	21.881	0	3.39	0	0.182	0.858	-0.676
373.2	56.713	-0.185	22.789	0	3.38	0	0.182	0.858	-0.676
373.3	56.713	-0.185	22.962	0	3.36	0	0.182	0.858	-0.676
373.4	56.713	-0.192	22.7	0	3.37	0	0.182	0.858	-0.676
373.5	56.719	-0.195	23.219	0	3.4	0	0.182	0.858	-0.676
373.6	56.719	-0.195	23.085	0	3.38	0	0.182	0.858	-0.676
373.7	56.719	-0.192	22.958	0	3.39	0	0.182	0.858	-0.676
373.8	56.719	-0.2	22.789	0	3.39	0	0.182	0.859	-0.676
373.9	56.725	-0.2	22.958	0	3.37	0	0.182	0.859	-0.676
374	56.725	-0.2	23.735	0	3.39	0	0.182	0.859	-0.676
374.1	56.725	-0.19	23.138	0	3.37	0	0.183	0.859	-0.676
374.2	56.737	-0.19	22.633	0	3.4	0	0.183	0.859	-0.676
374.3	56.737	-0.182	23.573	0	3.37	0	0.183	0.859	-0.676
374.4	56.737	-0.177	23.749	0	3.4	0	0.183	0.859	-0.676
374.5	56.744	-0.177	23.859	0	3.38	0	0.183	0.859	-0.676
374.6	56.744	-0.175	24.092	0	3.37	0	0.183	0.859	-0.676
374.7	56.75	-0.157	24.395	0	3.4	0	0.183	0.859	-0.676
374.8	56.756	-0.157	23.929	0	3.36	0	0.183	0.859	-0.676
374.9	56.756	-0.162	24.261	0	3.39	0	0.183	0.86	-0.676
375	56.762	-0.192	24.922	0	3.38	0	0.183	0.86	-0.676
375.1	56.768	-0.192	24.72	0	3.38	0	0.183	0.86	-0.676
375.2	56.768	-0.17	24.734	0	3.37	0	0.184	0.86	-0.676
375.3	56.775	-0.172	24.176	0	3.37	0	0.184	0.86	-0.676

375.4	56.787	-0.172	24.805	0	3.4	0	0.184	0.86	-0.676
375.5	56.787	-0.182	25.236	0	2.93	0	0.184	0.86	-0.676
375.6	56.787	-0.18	25.095	0	3.09	0	0.184	0.86	-0.676
375.7	56.793	-0.18	24.205	0	3.3	0	0.184	0.86	-0.676
375.8	56.806	-0.18	24.66	0	3.38	0	0.184	0.86	-0.676
375.9	56.806	-0.18	24.353	0	3.03	0	0.184	0.86	-0.676
376	56.812	-0.187	24.918	0	2.69	0	0.184	0.861	-0.676
376.1	56.812	-0.175	24.621	0	2.03	0	0.184	0.861	-0.676
376.2	56.818	-0.177	24.081	0	1.51	0	0.184	0.861	-0.676
376.3	56.818	-0.177	24.081	0	1.34	0	0.184	0.861	-0.676
376.4	56.812	-0.2	24.081	0	1.66	0	0.184	0.861	-0.676
376.5	56.812	-0.202	24.18	0	1.16	0	0.185	0.861	-0.676
376.6	56.806	-0.202	23.626	0	1.47	0	0.185	0.861	-0.676
376.7	56.806	-0.23	23.318	0	1.6	0	0.185	0.861	-0.676
376.8	56.8	-0.225	22.718	0	2.06	0	0.185	0.861	-0.676
376.9	56.793	-0.225	22.05	0	2.6	0	0.185	0.861	-0.676
377	56.793	-0.235	21.87	0	2.78	0	0.185	0.861	-0.676
377.1	56.787	-0.232	22.026	0	0	0	0.185	0.861	-0.676
377.2	56.775	-0.232	21.139	0	-0.69	0	0.185	0.861	-0.676
377.3	56.775	-0.25	21.358	0	0	0	0.185	0.861	-0.676
377.4	56.744	-0.25	21.274	0	0.61	0	0.185	0.861	-0.676
377.5	56.731	-0.25	20.744	0	0	0	0.185	0.861	-0.676
377.6	56.713	-0.282	20.567	0	1.11	0	0.185	0.861	-0.676
377.7	56.694	-0.302	19.896	0	1.42	0	0.185	0.861	-0.676
377.8	56.681	-0.302	19.148	0	1.22	0	0.185	0.861	-0.676
377.9	56.663	-0.3	18.318	0	1.13	0	0.185	0.861	-0.676
378	56.644	-0.32	17.675	0	1.24	0	0.185	0.861	-0.676
378.1	56.644	-0.32	17.929	0	1.72	0	0.185	0.861	-0.676
378.2	56.601	-0.315	17.039	0	2.04	0	0.185	0.861	-0.676
378.3	56.576	-0.322	16.923	0	2.03	0	0.185	0.861	-0.676
378.4	56.557	-0.322	16.898	0	1.59	0	0.185	0.862	-0.676
378.5	56.532	-0.317	16.326	0	1.4	0	0.185	0.862	-0.676
378.6	56.507	-0.335	15.842	0	2.17	0	0.185	0.862	-0.676
378.7	56.483	-0.335	16.114	0	2.02	0	0.185	0.862	-0.676
378.8	56.458	-0.33	16.45	0	1.84	0	0.185	0.862	-0.676
378.9	56.458	-0.33	15.553	0	1.84	0	0.185	0.862	-0.676
379	56.414	-0.337	15.351	0	2.16	0	0.186	0.862	-0.676
379.1	56.383	-0.362	15.74	0	2.79	0	0.186	0.862	-0.676
379.2	56.358	-0.342	15.302	0	3.4	0	0.186	0.862	-0.676
379.3	56.34	-0.342	14.355	0	3.44	0	0.186	0.862	-0.676
379.4	56.309	-0.352	15.005	0	3.34	0	0.186	0.862	-0.676
379.5	56.29	-0.365	15.062	0	3.43	0	0.186	0.862	-0.676
379.6	56.265	-0.365	14.242	0	3.47	0	0.186	0.862	-0.676
379.7	56.265	-0.355	13.822	0	3.47	0	0.186	0.862	-0.676
379.8	56.215	-0.355	13.766	0	3.51	0	0.186	0.863	-0.676
379.9	56.191	-0.355	13.995	0	3.48	0	0.186	0.863	-0.676
380	56.172	-0.35	14.398	0	3.49	0	0.186	0.863	-0.676

380.1	56.153	-0.342	14.264	0	3.5	0	0.187	0.863	-0.676
380.2	56.135	-0.342	14.493	0	3.49	0	0.187	0.863	-0.676
380.3	56.11	-0.31	14.754	0	3.49	0	0.187	0.863	-0.676
380.4	56.104	-0.312	15.355	0	3.52	0	0.187	0.863	-0.676
380.5	56.085	-0.312	16.351	0	3.5	0	0.187	0.863	-0.676
380.6	56.066	-0.312	16.898	0	3.49	0	0.187	0.863	-0.676
380.7	56.054	-0.3	16.601	0	3.53	0	0.187	0.863	-0.676
380.8	56.041	-0.3	17.174	0	3.5	0	0.187	0.864	-0.676
380.9	56.029	-0.29	17.608	0	3.52	0	0.187	0.864	-0.676
381	56.023	-0.267	18.279	0	3.52	0	0.187	0.864	-0.676
381.1	56.01	-0.267	18.42	0	3.5	0	0.188	0.864	-0.676
381.2	56.004	-0.277	19.455	0	3.5	0	0.188	0.864	-0.676
381.3	55.992	-0.28	19.363	0	3.54	0	0.188	0.864	-0.676
381.4	55.986	-0.28	19.769	0	3.51	0	0.188	0.864	-0.676
381.5	55.979	-0.275	19.822	0	3.35	0	0.188	0.864	-0.676
381.6	55.979	-0.247	20.596	0	3.37	0	0.188	0.864	-0.676
381.7	55.973	-0.247	20.189	0	3.33	0	0.188	0.864	-0.676
381.8	55.967	-0.237	20.091	0	3.33	0	0.188	0.865	-0.676
381.9	55.967	-0.237	21.337	0	3.36	0	0.188	0.865	-0.676
382	55.961	-0.232	21.351	0	3.32	0	0.188	0.865	-0.676
382.1	55.961	-0.26	20.98	0	3.34	0	0.188	0.865	-0.676
382.2	55.954	-0.27	21.849	0	3.35	0	0.189	0.865	-0.676
382.3	55.954	-0.27	22.202	0	3.33	0	0.189	0.865	-0.676
382.4	55.954	-0.25	21.694	0	3.34	0	0.189	0.865	-0.676
382.5	55.954	-0.23	21.432	0	3.35	0	0.189	0.865	-0.676
382.6	55.954	-0.23	21.295	0	3.31	0	0.189	0.865	-0.676
382.7	55.954	-0.227	21.849	0	3.33	0	0.189	0.865	-0.676
382.8	55.948	-0.217	22.329	0	3.34	0	0.189	0.865	-0.676
382.9	55.948	-0.217	21.987	0	3.32	0	0.189	0.866	-0.676
383	55.948	-0.245	22.086	0	3.33	0	0.189	0.866	-0.676
383.1	55.948	-0.242	22.608	0	3.35	0	0.189	0.866	-0.676
383.2	55.942	-0.242	22.252	0	3.32	0	0.19	0.866	-0.676
383.3	55.948	-0.23	21.892	0	3.32	0	0.19	0.866	-0.676
383.4	55.942	-0.222	22.195	0	3.32	0	0.19	0.866	-0.676
383.5	55.948	-0.222	22.125	0	3.32	0	0.19	0.866	-0.676
383.6	55.954	-0.207	22.319	0	3.33	0	0.19	0.866	-0.676
383.7	55.961	-0.18	22.372	0	3.35	0	0.19	0.866	-0.676
383.8	55.973	-0.18	22.919	0	3.31	0	0.19	0.866	-0.676
383.9	55.986	-0.15	23.626	0	3.33	0	0.19	0.866	-0.676
384	56.004	-0.125	25.155	0	3.35	0	0.19	0.867	-0.676
384.1	56.023	-0.125	26.267	0	3.31	0	0.19	0.867	-0.676
384.2	56.048	-0.097	26.818	0	3.34	0	0.19	0.867	-0.676
384.3	56.066	-0.072	28.52	0	3.33	0	0.191	0.867	-0.676
384.4	56.091	-0.072	28.884	0	3.32	0	0.191	0.867	-0.676
384.5	56.116	-0.072	29.724	0	3.35	0	0.191	0.867	-0.676
384.6	56.141	-0.067	31.066	0	3.34	0	0.191	0.867	-0.676
384.7	56.166	-0.067	31.864	0	3.31	0	0.191	0.867	-0.676

384.8	56.191	-0.045	31.497	0	3.36	0	0.191	0.867	-0.676
384.9	56.222	-0.045	31.684	0	3.33	0	0.191	0.867	-0.676
385	56.222	-0.057	32.316	0	3.32	0	0.191	0.867	-0.676
385.1	56.278	-0.032	32.316	0	3.36	0	0.191	0.868	-0.676
385.2	56.302	-0.022	31.769	0	3.34	0	0.191	0.868	-0.676
385.3	56.334	-0.022	32.316	0	3.35	0	0.191	0.868	-0.676
385.4	56.358	-0.032	32.648	0	3.36	0	0.192	0.868	-0.676
385.5	56.389	-0.015	33.1	0	3.34	0	0.192	0.868	-0.676
385.6	56.414	-0.015	32.066	0	3.38	0	0.192	0.868	-0.676
385.7	56.445	-0.082	32.023	0	3.35	0	0.192	0.868	-0.676
385.8	56.47	-0.112	32.779	0	3.36	0	0.192	0.868	-0.676
385.9	56.47	-0.112	33.221	0	3.37	0	0.192	0.868	-0.676
386	56.52	-0.055	31.85	0	3.35	0	0.192	0.868	-0.676
386.1	56.551	-0.047	30.89	0	3.39	0	0.192	0.868	-0.676
386.2	56.57	-0.047	31.741	0	3.37	0	0.192	0.869	-0.676
386.3	56.601	-0.047	32.451	0	3.36	0	0.192	0.869	-0.676
386.4	56.626	-0.052	31.928	0	3.39	0	0.192	0.869	-0.676
386.5	56.657	-0.052	32.08	0	3.36	0	0.193	0.869	-0.676
386.6	56.681	-0.05	32.281	0	3.39	0	0.193	0.869	-0.676
386.7	56.713	-0.04	32.182	0	3.35	0	0.193	0.869	-0.676
386.8	56.737	-0.04	31.525	0	3.39	0	0.193	0.869	-0.676
386.9	56.768	-0.032	32.242	0	3.38	0	0.193	0.869	-0.676
387	56.793	-0.032	32.309	0	3.37	0	0.193	0.869	-0.676
387.1	56.818	-0.032	32.518	0	3.39	0	0.193	0.869	-0.676
387.2	56.843	-0.027	32.214	0	3.35	0	0.193	0.87	-0.676
387.3	56.868	-0.052	31.706	0	3.4	0	0.193	0.87	-0.676
387.4	56.893	-0.052	32.677	0	3.36	0	0.193	0.87	-0.676
387.5	56.924	-0.047	32.652	0	3.39	0	0.194	0.87	-0.676
387.6	56.949	-0.055	31.921	0	3.37	0	0.194	0.87	-0.676
387.7	56.974	-0.055	31.893	0	3.37	0	0.194	0.87	-0.676
387.8	57.005	-0.08	32.627	0	3.4	0	0.194	0.87	-0.676
387.9	57.029	-0.08	32.232	0	3.52	0	0.194	0.87	-0.676
388	57.054	-0.057	31.381	0	3.54	0	0.194	0.87	-0.676
388.1	57.085	-0.047	31.43	0	3.53	0	0.194	0.87	-0.676
388.2	57.104	-0.04	32.076	0	3.55	0	0.194	0.87	-0.676
388.3	57.129	-0.04	31.868	0	3.1	0	0.194	0.871	-0.676
388.4	57.16	-0.072	31.681	0	3.02	0	0.194	0.871	-0.676
388.5	57.179	-0.057	32.256	0	2.3	0	0.194	0.871	-0.676
388.6	57.197	-0.057	31.73	0	1.27	0	0.194	0.871	-0.676
388.7	57.216	-0.057	31.352	0	-0.52	0	0.194	0.871	-0.676
388.8	57.235	-0.057	31.758	0	-2.31	0	0.194	0.871	-0.676
388.9	57.241	-0.057	31.532	0	-1.74	0	0.194	0.871	-0.676
389	57.247	-0.097	31.144	0	-0.87	0	0.194	0.871	-0.676
389.1	57.253	-0.127	31.578	0	0	0	0.194	0.871	-0.676
389.2	57.259	-0.127	30.978	0	0	0	0.194	0.871	-0.676
389.3	57.266	-0.157	29.092	0	0	0	0.194	0.871	-0.676
389.4	57.266	-0.157	27.57	0	0	0	0.194	0.871	-0.676

389.5	57.266	-0.162	26.377	0	0.54	0	0.194	0.871	-0.676
389.6	57.272	-0.2	25.504	0	1.13	0	0.194	0.871	-0.676
389.7	57.266	-0.192	25.755	0	0.79	0	0.194	0.871	-0.676
389.8	57.266	-0.192	24.572	0	1.13	0	0.194	0.871	-0.676
389.9	57.266	-0.185	23.502	0	1.92	0	0.194	0.871	-0.676
390	57.259	-0.195	23.693	0	2.07	0	0.195	0.871	-0.676
390.1	57.259	-0.195	22.764	0	2.41	0	0.195	0.871	-0.676
390.2	57.253	-0.227	22.365	0	3.45	0	0.195	0.871	-0.676
390.3	57.247	-0.22	22.587	0	3.52	0	0.195	0.871	-0.676
390.4	57.247	-0.22	22.658	0	3.38	0	0.195	0.871	-0.676
390.5	57.247	-0.207	21.365	0	3.42	0	0.195	0.871	-0.676
390.6	57.241	-0.222	22.075	0	3.38	0	0.195	0.872	-0.676
390.7	57.241	-0.222	22.45	0	3.41	0	0.195	0.872	-0.676
390.8	57.241	-0.215	21.567	0	3.37	0	0.195	0.872	-0.676
390.9	57.235	-0.215	21.581	0	3.41	0	0.195	0.872	-0.676
391	57.235	-0.225	22.276	0	3.37	0	0.195	0.872	-0.676
391.1	57.235	-0.215	22.301	0	3.4	0	0.196	0.872	-0.676
391.2	57.241	-0.207	22.216	0	3.37	0	0.196	0.872	-0.676
391.3	57.235	-0.207	22.46	0	3.37	0	0.196	0.872	-0.676
391.4	57.235	-0.22	22.654	0	2.22	0	0.196	0.872	-0.676
391.5	57.235	-0.21	23.096	0	0	0	0.196	0.872	-0.676
391.6	57.228	-0.21	23.015	0	-1.46	0	0.196	0.872	-0.677
391.7	57.216	-0.205	22.969	0	-1.22	0	0.196	0.872	-0.677
391.8	57.203	-0.215	23.322	0	0	0	0.196	0.872	-0.677
391.9	57.191	-0.215	23.322	0	0	0	0.196	0.872	-0.677
392	57.179	-0.252	22.817	0	0.95	0	0.196	0.872	-0.677
392.1	57.16	-0.257	22.329	0	1.43	0	0.196	0.872	-0.677
392.2	57.148	-0.257	20.913	0	1.78	0	0.196	0.872	-0.677
392.3	57.141	-0.285	19.907	0	1.97	0	0.196	0.872	-0.677
392.4	57.123	-0.292	19.681	0	2.09	0	0.196	0.873	-0.677
392.5	57.11	-0.292	18.586	0	2.49	0	0.196	0.873	-0.677
392.6	57.098	-0.28	18.095	0	3.07	0	0.196	0.873	-0.677
392.7	57.085	-0.285	17.862	0	3.07	0	0.196	0.873	-0.677
392.8	57.073	-0.285	18.049	0	2.98	0	0.196	0.873	-0.677
392.9	57.061	-0.297	18.395	0	3.05	0	0.196	0.873	-0.677
393	57.048	-0.292	17.922	0	2.95	0	0.196	0.873	-0.677
393.1	57.036	-0.292	17.915	0	2.89	0	0.197	0.873	-0.677
393.2	57.023	-0.282	18.798	0	3.04	0	0.197	0.873	-0.677
393.3	57.011	-0.262	18.138	0	2.89	0	0.197	0.873	-0.677
393.4	56.998	-0.262	17.65	0	2.94	0	0.197	0.873	-0.677
393.5	56.986	-0.282	18.123	0	3.25	0	0.197	0.873	-0.677
393.6	56.974	-0.29	18.597	0	3.21	0	0.197	0.873	-0.677
393.7	56.955	-0.29	18.667	0	3.24	0	0.197	0.874	-0.677
393.8	56.942	-0.27	18.579	0	3.04	0	0.197	0.874	-0.677
393.9	56.93	-0.27	18.053	0	2.16	0	0.197	0.874	-0.677
394	56.911	-0.28	18.802	0	1.33	0	0.197	0.874	-0.677
394.1	56.911	-0.29	18.505	0	0	0	0.197	0.874	-0.677

394.2	56.874	-0.295	18.307	0	0	0	0.197	0.874	-0.677
394.3	56.855	-0.295	18.173	0	-1.45	0	0.197	0.874	-0.677
394.4	56.824	-0.317	18.537	0	-1.96	0	0.197	0.874	-0.677
394.5	56.793	-0.322	18.261	0	-1.32	0	0.197	0.874	-0.677
394.6	56.768	-0.322	17.414	0	0	0	0.197	0.874	-0.677
394.7	56.737	-0.33	17.378	0	0	0	0.197	0.874	-0.677
394.8	56.7	-0.35	16.803	0	0	0	0.197	0.874	-0.677
394.9	56.669	-0.35	16.273	0	0	0	0.197	0.874	-0.677
395	56.669	-0.367	15.595	0	0.7	0	0.197	0.874	-0.677
395.1	56.601	-0.38	13.391	0	1.81	0	0.197	0.874	-0.677
395.2	56.557	-0.38	12.561	0	2.44	0	0.197	0.874	-0.677
395.3	56.526	-0.43	13.381	0	2.92	0	0.197	0.874	-0.677
395.4	56.489	-0.44	12.35	0	3.26	0	0.197	0.874	-0.677
395.5	56.445	-0.44	11.262	0	3.34	0	0.197	0.874	-0.677
395.6	56.414	-0.455	10.955	0	3.27	0	0.198	0.874	-0.677
395.7	56.377	-0.45	10.414	0	3.06	0	0.198	0.874	-0.677
395.8	56.34	-0.45	9.567	0	3.02	0	0.198	0.874	-0.677
395.9	56.309	-0.438	9.817	0	1.83	0	0.198	0.874	-0.677
396	56.309	-0.423	9.916	0	1.89	0	0.198	0.875	-0.677
396.1	56.228	-0.423	10.591	0	2.41	0	0.198	0.875	-0.677
396.2	56.191	-0.42	11.371	0	3.05	0	0.198	0.875	-0.677
396.3	56.16	-0.425	10.948	0	3.33	0	0.198	0.875	-0.677
396.4	56.122	-0.425	11.135	0	3.32	0	0.198	0.875	-0.677
396.5	56.085	-0.47	11.516	0	3.33	0	0.198	0.875	-0.677
396.6	56.054	-0.475	11.05	0	3.42	0	0.198	0.875	-0.677
396.7	56.035	-0.475	9.62	0	3.46	0	0.198	0.875	-0.677
396.8	56.023	-0.342	8.373	0	3.47	0	0.199	0.875	-0.677
396.9	56.017	-0.342	7.953	0	3.46	0	0.199	0.875	-0.677
397	56.01	-0.25	12.198	0	3.47	0	0.199	0.875	-0.677
397.1	56.01	-0.252	19.158	0	3.49	0	0.199	0.876	-0.677
397.2	56.01	-0.212	21.206	0	3.46	0	0.199	0.876	-0.677
397.3	56.017	-0.212	20.92	0	3.48	0	0.199	0.876	-0.677
397.4	56.017	-0.172	22.16	0	3.51	0	0.199	0.876	-0.677
397.5	56.029	-0.16	24.632	0	3.47	0	0.199	0.876	-0.677
397.6	56.035	-0.16	24.763	0	3.5	0	0.199	0.876	-0.677
397.7	56.041	-0.142	25.48	0	3.52	0	0.199	0.876	-0.677
397.8	56.054	-0.132	26.2	0	3.49	0	0.2	0.876	-0.677
397.9	56.073	-0.132	27.097	0	3.52	0	0.2	0.876	-0.677
398	56.091	-0.135	27.553	0	3.53	0	0.2	0.876	-0.677
398.1	56.11	-0.115	27.743	0	3.5	0	0.2	0.877	-0.677
398.2	56.135	-0.115	28.548	0	3.54	0	0.2	0.877	-0.677
398.3	56.16	-0.052	27.824	0	3.53	0	0.2	0.877	-0.677
398.4	56.191	-0.06	29.318	0	3.52	0	0.2	0.877	-0.677
398.5	56.222	-0.06	31.783	0	3.55	0	0.2	0.877	-0.677
398.6	56.247	-0.017	32.133	0	3.53	0	0.2	0.877	-0.677
398.7	56.278	-0.017	32.61	0	3.55	0	0.2	0.877	-0.677
398.8	56.309	-0.017	33.778	0	3.57	0	0.2	0.877	-0.677

398.9	56.346	-0.032	34.548	0	3.55	0	0.201	0.877	-0.677
399	56.377	0.015	34.234	0	3.59	0	0.201	0.877	-0.677
399.1	56.414	0.015	34.524	0	3.56	0	0.201	0.878	-0.677
399.2	56.445	0.01	35.209	0	3.39	0	0.201	0.878	-0.677
399.3	56.483	0	35.346	0	3.43	0	0.201	0.878	-0.677
399.4	56.52	0	35.788	0	2.92	0	0.201	0.878	-0.677
399.5	56.563	-0.06	35.594	0	3.31	0	0.201	0.878	-0.677
399.6	56.601	-0.045	36.032	0	3.4	0	0.201	0.878	-0.677
399.7	56.638	-0.045	36.413	0	3.41	0	0.201	0.878	-0.677
399.8	56.681	0.07	36.572	0	3.43	0	0.201	0.878	-0.677
399.9	56.725	0.07	37.063	0	3.4	0	0.202	0.878	-0.677
400	56.775	0.078	38.783	0	3.45	0	0.202	0.878	-0.677
400.1	56.831	0.103	39.362	0	3.4	0	0.202	0.878	-0.677
400.2	56.874	0.118	38.758	0	3.42	0	0.202	0.879	-0.677
400.3	56.924	0.118	39.439	0	3.41	0	0.202	0.879	-0.677
400.4	56.974	0.095	41.138	0	3.41	0	0.202	0.879	-0.677
400.5	57.023	0.065	42.625	0	3.41	0	0.202	0.879	-0.677
400.6	57.061	0.065	42.484	0	3.39	0	0.202	0.879	-0.677
400.7	57.123	0.118	40.52	0	3.42	0	0.202	0.879	-0.677
400.8	57.166	0.103	39.362	0	3.39	0	0.202	0.879	-0.677
400.9	57.216	0.103	40.873	0	3.43	0	0.202	0.879	-0.677
401	57.266	0.09	41.696	0	3.37	0	0.203	0.879	-0.677
401.1	57.309	0.103	41.495	0	2.11	0	0.203	0.879	-0.677
401.2	57.359	0.103	40.901	0	1.21	0	0.203	0.879	-0.677
401.3	57.408	0.115	40.82	0	2.73	0	0.203	0.879	-0.677
401.4	57.452	0.113	41.198	0	3.16	0	0.203	0.88	-0.677
401.5	57.495	0.113	41.318	0	3.36	0	0.203	0.88	-0.677
401.6	57.539	0.083	41.318	0	1.71	0	0.203	0.88	-0.677
401.7	57.582	0.09	41.117	0	-3.81	0	0.203	0.88	-0.677
401.8	57.614	0.09	40.135	0	-5.88	0	0.203	0.88	-0.677
401.9	57.638	0.085	39.715	0	-4.82	0	0.203	0.88	-0.677
402	57.663	0.053	39.807	0	-3.08	0	0.202	0.88	-0.677
402.1	57.676	0.053	38.889	0	-1.97	0	0.202	0.88	-0.677
402.2	57.707	-0.02	38.32	0	-2.15	0	0.202	0.88	-0.677
402.3	57.719	-0.027	36.756	0	-1.76	0	0.202	0.88	-0.677
402.4	57.732	-0.027	34.312	0	0	0	0.202	0.88	-0.677
402.5	57.756	-0.07	33.397	0	0.97	0	0.202	0.88	-0.677
402.6	57.769	-0.065	32.73	0	0.92	0	0.202	0.88	-0.677
402.7	57.781	-0.065	31.239	0	-0.9	0	0.202	0.88	-0.677
402.8	57.794	-0.095	30.222	0	-1.45	0	0.202	0.88	-0.677
402.9	57.8	-0.095	29.664	0	0	0	0.202	0.88	-0.677
403	57.806	-0.117	29.678	0	0	0	0.202	0.88	-0.677
403.1	57.812	-0.15	28.552	0	0	0	0.202	0.88	-0.677
403.2	57.819	-0.172	27.658	0	-0.95	0	0.202	0.88	-0.678
403.3	57.825	-0.172	26.97	0	-5.83	0	0.202	0.88	-0.678
403.4	57.825	-0.135	26.052	0	-9.12	0	0.202	0.88	-0.678
403.5	57.819	-0.127	25.285	0	-8.08	0	0.202	0.88	-0.678

403.6	57.819	-0.127	26.412	0	-9.09	0	0.201	0.88	-0.678
403.7	57.819	-0.087	27.263	0	-10.09	0	0.201	0.88	-0.679
403.8	57.812	-0.072	27.906	0	-11.41	0	0.201	0.88	-0.679
403.9	57.812	-0.072	28.683	0	-13.03	0	0.2	0.88	-0.679
404	57.806	-0.032	29.534	0	-13.5	0	0.2	0.88	-0.68
404.1	57.8	-0.035	30.586	0	-12.92	0	0.2	0.88	-0.68
404.2	57.8	-0.035	32.034	0	-12.53	0	0.199	0.88	-0.68
404.3	57.8	-0.022	33.005	0	-11.15	0	0.199	0.88	-0.681
404.4	57.806	-0.022	33.136	0	-10.58	0	0.199	0.88	-0.681
404.5	57.806	-0.022	32.896	0	-10.59	0	0.198	0.88	-0.681
404.6	57.806	-0.012	33.521	0	-10.57	0	0.198	0.88	-0.682
404.7	57.812	-0.022	33.436	0	-10.6	0	0.198	0.88	-0.682
404.8	57.812	-0.022	34.259	0	-10.01	0	0.198	0.88	-0.682
404.9	57.819	-0.027	33.983	0	-9.89	0	0.197	0.88	-0.682
405	57.825	-0.042	33.641	0	-9.87	0	0.197	0.88	-0.683
405.1	57.825	-0.042	33.277	0	-9.88	0	0.197	0.88	-0.683
405.2	57.831	-0.012	33.104	0	-9.88	0	0.196	0.88	-0.683
405.3	57.837	-0.015	32.542	0	-9.89	0	0.196	0.88	-0.684
405.4	57.843	-0.015	32.67	0	-9.98	0	0.196	0.88	-0.684
405.5	57.843	-0.027	33.277	0	-10.51	0	0.196	0.88	-0.684
405.6	57.85	-0.03	33.362	0	-10.47	0	0.195	0.88	-0.684
405.7	57.85	-0.03	32.804	0	-10.45	0	0.195	0.88	-0.685
405.8	57.85	-0.017	33.005	0	-10.44	0	0.195	0.88	-0.685
405.9	57.856	-0.017	32.896	0	-10.44	0	0.194	0.88	-0.685
406	57.856	-0.022	33.185	0	-10.44	0	0.194	0.88	-0.686
406.1	57.856	-0.03	33.266	0	-10.43	0	0.194	0.88	-0.686
406.2	57.856	-0.032	32.528	0	-10.46	0	0.194	0.88	-0.686
406.3	57.856	-0.032	32.8	0	-10.44	0	0.193	0.88	-0.686
406.4	57.862	-0.035	33.062	0	-10.44	0	0.193	0.88	-0.687
406.5	57.862	-0.025	33.083	0	-10.45	0	0.193	0.88	-0.687
406.6	57.862	-0.025	33.118	0	-10.44	0	0.192	0.88	-0.687
406.7	57.862	-0.022	33.238	0	-10.44	0	0.192	0.88	-0.688
406.8	57.868	-0.027	32.977	0	-10.43	0	0.192	0.88	-0.688
406.9	57.868	-0.027	32.86	0	-10.84	0	0.192	0.88	-0.688
407	57.875	-0.025	33.037	0	-11.07	0	0.191	0.88	-0.689
407.1	57.875	-0.027	32.716	0	-11.25	0	0.191	0.88	-0.689
407.2	57.875	-0.027	33.309	0	-11.79	0	0.191	0.88	-0.689
407.3	57.881	-0.025	33.108	0	-11.81	0	0.19	0.88	-0.689
407.4	57.875	-0.027	32.917	0	-11.78	0	0.19	0.88	-0.69
407.5	57.875	-0.027	32.641	0	-11.81	0	0.19	0.88	-0.69
407.6	57.881	-0.037	33.252	0	-11.8	0	0.189	0.88	-0.69
407.7	57.881	-0.022	33.369	0	-11.8	0	0.189	0.88	-0.691
407.8	57.881	-0.022	32.917	0	-11.8	0	0.189	0.88	-0.691
407.9	57.881	-0.017	32.818	0	-11.78	0	0.188	0.88	-0.691
408	57.881	-0.012	33.238	0	-11.84	0	0.188	0.88	-0.692
408.1	57.887	-0.012	32.871	0	-12.23	0	0.188	0.88	-0.692
408.2	57.887	-0.037	32.663	0	-13.35	0	0.187	0.88	-0.693

408.3	57.881	-0.027	33.468	0	-15.46	0	0.187	0.88	-0.693
408.4	57.875	-0.027	33.055	0	-17.03	0	0.186	0.88	-0.693
408.5	57.868	-0.017	33.083	0	-17.03	0	0.186	0.88	-0.694
408.6	57.856	-0.022	32.917	0	-17.05	0	0.185	0.88	-0.694
408.7	57.85	-0.022	33.065	0	-17.04	0	0.185	0.88	-0.695
408.8	57.843	-0.035	33.256	0	-17.03	0	0.184	0.88	-0.695
408.9	57.831	-0.035	33.065	0	-17.02	0	0.184	0.88	-0.696
409	57.825	-0.025	32.874	0	-17.03	0	0.184	0.88	-0.696
409.1	57.812	-0.032	32.783	0	-17.03	0	0.183	0.88	-0.697
409.2	57.806	-0.03	33.065	0	-17.03	0	0.183	0.88	-0.697
409.3	57.8	-0.03	33.175	0	-17.03	0	0.182	0.88	-0.698
409.4	57.788	-0.022	32.673	0	-17.01	0	0.182	0.88	-0.698
409.5	57.775	-0.025	32.85	0	-17.02	0	0.181	0.88	-0.699
409.6	57.769	-0.025	33.454	0	-17	0	0.181	0.88	-0.699
409.7	57.763	-0.027	32.864	0	-17.01	0	0.18	0.88	-0.7
409.8	57.75	-0.027	33.03	0	-16.99	0	0.18	0.88	-0.7
409.9	57.75	-0.027	33.231	0	-16.99	0	0.179	0.88	-0.7
410	57.738	-0.02	32.818	0	-16.99	0	0.179	0.88	-0.701
410.1	57.725	-0.015	33.125	0	-17.01	0	0.178	0.88	-0.701
410.2	57.719	-0.015	33.245	0	-16.68	0	0.178	0.88	-0.702
410.3	57.713	-0.047	32.864	0	-16.26	0	0.177	0.88	-0.702
410.4	57.707	-0.052	33.33	0	-16.27	0	0.177	0.88	-0.703
410.5	57.701	-0.052	33.496	0	-16.24	0	0.177	0.88	-0.703
410.6	57.694	-0.03	32.673	0	-16.26	0	0.176	0.88	-0.704
410.7	57.688	-0.032	32.779	0	-16.24	0	0.176	0.88	-0.704
410.8	57.682	-0.032	32.818	0	-15.63	0	0.175	0.88	-0.705
410.9	57.676	-0.03	33.185	0	-15.42	0	0.175	0.88	-0.705
411	57.669	-0.032	32.737	0	-14.9	0	0.174	0.88	-0.705
411.1	57.669	-0.032	32.645	0	-14.86	0	0.174	0.88	-0.706
411.2	57.663	-0.032	32.821	0	-14.9	0	0.173	0.88	-0.706
411.3	57.657	-0.03	32.578	0	-14.89	0	0.173	0.88	-0.707
411.4	57.657	-0.03	33.012	0	-14.89	0	0.173	0.88	-0.707
411.5	57.651	-0.03	32.62	0	-14.87	0	0.172	0.88	-0.708
411.6	57.645	-0.037	32.754	0	-14.88	0	0.172	0.88	-0.708
411.7	57.638	-0.037	32.74	0	-14.59	0	0.171	0.88	-0.708
411.8	57.632	-0.035	32.779	0	-13.98	0	0.171	0.88	-0.709
411.9	57.632	-0.035	33.16	0	-13.97	0	0.171	0.88	-0.709
412	57.626	-0.022	32.56	0	-13.98	0	0.17	0.88	-0.709
412.1	57.62	-0.042	32.987	0	-13.96	0	0.17	0.88	-0.71
412.2	57.62	-0.022	33.203	0	-13.63	0	0.17	0.88	-0.71
412.3	57.62	-0.022	32.429	0	-13.31	0	0.169	0.88	-0.711
412.4	57.614	-0.042	32.398	0	-13.31	0	0.169	0.88	-0.711
412.5	57.614	-0.037	33.376	0	-13.31	0	0.168	0.88	-0.711
412.6	57.614	-0.037	32.797	0	-13.29	0	0.168	0.88	-0.712
412.7	57.607	-0.04	32.253	0	-13.31	0	0.168	0.88	-0.712
412.8	57.607	-0.017	32.811	0	-13.31	0	0.167	0.88	-0.712
412.9	57.607	-0.017	32.634	0	-12.49	0	0.167	0.88	-0.713

413	57.607	-0.03	32.073	0	-11.91	0	0.167	0.88	-0.713
413.1	57.607	-0.032	33.277	0	-11.4	0	0.166	0.88	-0.713
413.2	57.607	-0.032	33.178	0	-11.17	0	0.166	0.88	-0.714
413.3	57.607	-0.027	32.168	0	-10.67	0	0.166	0.88	-0.714
413.4	57.614	-0.027	32.765	0	-10.31	0	0.165	0.88	-0.714
413.5	57.614	-0.04	32.987	0	-10.33	0	0.165	0.88	-0.715
413.6	57.62	-0.015	32.846	0	-10.28	0	0.165	0.88	-0.715
413.7	57.626	-0.02	32.186	0	-10.32	0	0.165	0.88	-0.715
413.8	57.626	-0.02	32.927	0	-10.14	0	0.164	0.88	-0.716
413.9	57.632	-0.025	32.68	0	-9.39	0	0.164	0.88	-0.716
414	57.632	-0.037	32.511	0	-8.14	0	0.164	0.88	-0.716
414.1	57.645	-0.037	33.192	0	-7.27	0	0.164	0.88	-0.716
414.2	57.657	-0.035	33.069	0	-6.62	0	0.163	0.88	-0.716
414.3	57.669	-0.025	32.79	0	-5.95	0	0.163	0.88	-0.717
414.4	57.676	-0.025	32.959	0	-4.83	0	0.163	0.88	-0.717
414.5	57.694	-0.02	33.044	0	-4.12	0	0.163	0.88	-0.717
414.6	57.707	-0.01	32.415	0	-3.89	0	0.163	0.88	-0.717
414.7	57.707	-0.01	32.772	0	-3.2	0	0.163	0.88	-0.717
414.8	57.744	-0.022	32.867	0	-2.7	0	0.163	0.88	-0.717
414.9	57.756	-0.022	33.206	0	-1.76	0	0.163	0.88	-0.717
415	57.775	-0.027	32.924	0	-1.36	0	0.163	0.88	-0.717
415.1	57.794	-0.007	32.783	0	-1.34	0	0.163	0.88	-0.717
415.2	57.806	-0.025	33.023	0	-1.37	0	0.163	0.88	-0.717
415.3	57.825	-0.025	33.704	0	-1.43	0	0.163	0.88	-0.717
415.4	57.825	-0.025	33.478	0	-1.58	0	0.162	0.88	-0.717
415.5	57.862	-0.042	32.927	0	-1.57	0	0.162	0.88	-0.717
415.6	57.881	-0.042	33.337	0	-1.15	0	0.162	0.88	-0.717
415.7	57.899	-0.032	33.432	0	0	0	0.162	0.88	-0.717
415.8	57.918	-0.02	33.252	0	1.46	0	0.162	0.88	-0.717
415.9	57.937	-0.02	32.959	0	3.19	0	0.162	0.88	-0.717
416	57.937	-0.03	32.952	0	4.3	0	0.163	0.88	-0.717
416.1	57.993	-0.045	32.963	0	4.55	0	0.163	0.88	-0.717
416.2	58.024	-0.045	33.524	0	4.57	0	0.163	0.88	-0.717
416.3	58.048	-0.042	33.531	0	4.56	0	0.163	0.88	-0.717
416.4	58.073	-0.042	33.079	0	4.88	0	0.163	0.881	-0.717
416.5	58.111	-0.04	32.712	0	5.6	0	0.163	0.881	-0.717
416.6	58.111	-0.032	32.829	0	6.46	0	0.163	0.881	-0.717
416.7	58.167	-0.027	32.758	0	7.41	0	0.164	0.881	-0.717
416.8	58.198	-0.027	33.111	0	7.41	0	0.164	0.881	-0.717
416.9	58.229	-0.025	33.309	0	7.29	0	0.164	0.881	-0.717
417	58.229	-0.035	33.309	0	6.48	0	0.164	0.882	-0.717
417.1	58.285	-0.035	33.263	0	3.83	0	0.164	0.882	-0.717
417.2	58.316	-0.02	33.344	0	3.42	0	0.164	0.882	-0.717
417.3	58.347	-0.002	33.079	0	3.38	0	0.165	0.882	-0.717
417.4	58.372	-0.002	32.934	0	3.42	0	0.165	0.882	-0.717
417.5	58.403	-0.002	33.761	0	3.4	0	0.165	0.882	-0.717
417.6	58.434	0.005	34.061	0	3.4	0	0.165	0.882	-0.717

417.7	58.465	0.005	34.531	0	3.43	0	0.165	0.882	-0.717
417.8	58.496	0.013	34.386	0	3.39	0	0.165	0.882	-0.717
417.9	58.496	0.013	35.131	0	3.41	0	0.165	0.883	-0.717
418	58.533	0.015	35.498	0	3.41	0	0.165	0.883	-0.717
418.1	58.583	0.015	35.272	0	3.39	0	0.165	0.883	-0.717
418.2	58.62	0.015	35.248	0	3.42	0	0.165	0.883	-0.717
418.3	58.651	0.015	34.944	0	3.41	0	0.166	0.883	-0.717
418.4	58.689	0.03	35.159	0	3.4	0	0.166	0.883	-0.717
418.5	58.72	0.053	35.392	0	3.37	0	0.166	0.883	-0.717
418.6	58.763	0.053	35.322	0	1.95	0	0.166	0.883	-0.717
418.7	58.8	0.073	36.657	0	1.13	0	0.166	0.883	-0.717
418.8	58.838	0.138	37.592	0	1.27	0	0.166	0.883	-0.717
418.9	58.881	0.138	37.592	0	1.76	0	0.166	0.883	-0.717
419	58.925	0.138	40.495	0	1.99	0	0.166	0.883	-0.717
419.1	58.962	0.115	42.868	0	1.65	0	0.166	0.883	-0.717
419.2	58.999	0.115	42.642	0	0.83	0	0.166	0.883	-0.717
419.3	59.036	0.095	41.435	0	1.78	0	0.166	0.883	-0.717
419.4	59.074	0.1	40.965	0	1.68	0	0.166	0.883	-0.717
419.5	59.111	0.1	40.951	0	1.94	0	0.166	0.884	-0.717
419.6	59.142	0.048	40.506	0	2.45	0	0.166	0.884	-0.717
419.7	59.173	0.048	40.764	0	2.84	0	0.166	0.884	-0.717
419.8	59.173	0.048	39.408	0	2.68	0	0.166	0.884	-0.717
419.9	59.242	0.065	37.377	0	1.32	0	0.166	0.884	-0.717
420	59.242	0.048	37.833	0	1	0	0.166	0.884	-0.717
420.1	59.304	0.048	38.182	0	0.61	0	0.166	0.884	-0.717
420.2	59.335	0.06	37.458	0	0.69	0	0.166	0.884	-0.717
420.3	59.366	0.053	37.056	0	0.96	0	0.166	0.884	-0.717
420.4	59.391	0.053	36.883	0	1.48	0	0.167	0.884	-0.717
420.5	59.416	0.033	37.592	0	1.63	0	0.167	0.884	-0.717
420.6	59.416	0.023	36.759	0	1.4	0	0.167	0.884	-0.717
420.7	59.471	0.023	36.01	0	-2.17	0	0.167	0.884	-0.717
420.8	59.49	0.018	35.866	0	-1.69	0	0.167	0.884	-0.718
420.9	59.509	0.018	35.442	0	-1.21	0	0.166	0.884	-0.718
421	59.509	0.003	36.07	0	0	0	0.166	0.884	-0.718
421.1	59.546	-0.01	35.562	0	0.8	0	0.166	0.884	-0.718
421.2	59.558	-0.02	34.577	0	1.59	0	0.167	0.884	-0.718
421.3	59.577	-0.02	33.436	0	2.51	0	0.167	0.884	-0.718
421.4	59.577	-0.05	32.67	0	2.69	0	0.167	0.884	-0.718
421.5	59.614	-0.062	32.384	0	2.9	0	0.167	0.884	-0.718
421.6	59.627	-0.062	31.564	0	3.2	0	0.167	0.884	-0.718
421.7	59.639	-0.08	31.578	0	3.42	0	0.167	0.884	-0.718
421.8	59.658	-0.06	30.992	0	3.41	0	0.167	0.885	-0.718
421.9	59.67	-0.06	30.484	0	3.1	0	0.167	0.885	-0.718
422	59.67	-0.075	30.837	0	0.91	0	0.167	0.885	-0.718
422.1	59.701	-0.062	30.932	0	-0.58	0	0.167	0.885	-0.718
422.2	59.708	-0.062	29.915	0	-1.32	0	0.167	0.885	-0.718
422.3	59.708	-0.07	29.657	0	0	0	0.167	0.885	-0.718

422.4	59.714	-0.09	30.805	0	0	0	0.167	0.885	-0.718
422.5	59.714	-0.09	30.586	0	1.01	0	0.167	0.885	-0.718
422.6	59.72	-0.132	30.13	0	1.77	0	0.167	0.885	-0.718
422.7	59.726	-0.127	28.937	0	2.26	0	0.167	0.885	-0.718
422.8	59.726	-0.127	27.161	0	2.75	0	0.167	0.885	-0.718
422.9	59.732	-0.127	27.256	0	2.87	0	0.167	0.885	-0.718
423	59.732	-0.132	26.648	0	2.91	0	0.167	0.885	-0.718
423.1	59.745	-0.132	26.698	0	3.15	0	0.168	0.885	-0.718
423.2	59.745	-0.15	26.306	0	3.43	0	0.168	0.885	-0.718
423.3	59.751	-0.15	26.122	0	3.58	0	0.168	0.885	-0.718
423.4	59.757	-0.15	26.437	0	3.57	0	0.168	0.885	-0.718
423.5	59.757	-0.157	25.992	0	3.58	0	0.168	0.886	-0.718
423.6	59.763	-0.155	26.119	0	3.59	0	0.168	0.886	-0.718
423.7	59.763	-0.155	25.84	0	3.61	0	0.168	0.886	-0.718
423.8	59.763	-0.142	25.829	0	3.58	0	0.168	0.886	-0.718
423.9	59.77	-0.142	25.843	0	3.42	0	0.168	0.886	-0.718
424	59.77	-0.142	25.741	0	2.66	0	0.168	0.886	-0.718
424.1	59.776	-0.15	26.03	0	1.8	0	0.168	0.886	-0.718
424.2	59.776	-0.152	26.253	0	1.07	0	0.169	0.886	-0.718
424.3	59.776	-0.152	26.765	0	0	0	0.169	0.886	-0.718
424.4	59.77	-0.167	26.214	0	-1.29	0	0.168	0.886	-0.718
424.5	59.763	-0.177	26.765	0	-1.52	0	0.168	0.886	-0.718
424.6	59.763	-0.177	26.119	0	0	0	0.168	0.886	-0.718
424.7	59.745	-0.172	25.289	0	0.58	0	0.168	0.886	-0.718
424.8	59.732	-0.187	24.914	0	1.61	0	0.168	0.886	-0.718
424.9	59.72	-0.187	24.406	0	2.15	0	0.169	0.886	-0.718
425	59.72	-0.207	23.647	0	2.1	0	0.169	0.886	-0.718
425.1	59.695	-0.22	22.234	0	1.87	0	0.169	0.886	-0.718
425.2	59.695	-0.22	21.62	0	1.94	0	0.169	0.886	-0.718
425.3	59.664	-0.25	21.266	0	1.64	0	0.169	0.886	-0.718
425.4	59.664	-0.25	20.793	0	1.64	0	0.169	0.887	-0.718
425.5	59.633	-0.262	20.564	0	1.53	0	0.169	0.887	-0.718
425.6	59.614	-0.267	20.302	0	2.44	0	0.169	0.887	-0.718
425.7	59.602	-0.267	19.974	0	2.65	0	0.169	0.887	-0.718
425.8	59.583	-0.267	19.275	0	2.01	0	0.169	0.887	-0.718
425.9	59.565	-0.285	19.451	0	0.9	0	0.169	0.887	-0.718
426	59.565	-0.285	18.929	0	0.63	0	0.169	0.887	-0.718
426.1	59.521	-0.285	18.247	0	1.03	0	0.169	0.887	-0.718
426.2	59.521	-0.295	17.947	0	0.9	0	0.169	0.887	-0.718
426.3	59.471	-0.31	18.851	0	1.9	0	0.169	0.887	-0.718
426.4	59.447	-0.31	18.794	0	2.37	0	0.169	0.887	-0.718
426.5	59.422	-0.317	17.544	0	2.69	0	0.169	0.887	-0.718
426.6	59.391	-0.33	17.096	0	2.79	0	0.169	0.887	-0.718
426.7	59.366	-0.33	16.481	0	2.98	0	0.17	0.887	-0.718
426.8	59.341	-0.335	16.382	0	2.99	0	0.17	0.887	-0.718
426.9	59.31	-0.335	15.514	0	3.24	0	0.17	0.887	-0.718
427	59.31	-0.337	16.103	0	3.42	0	0.17	0.887	-0.718

427.1	59.266	-0.335	15.863	0	3.43	0	0.17	0.888	-0.718
427.2	59.242	-0.33	15.803	0	3.43	0	0.17	0.888	-0.718
427.3	59.217	-0.33	16.167	0	3.42	0	0.17	0.888	-0.718
427.4	59.198	-0.3	15.821	0	3.43	0	0.17	0.888	-0.718
427.5	59.173	-0.305	15.556	0	3.43	0	0.17	0.888	-0.718
427.6	59.155	-0.305	16.721	0	3.41	0	0.17	0.888	-0.718
427.7	59.13	-0.29	17.184	0	3.42	0	0.17	0.888	-0.718
427.8	59.13	-0.302	16.93	0	3.42	0	0.171	0.888	-0.718
427.9	59.086	-0.302	17.693	0	3.42	0	0.171	0.888	-0.718
428	59.074	-0.282	17.968	0	3.41	0	0.171	0.888	-0.718
428.1	59.049	-0.287	16.983	0	3.43	0	0.171	0.889	-0.718
428.2	59.03	-0.287	17.332	0	3.41	0	0.171	0.889	-0.718
428.3	59.018	-0.287	18.039	0	3.42	0	0.171	0.889	-0.718
428.4	58.993	-0.292	17.583	0	3.44	0	0.171	0.889	-0.718
428.5	58.981	-0.292	18.219	0	3.42	0	0.171	0.889	-0.718
428.6	58.981	-0.257	18.063	0	3.41	0	0.171	0.889	-0.718
428.7	58.949	-0.25	18.459	0	3.41	0	0.171	0.889	-0.718
428.8	58.937	-0.25	19.649	0	3.39	0	0.171	0.889	-0.718
428.9	58.918	-0.26	20.175	0	3.41	0	0.172	0.889	-0.718
429	58.906	-0.242	20.567	0	3.43	0	0.172	0.889	-0.718
429.1	58.894	-0.242	20.038	0	3.4	0	0.172	0.889	-0.718
429.2	58.887	-0.25	20.066	0	3.42	0	0.172	0.89	-0.718
429.3	58.881	-0.227	21.475	0	3.42	0	0.172	0.89	-0.718
429.4	58.881	-0.227	21.079	0	3.41	0	0.172	0.89	-0.718
429.5	58.862	-0.22	21.259	0	3.42	0	0.172	0.89	-0.718
429.6	58.862	-0.212	22.524	0	3.43	0	0.172	0.89	-0.718
429.7	58.856	-0.212	22.743	0	3.39	0	0.172	0.89	-0.718
429.8	58.85	-0.187	22.548	0	3.41	0	0.172	0.89	-0.718
429.9	58.85	-0.187	22.81	0	3.41	0	0.173	0.89	-0.718
430	58.844	-0.197	23.611	0	3.39	0	0.173	0.89	-0.718
430.1	58.838	-0.205	24.194	0	3.41	0	0.173	0.89	-0.718
430.2	58.838	-0.197	23.795	0	3.41	0	0.173	0.891	-0.718
430.3	58.831	-0.197	23.65	0	3.39	0	0.173	0.891	-0.718
430.4	58.831	-0.195	23.724	0	3.41	0	0.173	0.891	-0.718
430.5	58.825	-0.205	23.88	0	2.56	0	0.173	0.891	-0.718
430.6	58.819	-0.205	23.611	0	1.79	0	0.173	0.891	-0.718
430.7	58.819	-0.2	23.396	0	2.27	0	0.173	0.891	-0.718
430.8	58.807	-0.205	23.823	0	2.35	0	0.173	0.891	-0.718
430.9	58.8	-0.205	24.261	0	1.85	0	0.173	0.891	-0.718
431	58.8	-0.21	23.467	0	1.14	0	0.173	0.891	-0.718
431.1	58.782	-0.22	23.131	0	0.6	0	0.173	0.891	-0.718
431.2	58.776	-0.22	22.573	0	-0.63	0	0.173	0.891	-0.718
431.3	58.757	-0.23	22.616	0	-1.25	0	0.173	0.891	-0.718
431.4	58.744	-0.25	22.181	0	-1.04	0	0.173	0.891	-0.718
431.5	58.72	-0.25	21.998	0	-0.82	0	0.173	0.891	-0.718
431.6	58.695	-0.29	21.828	0	0	0	0.173	0.891	-0.718
431.7	58.67	-0.287	20.67	0	0.89	0	0.173	0.891	-0.718

431.8	58.67	-0.287	19.02	0	1.4	0	0.173	0.891	-0.718
431.9	58.62	-0.282	17.784	0	1.42	0	0.173	0.891	-0.718
432	58.595	-0.345	17.015	0	1.4	0	0.173	0.891	-0.718
432.1	58.57	-0.345	17.279	0	1.64	0	0.173	0.891	-0.718
432.2	58.546	-0.352	16.043	0	2.04	0	0.173	0.891	-0.718
432.3	58.515	-0.342	15.397	0	2.37	0	0.174	0.891	-0.718
432.4	58.49	-0.342	15.065	0	2.74	0	0.174	0.891	-0.718
432.5	58.49	-0.347	15.051	0	3.31	0	0.174	0.892	-0.718
432.6	58.465	-0.36	15.316	0	3.54	0	0.174	0.892	-0.718
432.7	58.409	-0.36	15.235	0	3.55	0	0.174	0.892	-0.718
432.8	58.39	-0.35	14.875	0	3.55	0	0.174	0.892	-0.718
432.9	58.365	-0.35	13.928	0	3.57	0	0.174	0.892	-0.718
433	58.365	-0.347	14.062	0	3.56	0	0.174	0.892	-0.718
433.1	58.322	-0.357	14.49	0	3.56	0	0.174	0.892	-0.718
433.2	58.297	-0.34	14.889	0	3.58	0	0.174	0.892	-0.718
433.3	58.285	-0.34	15.507	0	3.56	0	0.175	0.892	-0.718
433.4	58.278	-0.317	15.507	0	3.57	0	0.175	0.892	-0.718
433.5	58.278	-0.265	17.025	0	3.55	0	0.175	0.893	-0.718
433.6	58.247	-0.265	18.247	0	3.59	0	0.175	0.893	-0.718
433.7	58.247	-0.25	19.55	0	3.56	0	0.175	0.893	-0.718
433.8	58.229	-0.242	20.511	0	3.56	0	0.175	0.893	-0.718
433.9	58.229	-0.242	21.012	0	3.57	0	0.175	0.893	-0.718
434	58.222	-0.22	21.281	0	3.57	0	0.175	0.893	-0.718
434.1	58.222	-0.207	21.771	0	3.58	0	0.175	0.893	-0.718
434.2	58.216	-0.207	22.224	0	3.58	0	0.175	0.893	-0.718
434.3	58.21	-0.21	22.481	0	3.59	0	0.176	0.893	-0.718
434.4	58.21	-0.21	23.403	0	3.6	0	0.176	0.893	-0.718
434.5	58.216	-0.205	23.813	0	3.58	0	0.176	0.894	-0.718
434.6	58.216	-0.197	23.742	0	3.49	0	0.176	0.894	-0.718
434.7	58.216	-0.187	24.169	0	3.39	0	0.176	0.894	-0.718
434.8	58.222	-0.187	23.982	0	3.43	0	0.176	0.894	-0.718
434.9	58.222	-0.187	24.738	0	3.41	0	0.176	0.894	-0.718
435	58.222	-0.162	25.038	0	3.39	0	0.176	0.894	-0.718
435.1	58.229	-0.162	25.052	0	3.42	0	0.176	0.894	-0.718
435.2	58.229	-0.157	25.67	0	3.38	0	0.176	0.894	-0.718
435.3	58.235	-0.167	25.642	0	3.42	0	0.176	0.894	-0.718
435.4	58.235	-0.167	25.656	0	3.39	0	0.177	0.894	-0.718
435.5	58.241	-0.162	25.794	0	3.39	0	0.177	0.894	-0.718
435.6	58.247	-0.155	26.016	0	3.41	0	0.177	0.895	-0.718
435.7	58.254	-0.155	25.723	0	3.39	0	0.177	0.895	-0.718
435.8	58.254	-0.16	26.165	0	3.41	0	0.177	0.895	-0.718
435.9	58.266	-0.16	26.154	0	3.38	0	0.177	0.895	-0.718
436	58.266	-0.142	25.603	0	3.4	0	0.177	0.895	-0.718
436.1	58.278	-0.15	25.988	0	3.4	0	0.177	0.895	-0.718
436.2	58.278	-0.162	26.606	0	2.78	0	0.177	0.895	-0.718
436.3	58.285	-0.162	26.482	0	-0.63	0	0.177	0.895	-0.718
436.4	58.285	-0.167	26.341	0	-2.3	0	0.177	0.895	-0.718

436.5	58.278	-0.142	25.868	0	-1.88	0	0.177	0.895	-0.718
436.6	58.272	-0.142	25.879	0	0	0	0.177	0.895	-0.718
436.7	58.266	-0.185	26.232	0	0.53	0	0.177	0.895	-0.718
436.8	58.254	-0.212	25.893	0	1	0	0.177	0.895	-0.718
436.9	58.254	-0.212	24.89	0	1.67	0	0.177	0.895	-0.718
437	58.241	-0.232	23.707	0	2.18	0	0.177	0.895	-0.718
437.1	58.229	-0.242	22.111	0	2.61	0	0.177	0.895	-0.718
437.2	58.222	-0.242	21.577	0	2.81	0	0.177	0.895	-0.718
437.3	58.216	-0.252	21.185	0	2.93	0	0.178	0.896	-0.718
437.4	58.204	-0.25	20.952	0	2.91	0	0.178	0.896	-0.718
437.5	58.198	-0.25	20.359	0	2.93	0	0.178	0.896	-0.718
437.6	58.191	-0.26	20.822	0	2.92	0	0.178	0.896	-0.718
437.7	58.179	-0.245	20.726	0	1.43	0	0.178	0.896	-0.718
437.8	58.167	-0.245	20.401	0	1.68	0	0.178	0.896	-0.718
437.9	58.154	-0.23	20.186	0	2.36	0	0.178	0.896	-0.718
438	58.142	-0.247	20.232	0	2.47	0	0.178	0.896	-0.718
438.1	58.135	-0.247	20.249	0	2.44	0	0.178	0.896	-0.718
438.2	58.117	-0.277	20.779	0	2.52	0	0.178	0.896	-0.718
438.3	58.111	-0.27	20.2	0	2.55	0	0.178	0.896	-0.718
438.4	58.098	-0.27	19.059	0	2.77	0	0.178	0.896	-0.718
438.5	58.086	-0.275	18.943	0	2.89	0	0.178	0.896	-0.718
438.6	58.067	-0.272	19.303	0	3.09	0	0.178	0.896	-0.718
438.7	58.055	-0.272	19.54	0	3.17	0	0.179	0.897	-0.718
438.8	58.036	-0.267	19.218	0	3.11	0	0.179	0.897	-0.718
438.9	58.024	-0.267	18.883	0	3.34	0	0.179	0.897	-0.718
439	58.011	-0.29	19.317	0	3.3	0	0.179	0.897	-0.718
439.1	57.999	-0.27	19.088	0	3.34	0	0.179	0.897	-0.718
439.2	57.993	-0.265	18.36	0	3.33	0	0.179	0.897	-0.718
439.3	57.974	-0.265	18.604	0	3.3	0	0.179	0.897	-0.718
439.4	57.955	-0.277	19.303	0	3.2	0	0.179	0.897	-0.718
439.5	57.943	-0.272	19.172	0	3.2	0	0.179	0.897	-0.718
439.6	57.93	-0.272	19.144	0	3.18	0	0.179	0.897	-0.718
439.7	57.918	-0.29	18.953	0	3.16	0	0.179	0.897	-0.718
439.8	57.906	-0.287	20.02	0	3.16	0	0.18	0.897	-0.718
439.9	57.906	-0.287	19.427	0	3.17	0	0.18	0.898	-0.718
440	57.881	-0.3	19.045	0	3.21	0	0.18	0.898	-0.718
440.1	57.868	-0.29	19.427	0	3.17	0	0.18	0.898	-0.718
440.2	57.85	-0.29	19.261	0	3.18	0	0.18	0.898	-0.718
440.3	57.837	-0.257	19.088	0	3.23	0	0.18	0.898	-0.718
440.4	57.825	-0.272	18.982	0	3.23	0	0.18	0.898	-0.718
440.5	57.812	-0.272	19.37	0	3.4	0	0.18	0.898	-0.718
440.6	57.806	-0.27	19.37	0	3.37	0	0.18	0.898	-0.718
440.7	57.794	-0.26	19.215	0	3.4	0	0.18	0.898	-0.718
440.8	57.781	-0.26	19.006	0	3.37	0	0.18	0.898	-0.718
440.9	57.775	-0.272	19.578	0	3.53	0	0.181	0.899	-0.718
441	57.763	-0.25	19.48	0	3.53	0	0.181	0.899	-0.718
441.1	57.756	-0.25	19.356	0	3.55	0	0.181	0.899	-0.718

441.2	57.756	-0.237	19.9	0	3.54	0	0.181	0.899	-0.718
441.3	57.75	-0.22	20.927	0	3.56	0	0.181	0.899	-0.718
441.4	57.744	-0.22	20.899	0	3.55	0	0.181	0.899	-0.718
441.5	57.738	-0.225	21.757	0	3.56	0	0.181	0.899	-0.718
441.6	57.732	-0.22	22.029	0	3.56	0	0.181	0.899	-0.718
441.7	57.725	-0.22	21.263	0	3.55	0	0.181	0.899	-0.718
441.8	57.725	-0.23	21.835	0	3.57	0	0.181	0.899	-0.718
441.9	57.719	-0.23	21.8	0	3.55	0	0.182	0.899	-0.718
442	57.719	-0.23	21.658	0	3.57	0	0.182	0.9	-0.718
442.1	57.719	-0.205	21.973	0	3.56	0	0.182	0.9	-0.718
442.2	57.713	-0.21	21.687	0	3.58	0	0.182	0.9	-0.718
442.3	57.713	-0.21	22.884	0	3.55	0	0.182	0.9	-0.718
442.4	57.713	-0.197	23.212	0	3.59	0	0.182	0.9	-0.718
442.5	57.707	-0.202	22.965	0	3.55	0	0.182	0.9	-0.718
442.6	57.707	-0.202	23.523	0	3.6	0	0.182	0.9	-0.718
442.7	57.713	-0.192	23.403	0	3.57	0	0.182	0.9	-0.718
442.8	57.707	-0.202	23.403	0	3.61	0	0.182	0.9	-0.718
442.9	57.701	-0.202	23.915	0	3.57	0	0.183	0.9	-0.718
443	57.707	-0.207	24.265	0	3.6	0	0.183	0.901	-0.718
443.1	57.707	-0.197	23.633	0	3.59	0	0.183	0.901	-0.718
443.2	57.707	-0.197	22.799	0	3.6	0	0.183	0.901	-0.718
443.3	57.707	-0.197	24.311	0	3.59	0	0.183	0.901	-0.718
443.4	57.707	-0.21	24.01	0	3.57	0	0.183	0.901	-0.718
443.5	57.713	-0.21	24.244	0	3.43	0	0.183	0.901	-0.718
443.6	57.719	-0.192	24.417	0	3.41	0	0.183	0.901	-0.718
443.7	57.725	-0.172	24.459	0	3.44	0	0.183	0.901	-0.718
443.8	57.738	-0.172	24.459	0	3.39	0	0.183	0.901	-0.718
443.9	57.744	-0.145	25.261	0	3.43	0	0.183	0.901	-0.718
444	57.75	-0.15	25.85	0	3.37	0	0.184	0.902	-0.718
444.1	57.763	-0.15	27.341	0	3.43	0	0.184	0.902	-0.718
444.2	57.775	-0.132	27.221	0	3.39	0	0.184	0.902	-0.718
444.3	57.788	-0.127	27.065	0	3.42	0	0.184	0.902	-0.718
444.4	57.8	-0.127	27.567	0	3.39	0	0.184	0.902	-0.718
444.5	57.812	-0.115	27.708	0	3.41	0	0.184	0.902	-0.718
444.6	57.831	-0.095	27.895	0	3.4	0	0.184	0.902	-0.718
444.7	57.843	-0.095	27.803	0	3.41	0	0.184	0.902	-0.718
444.8	57.85	-0.102	28.068	0	3.37	0	0.184	0.902	-0.718
444.9	57.862	-0.102	28.647	0	2.68	0	0.184	0.902	-0.718
445	57.875	-0.117	28.789	0	2.26	0	0.184	0.902	-0.718
445.1	57.887	-0.11	28.471	0	1.82	0	0.185	0.902	-0.718
445.2	57.893	-0.102	28.421	0	1.99	0	0.185	0.903	-0.718
445.3	57.906	-0.102	28.598	0	2.41	0	0.185	0.903	-0.718
445.4	57.912	-0.102	28.34	0	2.74	0	0.185	0.903	-0.718
445.5	57.924	-0.125	28.181	0	3.15	0	0.185	0.903	-0.718
445.6	57.93	-0.125	28.135	0	3.3	0	0.185	0.903	-0.718
445.7	57.943	-0.127	27.694	0	3.34	0	0.185	0.903	-0.718
445.8	57.955	-0.125	27.079	0	3.33	0	0.185	0.903	-0.718

445.9	57.962	-0.125	27.432	0	3.41	0	0.185	0.903	-0.718
446	57.974	-0.155	27.023	0	3.09	0	0.185	0.903	-0.718
446.1	57.98	-0.16	27.33	0	1.87	0	0.185	0.903	-0.718
446.2	57.986	-0.16	26.86	0	1.08	0	0.185	0.903	-0.718
446.3	57.993	-0.132	25.963	0	1.69	0	0.185	0.903	-0.718
446.4	57.999	-0.132	26.14	0	2.26	0	0.185	0.903	-0.718
446.5	57.999	-0.145	26.874	0	2.77	0	0.186	0.904	-0.718
446.6	58.005	-0.155	27.115	0	3.11	0	0.186	0.904	-0.718
446.7	58.005	-0.162	25.857	0	3.22	0	0.186	0.904	-0.718
446.8	58.011	-0.162	25.398	0	3.26	0	0.186	0.904	-0.718
446.9	58.011	-0.18	25.388	0	3.3	0	0.186	0.904	-0.718
447	58.024	-0.167	25.292	0	3.4	0	0.186	0.904	-0.718
447.1	58.017	-0.167	24.484	0	3.06	0	0.186	0.904	-0.718
447.2	58.024	-0.185	24.671	0	2.87	0	0.186	0.904	-0.718
447.3	58.03	-0.2	25.472	0	3.06	0	0.186	0.904	-0.718
447.4	58.03	-0.2	25.073	0	3.37	0	0.186	0.904	-0.718
447.5	58.036	-0.197	24.568	0	3.42	0	0.186	0.904	-0.718
447.6	58.036	-0.205	24.77	0	3.38	0	0.187	0.904	-0.718
447.7	58.042	-0.205	24.826	0	3.42	0	0.187	0.905	-0.718
447.8	58.048	-0.19	24.727	0	3.4	0	0.187	0.905	-0.718
447.9	58.048	-0.19	24.194	0	3.21	0	0.187	0.905	-0.718
448	58.048	-0.2	24.296	0	2.95	0	0.187	0.905	-0.718
448.1	58.055	-0.18	24.357	0	1.88	0	0.187	0.905	-0.718
448.2	58.055	-0.172	24.183	0	1.39	0	0.187	0.905	-0.718
448.3	58.055	-0.172	24.282	0	1.02	0	0.187	0.905	-0.718
448.4	58.048	-0.185	24.367	0	0.85	0	0.187	0.905	-0.718
448.5	58.042	-0.192	24.311	0	1.55	0	0.187	0.905	-0.718
448.6	58.042	-0.192	24.138	0	1.03	0	0.187	0.905	-0.718
448.7	58.036	-0.23	23.728	0	1.64	0	0.187	0.905	-0.718
448.8	58.024	-0.24	23.191	0	2.25	0	0.187	0.905	-0.718
448.9	58.024	-0.24	23.226	0	2.43	0	0.187	0.905	-0.718
449	58.017	-0.23	21.976	0	2.79	0	0.187	0.905	-0.718
449.1	58.011	-0.237	21.602	0	3.06	0	0.187	0.905	-0.718
449.2	58.005	-0.237	21.803	0	3.07	0	0.188	0.905	-0.718
449.3	57.999	-0.235	21.461	0	3.16	0	0.188	0.906	-0.718
449.4	57.993	-0.235	21.634	0	3.25	0	0.188	0.906	-0.718
449.5	57.993	-0.225	20.567	0	3.28	0	0.188	0.906	-0.718
449.6	57.98	-0.232	21.108	0	3.36	0	0.188	0.906	-0.718
449.7	57.974	-0.252	21.337	0	3.41	0	0.188	0.906	-0.718
449.8	57.974	-0.252	21.037	0	3.47	0	0.188	0.906	-0.718
449.9	57.968	-0.265	21.803	0	3.47	0	0.188	0.906	-0.718
450	57.955	-0.242	21.27	0	3.53	0	0.188	0.906	-0.718
450.1	57.949	-0.242	20.889	0	3.5	0	0.188	0.906	-0.718
450.2	57.943	-0.235	20.698	0	3.54	0	0.188	0.906	-0.718
450.3	57.937	-0.25	21.164	0	3.49	0	0.189	0.907	-0.718
450.4	57.93	-0.25	21.365	0	3.5	0	0.189	0.907	-0.718
450.5	57.918	-0.232	21.15	0	3.52	0	0.189	0.907	-0.718

450.6	57.912	-0.225	20.913	0	3.56	0	0.189	0.907	-0.718
450.7	57.906	-0.225	21.295	0	3.58	0	0.189	0.907	-0.718
450.8	57.893	-0.23	21.5	0	3.55	0	0.189	0.907	-0.718
450.9	57.887	-0.23	21.485	0	3.59	0	0.189	0.907	-0.718
451	57.881	-0.245	21.224	0	3.55	0	0.189	0.907	-0.718
451.1	57.875	-0.25	21.489	0	3.58	0	0.189	0.907	-0.718
451.2	57.868	-0.237	21.093	0	3.56	0	0.189	0.907	-0.718
451.3	57.862	-0.237	20.415	0	3.57	0	0.19	0.908	-0.718
451.4	57.856	-0.25	20.917	0	3.57	0	0.19	0.908	-0.718
451.5	57.85	-0.252	21.302	0	3.57	0	0.19	0.908	-0.718
451.6	57.843	-0.252	21.263	0	3.59	0	0.19	0.908	-0.718
451.7	57.831	-0.247	21.429	0	3.57	0	0.19	0.908	-0.718
451.8	57.831	-0.24	20.807	0	3.6	0	0.19	0.908	-0.718
451.9	57.825	-0.24	20.592	0	3.57	0	0.19	0.908	-0.718
452	57.812	-0.252	21.556	0	3.61	0	0.19	0.908	-0.718
452.1	57.806	-0.227	21.334	0	3.58	0	0.19	0.908	-0.718
452.2	57.8	-0.227	20.458	0	3.47	0	0.19	0.908	-0.718
452.3	57.794	-0.247	20.765	0	3.4	0	0.191	0.909	-0.718
452.4	57.788	-0.247	21.538	0	3.42	0	0.191	0.909	-0.718
452.5	57.781	-0.247	21.327	0	3.4	0	0.191	0.909	-0.718
452.6	57.775	-0.227	20.793	0	3.41	0	0.191	0.909	-0.718
452.7	57.769	-0.232	20.807	0	3.39	0	0.191	0.909	-0.718
452.8	57.763	-0.232	20.956	0	3.4	0	0.191	0.909	-0.718
452.9	57.756	-0.247	21.443	0	3.4	0	0.191	0.909	-0.718
453	57.75	-0.232	21.358	0	3.39	0	0.191	0.909	-0.718
453.1	57.738	-0.232	20.966	0	3.41	0	0.191	0.909	-0.718
453.2	57.732	-0.255	21.277	0	3.39	0	0.191	0.909	-0.718
453.3	57.725	-0.25	21.362	0	3.4	0	0.191	0.909	-0.718
453.4	57.719	-0.25	21.203	0	3.38	0	0.192	0.91	-0.718
453.5	57.713	-0.237	20.444	0	3.41	0	0.192	0.91	-0.718
453.6	57.707	-0.25	20.846	0	3.37	0	0.192	0.91	-0.718
453.7	57.701	-0.25	21.514	0	3.41	0	0.192	0.91	-0.718
453.8	57.694	-0.252	21.037	0	3.39	0	0.192	0.91	-0.718
453.9	57.682	-0.252	20.952	0	3.41	0	0.192	0.91	-0.718
454	57.682	-0.245	20.684	0	3.38	0	0.192	0.91	-0.718
454.1	57.676	-0.235	21.037	0	3.39	0	0.192	0.91	-0.718
454.2	57.669	-0.24	21.026	0	3.39	0	0.192	0.91	-0.718
454.3	57.669	-0.24	21.387	0	3.4	0	0.192	0.91	-0.718
454.4	57.669	-0.23	21.923	0	3.4	0	0.193	0.91	-0.718
454.5	57.669	-0.22	21.74	0	3.41	0	0.193	0.911	-0.718
454.6	57.669	-0.22	22.45	0	3.39	0	0.193	0.911	-0.718
454.7	57.663	-0.2	22.806	0	3.41	0	0.193	0.911	-0.718
454.8	57.663	-0.2	22.22	0	3.4	0	0.193	0.911	-0.718
454.9	57.663	-0.2	23.283	0	3.4	0	0.193	0.911	-0.718
455	57.657	-0.187	22.944	0	3.41	0	0.193	0.911	-0.718
455.1	57.657	-0.2	23.205	0	3.38	0	0.193	0.911	-0.718
455.2	57.657	-0.2	23.848	0	3.41	0	0.193	0.911	-0.718

455.3	57.663	-0.19	23.297	0	3.4	0	0.193	0.911	-0.718
455.4	57.663	-0.19	22.591	0	3.41	0	0.193	0.911	-0.718
455.5	57.663	-0.185	23.82	0	3.38	0	0.194	0.912	-0.718
455.6	57.663	-0.165	24.275	0	3.42	0	0.194	0.912	-0.718
455.7	57.669	-0.155	24.491	0	3.39	0	0.194	0.912	-0.718
455.8	57.676	-0.155	24.275	0	3.42	0	0.194	0.912	-0.718
455.9	57.676	-0.167	25.109	0	3.39	0	0.194	0.912	-0.718
456	57.688	-0.155	24.508	0	3.41	0	0.194	0.912	-0.718
456.1	57.694	-0.155	25.003	0	3.39	0	0.194	0.912	-0.718
456.2	57.701	-0.157	25.441	0	3.4	0	0.194	0.912	-0.718
456.3	57.707	-0.167	25.359	0	3.4	0	0.194	0.912	-0.718
456.4	57.719	-0.167	25.857	0	3.39	0	0.194	0.912	-0.718
456.5	57.725	-0.132	25.91	0	3.4	0	0.195	0.912	-0.718
456.6	57.732	-0.13	25.525	0	3.39	0	0.195	0.913	-0.718
456.7	57.744	-0.13	26.422	0	3.41	0	0.195	0.913	-0.718
456.8	57.75	-0.155	26.97	0	3.39	0	0.195	0.913	-0.718
456.9	57.763	-0.155	27.143	0	3.41	0	0.195	0.913	-0.718
457	57.769	-0.135	26.32	0	3.39	0	0.195	0.913	-0.718
457.1	57.775	-0.14	26.405	0	3.42	0	0.195	0.913	-0.718
457.2	57.794	-0.137	27.157	0	3.23	0	0.195	0.913	-0.718
457.3	57.8	-0.137	26.931	0	2.31	0	0.195	0.913	-0.718
457.4	57.806	-0.13	26.557	0	0.89	0	0.195	0.913	-0.718
457.5	57.812	-0.14	26.451	0	1.72	0	0.195	0.913	-0.718
457.6	57.819	-0.14	27.528	0	2.38	0	0.195	0.913	-0.718
457.7	57.825	-0.152	27.044	0	2.98	0	0.195	0.913	-0.718
457.8	57.831	-0.147	26.486	0	3.09	0	0.196	0.914	-0.718
457.9	57.837	-0.147	25.924	0	3.36	0	0.196	0.914	-0.718
458	57.837	-0.175	25.388	0	3.38	0	0.196	0.914	-0.718
458.1	57.843	-0.17	25.564	0	3.38	0	0.196	0.914	-0.718
458.2	57.85	-0.17	25.193	0	3.41	0	0.196	0.914	-0.718
458.3	57.85	-0.17	24.798	0	3.41	0	0.196	0.914	-0.718
458.4	57.856	-0.17	24.939	0	3.55	0	0.196	0.914	-0.718
458.5	57.856	-0.165	24.311	0	3.52	0	0.196	0.914	-0.718
458.6	57.862	-0.192	24.939	0	3.57	0	0.196	0.914	-0.718
458.7	57.868	-0.187	25.363	0	3.56	0	0.196	0.914	-0.718
458.8	57.868	-0.187	24.551	0	3.56	0	0.197	0.914	-0.718
458.9	57.868	-0.172	24.371	0	3.56	0	0.197	0.915	-0.718
459	57.875	-0.165	24.551	0	3.56	0	0.197	0.915	-0.718
459.1	57.881	-0.165	24.911	0	3.58	0	0.197	0.915	-0.718
459.2	57.887	-0.17	24.604	0	3.56	0	0.197	0.915	-0.718
459.3	57.887	-0.17	24.699	0	3.59	0	0.197	0.915	-0.718
459.4	57.893	-0.17	24.455	0	3.56	0	0.197	0.915	-0.718
459.5	57.899	-0.172	24.918	0	3.6	0	0.197	0.915	-0.718
459.6	57.906	-0.16	24.801	0	3.55	0	0.197	0.915	-0.718
459.7	57.906	-0.16	24.618	0	3.59	0	0.197	0.915	-0.718
459.8	57.912	-0.185	25.155	0	3.57	0	0.197	0.915	-0.718
459.9	57.912	-0.185	25.748	0	3.58	0	0.198	0.916	-0.718

460	57.918	-0.19	24.812	0	3.59	0	0.198	0.916	-0.718
460.1	57.924	-0.187	24.3	0	3.57	0	0.198	0.916	-0.718
460.2	57.924	-0.19	24.385	0	3.61	0	0.198	0.916	-0.718
460.3	57.93	-0.19	24.664	0	3.56	0	0.198	0.916	-0.718
460.4	57.937	-0.17	24.085	0	3.61	0	0.198	0.916	-0.718
460.5	57.937	-0.17	23.986	0	3.59	0	0.198	0.916	-0.718
460.6	57.943	-0.17	24.886	0	3.61	0	0.198	0.916	-0.718
460.7	57.943	-0.167	24.886	0	3.6	0	0.198	0.916	-0.718
460.8	57.949	-0.167	24.66	0	3.6	0	0.198	0.916	-0.718
460.9	57.949	-0.167	24.473	0	3.62	0	0.199	0.917	-0.718
461	57.955	-0.18	24.717	0	3.43	0	0.199	0.917	-0.718
461.1	57.955	-0.182	24.833	0	3.43	0	0.199	0.917	-0.718
461.2	57.962	-0.182	24.801	0	3.4	0	0.199	0.917	-0.718
461.3	57.962	-0.17	24.554	0	3.43	0	0.199	0.917	-0.718
461.4	57.968	-0.17	24.717	0	3.4	0	0.199	0.917	-0.718
461.5	57.974	-0.175	24.95	0	3.41	0	0.199	0.917	-0.718
461.6	57.974	-0.172	24.812	0	3.41	0	0.199	0.917	-0.718
461.7	57.974	-0.175	24.417	0	3.41	0	0.199	0.917	-0.718
461.8	57.98	-0.175	24.318	0	3.42	0	0.199	0.917	-0.718
461.9	57.98	-0.177	24.512	0	3.39	0	0.2	0.918	-0.718
462	57.98	-0.16	24.515	0	3.43	0	0.2	0.918	-0.718
462.1	57.986	-0.16	24.593	0	3.39	0	0.2	0.918	-0.718
462.2	57.986	-0.16	24.498	0	3.43	0	0.2	0.918	-0.718
462.3	57.993	-0.167	24.498	0	3.4	0	0.2	0.918	-0.718
462.4	57.999	-0.167	25.215	0	3.41	0	0.2	0.918	-0.718
462.5	57.999	-0.145	25.077	0	3.41	0	0.2	0.918	-0.718
462.6	58.005	-0.152	24.862	0	3.38	0	0.2	0.918	-0.718
462.7	58.011	-0.152	25.133	0	3.42	0	0.2	0.918	-0.718
462.8	58.011	-0.152	25.487	0	3.39	0	0.2	0.918	-0.718
462.9	58.017	-0.152	25.568	0	3.43	0	0.2	0.918	-0.718
463	58.024	-0.162	25.271	0	3.39	0	0.201	0.919	-0.718
463.1	58.036	-0.175	25.568	0	3.42	0	0.201	0.919	-0.718
463.2	58.036	-0.16	25.582	0	3.4	0	0.201	0.919	-0.718
463.3	58.042	-0.16	24.784	0	3.41	0	0.201	0.919	-0.718
463.4	58.048	-0.157	25.225	0	3.42	0	0.201	0.919	-0.718
463.5	58.061	-0.152	25.571	0	3.38	0	0.201	0.919	-0.718
463.6	58.061	-0.152	25.928	0	3.43	0	0.201	0.919	-0.718
463.7	58.067	-0.142	25.847	0	3.4	0	0.201	0.919	-0.718
463.8	58.073	-0.142	26.023	0	3.41	0	0.201	0.919	-0.718
463.9	58.08	-0.142	26.105	0	3.41	0	0.201	0.919	-0.718
464	58.086	-0.162	26.302	0	3.41	0	0.202	0.919	-0.718
464.1	58.098	-0.15	26.122	0	3.42	0	0.202	0.92	-0.718
464.2	58.098	-0.15	25.822	0	3.36	0	0.202	0.92	-0.718
464.3	58.111	-0.14	25.741	0	3.42	0	0.202	0.92	-0.718
464.4	58.111	-0.14	26.105	0	3.38	0	0.202	0.92	-0.718
464.5	58.117	-0.14	25.684	0	3.41	0	0.202	0.92	-0.718
464.6	58.129	-0.157	25.698	0	3.41	0	0.202	0.92	-0.718

464.7	58.129	-0.145	26.475	0	3.4	0	0.202	0.92	-0.718
464.8	58.135	-0.145	26.108	0	3.41	0	0.202	0.92	-0.718
464.9	58.148	-0.132	25.684	0	3.4	0	0.202	0.92	-0.718
465	58.154	-0.127	26.44	0	3.42	0	0.202	0.92	-0.718
465.1	58.16	-0.127	26.465	0	3.4	0	0.203	0.921	-0.718
465.2	58.167	-0.142	26.44	0	3.4	0	0.203	0.921	-0.718
465.3	58.173	-0.137	26.684	0	3.41	0	0.203	0.921	-0.718
465.4	58.185	-0.137	27.161	0	3.39	0	0.203	0.921	-0.718
465.5	58.191	-0.122	26.708	0	3.32	0	0.203	0.921	-0.718
465.6	58.198	-0.122	26.984	0	3.18	0	0.203	0.921	-0.718
465.7	58.21	-0.122	26.945	0	2.57	0	0.203	0.921	-0.718
465.8	58.216	-0.132	26.758	0	2.92	0	0.203	0.921	-0.718
465.9	58.222	-0.132	26.984	0	3.14	0	0.203	0.921	-0.718
466	58.229	-0.127	26.758	0	2.54	0	0.203	0.921	-0.718
466.1	58.235	-0.145	26.624	0	2.77	0	0.203	0.921	-0.718
466.2	58.241	-0.155	26.984	0	3.19	0	0.204	0.921	-0.718
466.3	58.247	-0.155	26.239	0	3.17	0	0.204	0.922	-0.718
466.4	58.247	-0.147	25.819	0	2.64	0	0.204	0.922	-0.718
466.5	58.254	-0.177	25.879	0	2.21	0	0.204	0.922	-0.718
466.6	58.26	-0.177	26.306	0	1.59	0	0.204	0.922	-0.718
466.7	58.26	-0.155	25.97	0	2.26	0	0.204	0.922	-0.718
466.8	58.26	-0.152	25.158	0	2.03	0	0.204	0.922	-0.718
466.9	58.266	-0.152	24.897	0	2.16	0	0.204	0.922	-0.718
467	58.26	-0.197	25.617	0	1.11	0	0.204	0.922	-0.718
467.1	58.26	-0.185	24.982	0	1.14	0	0.204	0.922	-0.718
467.2	58.26	-0.185	24.265	0	1.2	0	0.204	0.922	-0.718
467.3	58.254	-0.202	23.304	0	1.49	0	0.204	0.922	-0.718
467.4	58.254	-0.202	23.795	0	2.06	0	0.204	0.922	-0.718
467.5	58.247	-0.205	23.481	0	2.45	0	0.204	0.922	-0.718
467.6	58.241	-0.222	22.947	0	1.8	0	0.204	0.922	-0.718
467.7	58.235	-0.227	22.894	0	0.65	0	0.204	0.922	-0.718
467.8	58.222	-0.227	22.594	0	0	0	0.204	0.922	-0.718
467.9	58.21	-0.222	21.98	0	0	0	0.204	0.922	-0.718
468	58.21	-0.23	21.884	0	1	0	0.204	0.922	-0.718
468.1	58.185	-0.23	21.669	0	0.96	0	0.204	0.922	-0.718
468.2	58.185	-0.25	21.711	0	0.78	0	0.204	0.922	-0.718
468.3	58.16	-0.26	20.874	0	0.96	0	0.204	0.922	-0.718
468.4	58.142	-0.26	19.854	0	1.76	0	0.204	0.922	-0.718
468.5	58.117	-0.272	19.642	0	1.9	0	0.205	0.922	-0.718
468.6	58.104	-0.287	18.971	0	2.02	0	0.205	0.923	-0.718
468.7	58.086	-0.287	18.703	0	2.46	0	0.205	0.923	-0.718
468.8	58.067	-0.282	18.109	0	3.24	0	0.205	0.923	-0.718
468.9	58.048	-0.282	17.534	0	3.41	0	0.205	0.923	-0.718
469	58.03	-0.282	17.068	0	3.4	0	0.205	0.923	-0.718
469.1	58.017	-0.3	17.414	0	3.45	0	0.205	0.923	-0.718
469.2	57.999	-0.297	17.417	0	3.33	0	0.205	0.923	-0.718
469.3	57.98	-0.297	17.202	0	3.27	0	0.205	0.923	-0.718

469.4	57.968	-0.28	17.322	0	3.26	0	0.205	0.923	-0.718
469.5	57.949	-0.3	17.442	0	2.75	0	0.205	0.923	-0.718
469.6	57.93	-0.3	17.873	0	2.94	0	0.205	0.923	-0.718
469.7	57.912	-0.295	18.138	0	3.37	0	0.206	0.924	-0.718
469.8	57.893	-0.297	17.336	0	2.41	0	0.206	0.924	-0.718
469.9	57.875	-0.297	17.467	0	0.67	0	0.206	0.924	-0.718
470	57.856	-0.335	17.845	0	1.56	0	0.206	0.924	-0.718
470.1	57.831	-0.34	17.64	0	2.5	0	0.206	0.924	-0.718
470.2	57.812	-0.34	16.774	0	2.9	0	0.206	0.924	-0.718
470.3	57.788	-0.317	17.375	0	2.98	0	0.206	0.924	-0.718
470.4	57.763	-0.317	16.273	0	3.09	0	0.206	0.924	-0.718
470.5	57.744	-0.327	16.259	0	3.08	0	0.206	0.924	-0.718
470.6	57.744	-0.342	15.641	0	3.23	0	0.206	0.924	-0.718
470.7	57.694	-0.345	15.461	0	3.29	0	0.206	0.924	-0.718
470.8	57.676	-0.345	15.655	0	3.28	0	0.206	0.924	-0.718
470.9	57.651	-0.33	14.949	0	3.33	0	0.206	0.924	-0.718
471	57.626	-0.325	14.92	0	3.33	0	0.207	0.925	-0.718
471.1	57.607	-0.325	15.436	0	3.36	0	0.207	0.925	-0.718
471.2	57.576	-0.322	15.238	0	2.69	0	0.207	0.925	-0.718
471.3	57.558	-0.32	15.129	0	1.73	0	0.207	0.925	-0.718
471.4	57.533	-0.32	14.973	0	1.39	0	0.207	0.925	-0.718
471.5	57.533	-0.327	15.249	0	2.02	0	0.207	0.925	-0.718
471.6	57.477	-0.33	15.358	0	2.57	0	0.207	0.925	-0.718
471.7	57.452	-0.33	15.139	0	2.83	0	0.207	0.925	-0.718
471.8	57.427	-0.337	15.471	0	3.04	0	0.207	0.925	-0.718
471.9	57.402	-0.337	15.302	0	3.21	0	0.207	0.925	-0.718
472	57.377	-0.33	14.578	0	3.24	0	0.207	0.925	-0.718
472.1	57.346	-0.34	14.553	0	3.06	0	0.207	0.925	-0.718
472.2	57.321	-0.357	14.479	0	1.95	0	0.207	0.925	-0.718
472.3	57.29	-0.357	14.585	0	1.26	0	0.207	0.925	-0.718
472.4	57.259	-0.375	14.292	0	0.78	0	0.207	0.925	-0.718
472.5	57.228	-0.37	14.362	0	0	0	0.207	0.925	-0.718
472.6	57.197	-0.37	14.528	0	0	0	0.207	0.925	-0.718
472.7	57.16	-0.362	14.278	0	1.14	0	0.208	0.925	-0.718
472.8	57.123	-0.365	14.528	0	1.97	0	0.208	0.926	-0.718
472.9	57.098	-0.365	14.444	0	2.7	0	0.208	0.926	-0.718
473	57.098	-0.383	13.886	0	3.02	0	0.208	0.926	-0.718
473.1	57.061	-0.398	12.886	0	3.12	0	0.208	0.926	-0.718
473.2	56.992	-0.398	12.067	0	3.28	0	0.208	0.926	-0.718
473.3	56.961	-0.428	11.767	0	3.35	0	0.208	0.926	-0.718
473.4	56.93	-0.428	11.244	0	3.35	0	0.208	0.926	-0.718
473.5	56.899	-0.413	10.75	0	3.37	0	0.208	0.926	-0.718
473.6	56.899	-0.413	10.82	0	3.37	0	0.208	0.926	-0.718
473.7	56.831	-0.415	11.064	0	3.34	0	0.208	0.926	-0.718
473.8	56.793	-0.415	11.191	0	3.37	0	0.208	0.926	-0.718
473.9	56.762	-0.43	11.322	0	3.37	0	0.209	0.927	-0.718
474	56.725	-0.41	11.608	0	3.37	0	0.209	0.927	-0.718

474.1	56.694	-0.41	10.764	0	3.36	0	0.209	0.927	-0.718
474.2	56.657	-0.403	11.202	0	3.37	0	0.209	0.927	-0.718
474.3	56.619	-0.41	11.304	0	3.34	0	0.209	0.927	-0.718
474.4	56.619	-0.41	11.149	0	3.36	0	0.209	0.927	-0.718
474.5	56.557	-0.418	11.463	0	3.37	0	0.209	0.927	-0.718
474.6	56.52	-0.41	11.661	0	2.39	0	0.209	0.927	-0.718
474.7	56.495	-0.41	11.661	0	1.7	0	0.209	0.927	-0.718
474.8	56.452	-0.42	11.661	0	1.65	0	0.209	0.927	-0.718
474.9	56.414	-0.42	12.032	0	1.54	0	0.209	0.927	-0.718
475	56.383	-0.423	12.215	0	2.56	0	0.209	0.927	-0.718
475.1	56.346	-0.395	11.703	0	3.34	0	0.209	0.927	-0.718
475.2	56.309	-0.425	11.431	0	3.34	0	0.21	0.928	-0.718
475.3	56.271	-0.425	12.395	0	3.33	0	0.21	0.928	-0.718
475.4	56.24	-0.458	11.717	0	3.33	0	0.21	0.928	-0.718
475.5	56.209	-0.443	10.775	0	3.33	0	0.21	0.928	-0.718
475.6	56.172	-0.443	9.588	0	3.33	0	0.21	0.928	-0.718
475.7	56.141	-0.42	10.118	0	3.33	0	0.21	0.928	-0.718
475.8	56.11	-0.405	10.88	0	3.35	0	0.21	0.928	-0.718
475.9	56.085	-0.405	10.799	0	3.45	0	0.21	0.928	-0.718
476	56.06	-0.367	10.859	0	3.48	0	0.21	0.928	-0.718
476.1	56.041	-0.357	11.403	0	3.48	0	0.21	0.928	-0.718
476.2	56.017	-0.357	13.232	0	3.48	0	0.211	0.928	-0.718
476.3	55.998	-0.327	15.03	0	3.48	0	0.211	0.929	-0.718
476.4	55.979	-0.327	15.68	0	3.49	0	0.211	0.929	-0.718
476.5	55.954	-0.33	16.111	0	3.49	0	0.211	0.929	-0.718
476.6	55.93	-0.317	16.22	0	3.49	0	0.211	0.929	-0.718
476.7	55.917	-0.307	16.149	0	3.52	0	0.211	0.929	-0.718
476.8	55.892	-0.307	15.606	0	3.49	0	0.211	0.929	-0.718
476.9	55.874	-0.312	16.669	0	2.99	0	0.211	0.929	-0.718
477	55.855	-0.33	16.608	0	2.5	0	0.211	0.929	-0.718
477.1	55.836	-0.33	16.697	0	2.05	0	0.211	0.929	-0.718
477.2	55.812	-0.34	16.39	0	0	0	0.211	0.929	-0.718
477.3	55.787	-0.347	16.079	0	-1.27	0	0.211	0.929	-0.718
477.4	55.756	-0.347	16.036	0	-1.45	0	0.211	0.929	-0.718
477.5	55.725	-0.35	16.64	0	-1.19	0	0.211	0.929	-0.718
477.6	55.694	-0.327	15.885	0	0	0	0.211	0.929	-0.718
477.7	55.656	-0.327	15.485	0	0.81	0	0.211	0.929	-0.718
477.8	55.625	-0.395	15.934	0	1.7	0	0.211	0.929	-0.718
477.9	55.594	-0.395	16.121	0	2.82	0	0.211	0.929	-0.718
478	55.563	-0.405	14.249	0	3.51	0	0.211	0.93	-0.718
478.1	55.526	-0.443	11.76	0	3.52	0	0.212	0.93	-0.718
478.2	55.501	-0.455	11.65	0	3.51	0	0.212	0.93	-0.718
478.3	55.47	-0.455	10.877	0	3.52	0	0.212	0.93	-0.718
478.4	55.439	-0.453	10.33	0	3.52	0	0.212	0.93	-0.718
478.5	55.439	-0.403	9.648	0	3.44	0	0.212	0.93	-0.718
478.6	55.383	-0.403	9.761	0	3.35	0	0.212	0.93	-0.718
478.7	55.352	-0.405	10.895	0	3.33	0	0.212	0.93	-0.718

478.8	55.333	-0.385	11.961	0	3.35	0	0.212	0.93	-0.718
478.9	55.314	-0.385	11.375	0	3.32	0	0.212	0.93	-0.718
479	55.296	-0.35	12.078	0	3.32	0	0.212	0.93	-0.718
479.1	55.283	-0.332	13.963	0	3.33	0	0.212	0.931	-0.718
479.2	55.265	-0.332	15.083	0	3.33	0	0.213	0.931	-0.718
479.3	55.252	-0.295	16.079	0	3.32	0	0.213	0.931	-0.718
479.4	55.24	-0.295	16.322	0	4.22	0	0.213	0.931	-0.718
479.5	55.227	-0.307	17.039	0	3.99	0	0.213	0.931	-0.718
479.6	55.215	-0.312	17.618	0	3.34	0	0.213	0.931	-0.718
479.7	55.209	-0.287	17.746	0	3.32	0	0.213	0.931	-0.718
479.8	55.196	-0.287	17.099	0	3.31	0	0.213	0.931	-0.718
479.9	55.184	-0.292	17.753	0	3.3	0	0.213	0.931	-0.718
480	55.172	-0.287	18.579	0	2.79	0	0.213	0.931	-0.718
480.1	55.165	-0.287	18.989	0	2.48	0	0.213	0.931	-0.718
480.2	55.153	-0.27	19.059	0	2.36	0	0.213	0.932	-0.718
480.3	55.14	-0.287	18.798	0	2.98	0	0.214	0.932	-0.718
480.4	55.128	-0.287	19.79	0	3.18	0	0.214	0.932	-0.718
480.5	55.116	-0.287	19.773	0	3.28	0	0.214	0.932	-0.718
480.6	55.103	-0.29	18.826	0	3.27	0	0.214	0.932	-0.718
480.7	55.097	-0.29	17.915	0	2.43	0	0.214	0.932	-0.718
480.8	55.078	-0.305	18.551	0	1.35	0	0.214	0.932	-0.718
480.9	55.066	-0.305	17.883	0	2.12	0	0.214	0.932	-0.718
481	55.053	-0.312	17.753	0	2.39	0	0.214	0.932	-0.718
481.1	55.041	-0.305	17.943	0	2.68	0	0.214	0.932	-0.718
481.2	55.029	-0.317	17.58	0	3.13	0	0.214	0.932	-0.718
481.3	55.01	-0.317	17.58	0	3.28	0	0.214	0.932	-0.718
481.4	55.004	-0.322	17.488	0	3.31	0	0.214	0.932	-0.718
481.5	54.991	-0.33	16.174	0	3.29	0	0.214	0.933	-0.718
481.6	54.973	-0.33	16.39	0	3.31	0	0.215	0.933	-0.718
481.7	54.96	-0.33	16.651	0	3.32	0	0.215	0.933	-0.718
481.8	54.948	-0.317	16.351	0	3.32	0	0.215	0.933	-0.718
481.9	54.935	-0.317	16.245	0	3.3	0	0.215	0.933	-0.718
482	54.923	-0.307	16.273	0	3.3	0	0.215	0.933	-0.718
482.1	54.923	-0.322	15.817	0	3.32	0	0.215	0.933	-0.718
482.2	54.898	-0.322	16.683	0	3.32	0	0.215	0.933	-0.718
482.3	54.886	-0.312	17.113	0	3.32	0	0.215	0.933	-0.718
482.4	54.88	-0.312	16.725	0	3.31	0	0.215	0.933	-0.718
482.5	54.873	-0.292	16.753	0	3.31	0	0.215	0.933	-0.718
482.6	54.861	-0.292	17.209	0	3.32	0	0.216	0.934	-0.718
482.7	54.848	-0.305	17.516	0	3.33	0	0.216	0.934	-0.718
482.8	54.842	-0.305	18.318	0	3.31	0	0.216	0.934	-0.718
482.9	54.836	-0.297	17.89	0	3.3	0	0.216	0.934	-0.718
483	54.824	-0.3	17.435	0	3.3	0	0.216	0.934	-0.718
483.1	54.817	-0.3	18.371	0	3.32	0	0.216	0.934	-0.718
483.2	54.811	-0.27	18.236	0	3.33	0	0.216	0.934	-0.718
483.3	54.799	-0.28	17.876	0	3.31	0	0.216	0.934	-0.718
483.4	54.786	-0.28	18.84	0	3.31	0	0.216	0.934	-0.718

483.5	54.786	-0.292	18.498	0	4.89	0	0.216	0.934	-0.718
483.6	54.78	-0.305	18.293	0	3.41	0	0.216	0.935	-0.718
483.7	54.774	-0.305	18.71	0	3.32	0	0.217	0.935	-0.718
483.8	54.768	-0.295	18.374	0	4.34	0	0.217	0.935	-0.718
483.9	54.768	-0.295	17.728	0	5.34	0	0.217	0.935	-0.718
484	54.761	-0.282	18.512	0	3.3	0	0.217	0.935	-0.718
484.1	54.761	-0.265	18.47	0	3.31	0	0.217	0.935	-0.718
484.2	54.755	-0.27	19.045	0	3.33	0	0.217	0.935	-0.718
484.3	54.749	-0.27	19.568	0	3.32	0	0.217	0.935	-0.718
484.4	54.743	-0.257	19.808	0	3.29	0	0.217	0.935	-0.718
484.5	54.73	-0.27	19.43	0	3.35	0	0.217	0.935	-0.718
484.6	54.73	-0.27	20.221	0	3.46	0	0.217	0.936	-0.718
484.7	54.73	-0.24	20.207	0	3.48	0	0.218	0.936	-0.718
484.8	54.73	-0.26	19.879	0	5.05	0	0.218	0.936	-0.718
484.9	54.724	-0.26	20.37	0	4.87	0	0.218	0.936	-0.718
485	54.73	-0.25	20.924	0	3.47	0	0.218	0.936	-0.718
485.1	54.73	-0.235	20.122	0	3.47	0	0.218	0.936	-0.718
485.2	54.73	-0.235	20.461	0	3.49	0	0.218	0.936	-0.718
485.3	54.73	-0.212	20.761	0	3.49	0	0.218	0.936	-0.718
485.4	54.737	-0.212	21.411	0	3.49	0	0.218	0.936	-0.718
485.5	54.737	-0.21	21.655	0	3.48	0	0.218	0.937	-0.718
485.6	54.743	-0.21	22.322	0	3.49	0	0.219	0.937	-0.718
485.7	54.749	-0.225	22.132	0	3.49	0	0.219	0.937	-0.718
485.8	54.755	-0.225	22.591	0	3.5	0	0.219	0.937	-0.718
485.9	54.761	-0.22	22.269	0	3.5	0	0.219	0.937	-0.718
486	54.761	-0.22	21.874	0	3.5	0	0.219	0.937	-0.718
486.1	54.761	-0.22	22.626	0	3.51	0	0.219	0.937	-0.718
486.2	54.768	-0.207	22.545	0	3.52	0	0.219	0.937	-0.718
486.3	54.774	-0.222	22.633	0	3.52	0	0.219	0.937	-0.718
486.4	54.78	-0.222	22.718	0	3.51	0	0.219	0.937	-0.718
486.5	54.786	-0.202	22.902	0	3.5	0	0.219	0.937	-0.718
486.6	54.786	-0.21	22.163	0	3.52	0	0.22	0.938	-0.718
486.7	54.786	-0.21	22.421	0	3.54	0	0.22	0.938	-0.718
486.8	54.793	-0.215	22.99	0	3.54	0	0.22	0.938	-0.718
486.9	54.799	-0.215	22.559	0	3.52	0	0.22	0.938	-0.718
487	54.805	-0.21	22.04	0	3.52	0	0.22	0.938	-0.718
487.1	54.805	-0.227	22.993	0	3.52	0	0.22	0.938	-0.718
487.2	54.811	-0.205	23.262	0	3.38	0	0.22	0.938	-0.718
487.3	54.817	-0.205	22.926	0	3.36	0	0.22	0.938	-0.718
487.4	54.817	-0.192	22.45	0	3.35	0	0.22	0.938	-0.718
487.5	54.83	-0.21	22.721	0	3.29	0	0.22	0.938	-0.718
487.6	54.83	-0.21	22.721	0	3.15	0	0.22	0.939	-0.718
487.7	54.836	-0.205	22.506	0	2.66	0	0.221	0.939	-0.718
487.8	54.842	-0.21	21.945	0	2.17	0	0.221	0.939	-0.718
487.9	54.842	-0.21	23.396	0	1.93	0	0.221	0.939	-0.718
488	54.842	-0.217	22.764	0	2.35	0	0.221	0.939	-0.718
488.1	54.842	-0.23	22.778	0	2.64	0	0.221	0.939	-0.718

488.2	54.848	-0.23	23.375	0	3	0	0.221	0.939	-0.718
488.3	54.848	-0.232	21.934	0	2.84	0	0.221	0.939	-0.718
488.4	54.848	-0.232	22.188	0	2.62	0	0.221	0.939	-0.718
488.5	54.848	-0.252	22.623	0	2.96	0	0.221	0.939	-0.718
488.6	54.848	-0.215	21.168	0	3.23	0	0.221	0.939	-0.718
488.7	54.848	-0.22	20.899	0	3.3	0	0.221	0.939	-0.718
488.8	54.855	-0.22	21.263	0	3.31	0	0.221	0.939	-0.718
488.9	54.855	-0.24	21.786	0	3.24	0	0.221	0.94	-0.718
489	54.855	-0.242	21.503	0	3.26	0	0.222	0.94	-0.718
489.1	54.855	-0.242	21.468	0	3.31	0	0.222	0.94	-0.718
489.2	54.855	-0.235	21.153	0	3.34	0	0.222	0.94	-0.718
489.3	54.861	-0.242	20.874	0	3.32	0	0.222	0.94	-0.718
489.4	54.861	-0.242	20.903	0	3.31	0	0.222	0.94	-0.718
489.5	54.861	-0.237	21.214	0	3.32	0	0.222	0.94	-0.718
489.6	54.861	-0.237	20.426	0	3.33	0	0.222	0.94	-0.718
489.7	54.861	-0.237	20.546	0	3.32	0	0.222	0.94	-0.718
489.8	54.867	-0.232	21.21	0	3.31	0	0.222	0.94	-0.718
489.9	54.867	-0.232	21.39	0	3.3	0	0.222	0.94	-0.718
490	54.873	-0.217	21.309	0	3.32	0	0.222	0.941	-0.718
490.1	54.873	-0.245	21.754	0	3.32	0	0.223	0.941	-0.718
490.2	54.873	-0.237	22.149	0	2.53	0	0.223	0.941	-0.718
490.3	54.873	-0.237	21.312	0	2.22	0	0.223	0.941	-0.718
490.4	54.873	-0.222	20.656	0	2.66	0	0.223	0.941	-0.718
490.5	54.873	-0.24	21.065	0	3.03	0	0.223	0.941	-0.718
490.6	54.867	-0.24	21.454	0	3.19	0	0.223	0.941	-0.718
490.7	54.873	-0.242	21.733	0	3.22	0	0.223	0.941	-0.718
490.8	54.867	-0.237	21.228	0	3.21	0	0.223	0.941	-0.718
490.9	54.861	-0.237	20.129	0	3.28	0	0.223	0.941	-0.718
491	54.861	-0.245	20.302	0	3.32	0	0.223	0.941	-0.718
491.1	54.861	-0.26	20.37	0	3.39	0	0.223	0.941	-0.718
491.2	54.861	-0.26	20.571	0	3.45	0	0.223	0.942	-0.718
491.3	54.855	-0.247	20.846	0	3.4	0	0.224	0.942	-0.718
491.4	54.855	-0.247	20.172	0	3.42	0	0.224	0.942	-0.718
491.5	54.855	-0.232	20.038	0	3.46	0	0.224	0.942	-0.718
491.6	54.855	-0.242	20.832	0	3.47	0	0.224	0.942	-0.718
491.7	54.855	-0.245	20.698	0	3.46	0	0.224	0.942	-0.718
491.8	54.855	-0.245	20.656	0	3.47	0	0.224	0.942	-0.718
491.9	54.848	-0.25	20.444	0	3.45	0	0.224	0.942	-0.718
492	54.848	-0.232	20.497	0	3.43	0	0.224	0.942	-0.718
492.1	54.848	-0.232	20.129	0	3.49	0	0.224	0.942	-0.718
492.2	54.848	-0.26	20.521	0	3.49	0	0.224	0.943	-0.718
492.3	54.848	-0.242	21.185	0	3.48	0	0.225	0.943	-0.718
492.4	54.842	-0.242	20.521	0	3.5	0	0.225	0.943	-0.718
492.5	54.842	-0.247	20.119	0	3.51	0	0.225	0.943	-0.718
492.6	54.842	-0.255	20.656	0	3.51	0	0.225	0.943	-0.718
492.7	54.842	-0.255	20.613	0	3.5	0	0.225	0.943	-0.718
492.8	54.842	-0.245	20.493	0	3.51	0	0.225	0.943	-0.718

492.9	54.842	-0.245	20.359	0	3.51	0	0.225	0.943	-0.718
493	54.842	-0.26	21.037	0	3.51	0	0.225	0.943	-0.718
493.1	54.842	-0.255	20.26	0	3.52	0	0.225	0.943	-0.718
493.2	54.842	-0.242	19.939	0	3.52	0	0.225	0.944	-0.718
493.3	54.848	-0.242	20.952	0	3.51	0	0.226	0.944	-0.718
493.4	54.848	-0.22	20.483	0	3.53	0	0.226	0.944	-0.718
493.5	54.848	-0.222	21.337	0	3.41	0	0.226	0.944	-0.718
493.6	54.848	-0.222	21.719	0	3.35	0	0.226	0.944	-0.718
493.7	54.855	-0.205	21.937	0	3.34	0	0.226	0.944	-0.718
493.8	54.855	-0.2	21.937	0	3.33	0	0.226	0.944	-0.718
493.9	54.861	-0.2	21.817	0	3.34	0	0.226	0.944	-0.718
494	54.861	-0.225	22.958	0	3.34	0	0.226	0.944	-0.718
494.1	54.861	-0.21	22.432	0	3.33	0	0.226	0.944	-0.718
494.2	54.873	-0.21	22.022	0	3.29	0	0.226	0.944	-0.718
494.3	54.873	-0.195	22.46	0	2.64	0	0.226	0.945	-0.718
494.4	54.88	-0.195	22.22	0	2.16	0	0.226	0.945	-0.718
494.5	54.873	-0.202	22.545	0	2.47	0	0.227	0.945	-0.718
494.6	54.873	-0.217	23.131	0	2.61	0	0.227	0.945	-0.718
494.7	54.873	-0.215	22.093	0	2.88	0	0.227	0.945	-0.718
494.8	54.873	-0.215	21.909	0	2.36	0	0.227	0.945	-0.718
494.9	54.873	-0.232	22.033	0	1.24	0	0.227	0.945	-0.718
495	54.873	-0.227	22.107	0	1.38	0	0.227	0.945	-0.718
495.1	54.867	-0.227	21.217	0	-0.68	0	0.227	0.945	-0.718
495.2	54.861	-0.252	21.185	0	-0.67	0	0.227	0.945	-0.718
495.3	54.861	-0.232	21.637	0	-1.04	0	0.227	0.945	-0.718
495.4	54.855	-0.232	20.483	0	-0.98	0	0.227	0.945	-0.718
495.5	54.848	-0.195	20.317	0	-1.12	0	0.227	0.945	-0.718
495.6	54.842	-0.212	21.309	0	-0.89	0	0.227	0.945	-0.718
495.7	54.836	-0.212	22.471	0	-0.8	0	0.227	0.945	-0.718
495.8	54.83	-0.217	21.853	0	-1.04	0	0.227	0.945	-0.718
495.9	54.824	-0.217	21.553	0	-0.71	0	0.227	0.945	-0.718
496	54.817	-0.23	22.068	0	-1.27	0	0.227	0.945	-0.718
496.1	54.817	-0.217	21.009	0	-1.16	0	0.227	0.945	-0.718
496.2	54.811	-0.222	21.362	0	-1.44	0	0.227	0.945	-0.718
496.3	54.811	-0.222	21.471	0	-1.38	0	0.227	0.945	-0.718
496.4	54.793	-0.225	21.09	0	-1.32	0	0.226	0.945	-0.718
496.5	54.786	-0.247	21.598	0	-1.06	0	0.226	0.945	-0.719
496.6	54.78	-0.247	21.842	0	-1.01	0	0.226	0.945	-0.719
496.7	54.774	-0.225	20.737	0	-0.69	0	0.226	0.945	-0.719
496.8	54.768	-0.22	20.468	0	-0.99	0	0.226	0.945	-0.719
496.9	54.755	-0.22	20.56	0	-0.99	0	0.226	0.945	-0.719
497	54.743	-0.242	20.822	0	-0.94	0	0.226	0.945	-0.719
497.1	54.743	-0.242	20.857	0	-0.52	0	0.226	0.945	-0.719
497.2	54.737	-0.242	20.631	0	-0.56	0	0.226	0.945	-0.719
497.3	54.737	-0.255	19.942	0	-0.98	0	0.226	0.945	-0.719
497.4	54.724	-0.255	20.779	0	-0.98	0	0.226	0.945	-0.719
497.5	54.718	-0.242	20.984	0	-0.99	0	0.226	0.945	-0.719

497.6	54.712	-0.202	20.645	0	-0.97	0	0.226	0.945	-0.719
497.7	54.712	-0.212	20.807	0	-0.99	0	0.226	0.945	-0.719
497.8	54.699	-0.212	20.942	0	-1.09	0	0.226	0.945	-0.719
497.9	54.693	-0.232	21.729	0	-1.29	0	0.226	0.945	-0.719
498	54.681	-0.23	21.602	0	-1.31	0	0.226	0.945	-0.719
498.1	54.681	-0.23	20.899	0	-1.21	0	0.226	0.945	-0.719
498.2	54.674	-0.242	20.984	0	-1.28	0	0.226	0.945	-0.719
498.3	54.674	-0.245	21.161	0	-1.75	0	0.226	0.945	-0.719
498.4	54.656	-0.245	20.822	0	-1.05	0	0.226	0.945	-0.719
498.5	54.65	-0.247	20.345	0	-0.97	0	0.226	0.945	-0.719
498.6	54.643	-0.24	20.723	0	-1.03	0	0.226	0.945	-0.719
498.7	54.631	-0.24	20.37	0	-1.07	0	0.226	0.945	-0.719
498.8	54.625	-0.245	20.034	0	-1.35	0	0.226	0.945	-0.719
498.9	54.619	-0.245	20.196	0	-1.35	0	0.226	0.945	-0.719
499	54.606	-0.252	20.281	0	-1	0	0.226	0.945	-0.719
499.1	54.606	-0.247	20.415	0	-1.32	0	0.226	0.945	-0.719
499.2	54.587	-0.24	20.108	0	-1.6	0	0.226	0.945	-0.719
499.3	54.587	-0.24	20.066	0	-1.51	0	0.226	0.945	-0.719
499.4	54.569	-0.245	19.886	0	-1.34	0	0.226	0.945	-0.719
499.5	54.556	-0.252	20.532	0	-1.81	0	0.225	0.945	-0.719
499.6	54.544	-0.252	20.023	0	-1.49	0	0.225	0.945	-0.72
499.7	54.532	-0.25	19.713	0	-1.29	0	0.225	0.945	-0.72
499.8	54.525	-0.247	19.981	0	-1.18	0	0.225	0.945	-0.72
499.9	54.513	-0.247	19.617	0	-1.22	0	0.225	0.945	-0.72
500	54.5	-0.27	19.843	0	-1.2	0	0.225	0.945	-0.72
500.1	54.5	-0.26	20.023	0	-1.08	0	0.225	0.945	-0.72
500.2	54.476	-0.26	19.239	0	-1.15	0	0.225	0.945	-0.72
500.3	54.476	-0.26	18.614	0	-1.07	0	0.225	0.945	-0.72
500.4	54.457	-0.26	19.038	0	-0.99	0	0.225	0.945	-0.72
500.5	54.438	-0.267	19.755	0	-1.1	0	0.225	0.945	-0.72
500.6	54.426	-0.247	19.222	0	-1.08	0	0.225	0.945	-0.72
500.7	54.413	-0.27	19.052	0	-0.66	0	0.225	0.945	-0.72
500.8	54.407	-0.27	19.699	0	-0.7	0	0.225	0.945	-0.72
500.9	54.395	-0.275	19.999	0	-1.11	0	0.225	0.945	-0.72
501	54.389	-0.255	19.077	0	-1.08	0	0.225	0.945	-0.72
501.1	54.389	-0.255	18.872	0	-0.67	0	0.225	0.945	-0.72
501.2	54.364	-0.265	19.755	0	-0.66	0	0.225	0.945	-0.72
501.3	54.364	-0.267	19.872	0	-0.65	0	0.225	0.945	-0.72
501.4	54.351	-0.267	19.942	0	-0.63	0	0.225	0.945	-0.72
501.5	54.339	-0.25	19.434	0	-0.63	0	0.225	0.945	-0.72
501.6	54.326	-0.242	19.783	0	-0.63	0	0.225	0.945	-0.72
501.7	54.32	-0.242	19.518	0	-0.63	0	0.225	0.945	-0.72
501.8	54.314	-0.242	20.052	0	-0.63	0	0.225	0.945	-0.72
501.9	54.308	-0.242	20.225	0	-0.62	0	0.225	0.945	-0.72
502	54.295	-0.252	20.599	0	-0.61	0	0.225	0.945	-0.72
502.1	54.295	-0.257	20.479	0	-0.62	0	0.225	0.945	-0.72
502.2	54.277	-0.265	20.08	0	-0.64	0	0.225	0.945	-0.72

502.3	54.277	-0.265	20.309	0	-0.79	0	0.225	0.945	-0.72
502.4	54.264	-0.25	19.97	0	-0.83	0	0.225	0.945	-0.72
502.5	54.252	-0.237	20.094	0	-0.79	0	0.225	0.945	-0.72
502.6	54.246	-0.237	20.306	0	0	0	0.225	0.945	-0.72
502.7	54.239	-0.232	19.967	0	0	0	0.225	0.945	-0.72
502.8	54.239	-0.247	19.939	0	0	0	0.225	0.945	-0.72
502.9	54.233	-0.247	20.659	0	0	0	0.225	0.945	-0.72
503	54.221	-0.252	20.659	0	0	0	0.225	0.945	-0.72
503.1	54.221	-0.252	20.264	0	0	0	0.225	0.945	-0.72
503.2	54.215	-0.252	20.175	0	0	0	0.225	0.945	-0.72
503.3	54.208	-0.255	19.783	0	0	0	0.225	0.945	-0.72
503.4	54.202	-0.255	20.133	0	0	0	0.225	0.945	-0.72
503.5	54.196	-0.252	20.479	0	0	0	0.225	0.945	-0.72
503.6	54.19	-0.242	19.766	0	0	0	0.225	0.945	-0.72
503.7	54.184	-0.24	20.094	0	0	0	0.225	0.945	-0.72
503.8	54.177	-0.24	20.465	0	0	0	0.225	0.945	-0.72
503.9	54.165	-0.237	20.253	0	0	0	0.225	0.945	-0.72
504	54.165	-0.237	20.673	0	0	0	0.225	0.945	-0.72
504.1	54.165	-0.237	20.211	0	0	0	0.225	0.945	-0.72
504.2	54.159	-0.232	20.264	0	0	0	0.225	0.945	-0.72
504.3	54.146	-0.242	20.398	0	0	0	0.225	0.945	-0.72
504.4	54.14	-0.242	20.995	0	0	0	0.225	0.945	-0.72
504.5	54.14	-0.235	21.012	0	0	0	0.225	0.945	-0.72
504.6	54.134	-0.23	21.189	0	0	0	0.225	0.945	-0.72
504.7	54.121	-0.23	20.832	0	0	0	0.225	0.945	-0.72
504.8	54.115	-0.24	20.652	0	0	0	0.224	0.945	-0.72
504.9	54.115	-0.24	20.995	0	0	0	0.224	0.945	-0.72
505	54.109	-0.232	20.641	0	0	0	0.224	0.945	-0.72
505.1	54.109	-0.235	20.518	0	0	0	0.224	0.945	-0.721
505.2	54.103	-0.242	20.998	0	0	0	0.224	0.945	-0.721
505.3	54.097	-0.242	21.358	0	0	0	0.224	0.945	-0.721
505.4	54.097	-0.247	21.055	0	0	0	0.224	0.945	-0.721
505.5	54.097	-0.24	21.189	0	0	0	0.224	0.945	-0.721
505.6	54.09	-0.24	20.846	0	0	0	0.224	0.945	-0.721
505.7	54.084	-0.245	20.818	0	0	0	0.224	0.945	-0.721
505.8	54.078	-0.242	21.298	0	0	0	0.224	0.945	-0.721
505.9	54.078	-0.242	21.312	0	0	0	0.224	0.945	-0.721
506	54.072	-0.247	20.723	0	0	0	0.224	0.945	-0.721
506.1	54.066	-0.26	20.998	0	0	0	0.224	0.945	-0.721
506.2	54.059	-0.26	21.012	0	0	0	0.224	0.945	-0.721
506.3	54.053	-0.24	20.74	0	0	0	0.224	0.945	-0.721
506.4	54.047	-0.24	20.08	0	0	0	0.224	0.945	-0.721
506.5	54.041	-0.245	20.384	0	0	0	0.224	0.945	-0.721
506.6	54.041	-0.242	21.09	0	0	0	0.224	0.945	-0.721
506.7	54.034	-0.23	20.532	0	0	0	0.224	0.945	-0.721
506.8	54.01	-0.23	20.43	0	0	0	0.224	0.945	-0.721
506.9	54.003	-0.237	20.645	0	0	0	0.224	0.945	-0.721

507	53.997	-0.232	20.532	0	0	0	0.224	0.945	-0.721
507.1	53.997	-0.232	20.355	0	0	0	0.224	0.945	-0.721
507.2	53.991	-0.24	20.574	0	0	0	0.224	0.945	-0.721
507.3	53.985	-0.232	20.599	0	0	0	0.224	0.945	-0.721
507.4	53.979	-0.232	20.401	0	0	0	0.224	0.945	-0.721
507.5	53.972	-0.245	20.292	0	0	0	0.224	0.945	-0.721
507.6	53.979	-0.262	20.631	0	0	0	0.224	0.945	-0.721
507.7	53.972	-0.262	20.995	0	0	0	0.224	0.945	-0.721
507.8	53.966	-0.232	20.617	0	0	0	0.224	0.945	-0.721
507.9	53.96	-0.232	19.928	0	0	0	0.224	0.945	-0.721
508	53.954	-0.227	20.182	0	0	0	0.224	0.945	-0.721
508.1	53.954	-0.265	21.09	0	0	0	0.224	0.945	-0.721
508.2	53.941	-0.26	20.641	0	0	0	0.224	0.945	-0.721
508.3	53.935	-0.26	20.094	0	0	0	0.224	0.945	-0.721
508.4	53.929	-0.267	20.532	0	0	0	0.224	0.945	-0.721
508.5	53.929	-0.27	20.451	0	0	0	0.224	0.945	-0.721
508.6	53.923	-0.27	20.44	0	-0.76	0	0.224	0.945	-0.721
508.7	53.916	-0.26	21.288	0	-0.76	0	0.224	0.945	-0.721
508.8	53.916	-0.245	19.967	0	-0.75	0	0.224	0.945	-0.721
508.9	53.91	-0.245	20.454	0	-0.75	0	0.224	0.945	-0.721
509	53.904	-0.255	20.345	0	-0.75	0	0.224	0.945	-0.721
509.1	53.904	-0.237	20.606	0	-0.75	0	0.224	0.945	-0.721
509.2	53.898	-0.237	20.779	0	-0.81	0	0.224	0.945	-0.721
509.3	53.892	-0.242	21.132	0	-0.82	0	0.224	0.945	-0.721
509.4	53.892	-0.242	21.588	0	-0.81	0	0.224	0.945	-0.721
509.5	53.879	-0.242	21.118	0	-0.81	0	0.224	0.945	-0.721
509.6	53.879	-0.23	21.856	0	-0.8	0	0.224	0.945	-0.721
509.7	53.879	-0.237	21.319	0	-0.81	0	0.224	0.945	-0.721
509.8	53.873	-0.237	22.015	0	-0.77	0	0.224	0.945	-0.721
509.9	53.873	-0.22	22.029	0	2.25	0	0.224	0.945	-0.721
510	53.873	-0.222	21.856	0	2.02	0	0.224	0.945	-0.721
510.1	53.873	-0.222	21.814	0	1.94	0	0.224	0.945	-0.721
510.2	53.892	-0.222	22.294	0	0	0	0.224	0.945	-0.721
510.3	53.892	-0.205	21.641	0	2.31	0	0.224	0.945	-0.721
510.4	53.898	-0.205	21.641	0	2.37	0	0.224	0.945	-0.721
510.5	53.91	-0.18	22.552	0	2.31	0	0.224	0.945	-0.721
510.6	53.916	-0.175	23.269	0	0.79	0	0.224	0.945	-0.721
510.7	53.929	-0.175	23.587	0	-0.78	0	0.224	0.945	-0.721
510.8	53.935	-0.16	24.208	0	-0.77	0	0.224	0.945	-0.721
510.9	53.941	-0.16	24.526	0	-0.76	0	0.224	0.945	-0.721
511	53.954	-0.152	25.102	0	-0.84	0	0.224	0.945	-0.721
511.1	53.954	-0.145	25.317	0	-0.92	0	0.224	0.945	-0.721
511.2	53.972	-0.14	25.819	0	-0.9	0	0.224	0.945	-0.721
511.3	53.979	-0.14	25.886	0	0	0	0.224	0.945	-0.721
511.4	53.991	-0.142	26.158	0	0	0	0.224	0.945	-0.721
511.5	54.003	-0.142	26.631	0	0	0	0.224	0.945	-0.721
511.6	54.01	-0.142	26.461	0	0	0	0.224	0.945	-0.721

511.7	54.016	-0.137	26.8	0	0	0	0.224	0.945	-0.721
511.8	54.034	-0.142	26.465	0	0	0	0.224	0.945	-0.721
511.9	54.041	-0.142	25.882	0	0	0	0.224	0.945	-0.721
512	54.047	-0.155	26.327	0	0	0	0.224	0.945	-0.721
512.1	54.059	-0.135	25.953	0	0	0	0.224	0.945	-0.721
512.2	54.072	-0.135	25.289	0	-0.55	0	0.224	0.945	-0.722
512.3	54.084	-0.147	25.61	0	-1.31	0	0.224	0.945	-0.722
512.4	54.09	-0.147	26.581	0	-1.9	0	0.224	0.945	-0.722
512.5	54.097	-0.165	26.394	0	-2.26	0	0.224	0.945	-0.722
512.6	54.109	-0.162	26.256	0	-2.57	0	0.224	0.945	-0.722
512.7	54.115	-0.15	26.02	0	-1.87	0	0.224	0.945	-0.722
512.8	54.115	-0.15	25.501	0	-1.4	0	0.224	0.945	-0.722
512.9	54.121	-0.187	25.808	0	-0.96	0	0.224	0.945	-0.722
513	54.121	-0.195	25.9	0	-0.74	0	0.223	0.945	-0.722
513.1	54.134	-0.195	24.424	0	-0.68	0	0.223	0.945	-0.722
513.2	54.134	-0.212	24.205	0	-1.25	0	0.223	0.945	-0.722
513.3	54.134	-0.197	24.258	0	-2.52	0	0.223	0.945	-0.722
513.4	54.134	-0.197	23.015	0	-2.25	0	0.223	0.945	-0.722
513.5	54.134	-0.207	23.304	0	-1.71	0	0.223	0.945	-0.722
513.6	54.134	-0.21	23.505	0	-1.3	0	0.223	0.945	-0.722
513.7	54.134	-0.21	22.976	0	-1.05	0	0.223	0.945	-0.722
513.8	54.128	-0.237	23.343	0	-0.83	0	0.223	0.945	-0.722
513.9	54.134	-0.237	22.976	0	-0.65	0	0.223	0.945	-0.722
514	54.134	-0.237	22.079	0	0	0	0.223	0.945	-0.722
514.1	54.128	-0.232	21.351	0	0	0	0.223	0.945	-0.722
514.2	54.128	-0.225	21.542	0	0	0	0.223	0.945	-0.722
514.3	54.121	-0.225	21.482	0	0	0	0.223	0.945	-0.722
514.4	54.121	-0.23	21.57	0	2.93	0	0.223	0.945	-0.722
514.5	54.128	-0.237	21.899	0	1.21	0	0.223	0.945	-0.722
514.6	54.128	-0.237	21.556	0	2.52	0	0.223	0.946	-0.722
514.7	54.134	-0.222	21.369	0	1.14	0	0.223	0.946	-0.722
514.8	54.146	-0.207	20.959	0	1.96	0	0.223	0.946	-0.722
514.9	54.146	-0.207	21.425	0	0	0	0.223	0.946	-0.722
515	54.152	-0.205	22.407	0	0	0	0.223	0.946	-0.722
515.1	54.159	-0.195	22.88	0	0	0	0.223	0.946	-0.722
515.2	54.165	-0.195	23.11	0	0	0	0.223	0.946	-0.722
515.3	54.171	-0.172	23.668	0	0	0	0.223	0.946	-0.722
515.4	54.171	-0.172	23.982	0	0	0	0.223	0.946	-0.722
515.5	54.177	-0.155	24.3	0	0	0	0.223	0.946	-0.722
515.6	54.184	-0.18	23.993	0	0	0	0.223	0.946	-0.722
515.7	54.196	-0.187	24.967	0	0	0	0.223	0.946	-0.722
515.8	54.202	-0.187	24.692	0	0	0	0.223	0.946	-0.722
515.9	54.202	-0.182	24.236	0	0	0	0.223	0.946	-0.722
516	54.208	-0.155	24.823	0	0	0	0.223	0.946	-0.722
516.1	54.221	-0.155	24.826	0	0	0	0.223	0.946	-0.722
516.2	54.227	-0.155	25.518	0	0	0	0.223	0.946	-0.722
516.3	54.233	-0.145	25.215	0	0	0	0.223	0.946	-0.722

516.4	54.239	-0.145	25.059	0	0	0	0.223	0.946	-0.722
516.5	54.246	-0.175	25.31	0	0	0	0.223	0.946	-0.722
516.6	54.258	-0.167	25.9	0	0	0	0.223	0.946	-0.722
516.7	54.264	-0.167	25.077	0	0	0	0.223	0.946	-0.722
516.8	54.271	-0.175	24.498	0	0	0	0.223	0.946	-0.722
516.9	54.271	-0.175	25.063	0	0	0	0.223	0.946	-0.722
517	54.283	-0.19	25.804	0	0	0	0.223	0.946	-0.722
517.1	54.289	-0.182	24.914	0	0	0	0.223	0.946	-0.722
517.2	54.295	-0.18	24.844	0	-0.66	0	0.223	0.946	-0.722
517.3	54.308	-0.18	25.342	0	-0.67	0	0.223	0.946	-0.722
517.4	54.308	-0.17	24.311	0	-0.65	0	0.223	0.946	-0.722
517.5	54.32	-0.157	24.886	0	-0.66	0	0.223	0.946	-0.723
517.6	54.326	-0.157	24.929	0	-0.66	0	0.223	0.946	-0.723
517.7	54.333	-0.16	24.325	0	-0.65	0	0.223	0.946	-0.723
517.8	54.339	-0.165	25.465	0	0	0	0.223	0.946	-0.723
517.9	54.351	-0.165	25.437	0	2.6	0	0.223	0.946	-0.723
518	54.364	-0.165	25.066	0	2.8	0	0.223	0.946	-0.723
518.1	54.382	-0.155	25.462	0	1.54	0	0.223	0.946	-0.723
518.2	54.407	-0.155	25.261	0	2	0	0.223	0.946	-0.723
518.3	54.42	-0.137	25.988	0	0.52	0	0.223	0.946	-0.723
518.4	54.432	-0.137	26.327	0	-0.66	0	0.223	0.946	-0.723
518.5	54.445	-0.117	26.225	0	-0.66	0	0.223	0.946	-0.723
518.6	54.463	-0.117	27.213	0	-0.73	0	0.223	0.946	-0.723
518.7	54.469	-0.107	28.114	0	-1.17	0	0.223	0.946	-0.723
518.8	54.482	-0.107	27.764	0	-1.1	0	0.223	0.946	-0.723
518.9	54.5	-0.107	28.319	0	-0.72	0	0.223	0.946	-0.723
519	54.519	-0.105	28.679	0	-1.12	0	0.223	0.946	-0.723
519.1	54.532	-0.105	28.326	0	-0.73	0	0.223	0.946	-0.723
519.2	54.55	-0.097	28.668	0	-1.11	0	0.223	0.946	-0.723
519.3	54.563	-0.1	29.06	0	-0.71	0	0.223	0.946	-0.723
519.4	54.581	-0.1	28.993	0	-1.16	0	0.223	0.946	-0.723
519.5	54.6	-0.11	29.159	0	-1.16	0	0.223	0.946	-0.723
519.6	54.619	-0.1	29.474	0	-1.3	0	0.223	0.946	-0.723
519.7	54.637	-0.1	28.845	0	-1.48	0	0.223	0.946	-0.723
519.8	54.65	-0.11	28.654	0	-1.38	0	0.223	0.946	-0.723
519.9	54.668	-0.11	29.346	0	-1.24	0	0.223	0.946	-0.723
520	54.681	-0.115	29.414	0	-1.22	0	0.223	0.946	-0.723
520.1	54.699	-0.107	29.184	0	-1.17	0	0.223	0.946	-0.723
520.2	54.712	-0.12	29.368	0	-1.56	0	0.223	0.946	-0.723
520.3	54.73	-0.12	29.354	0	-2.16	0	0.223	0.946	-0.723
520.4	54.743	-0.117	28.993	0	-2.52	0	0.223	0.946	-0.723
520.5	54.749	-0.112	27.902	0	-2.69	0	0.223	0.946	-0.723
520.6	54.761	-0.112	28.845	0	-1.68	0	0.223	0.946	-0.723
520.7	54.774	-0.135	27.99	0	-1.3	0	0.222	0.946	-0.723
520.8	54.786	-0.122	28.379	0	-1.21	0	0.222	0.946	-0.723
520.9	54.793	-0.122	27.341	0	-1.31	0	0.222	0.946	-0.723
521	54.805	-0.13	26.701	0	-0.96	0	0.222	0.946	-0.724

521.1	54.817	-0.157	26.701	0	-0.68	0	0.222	0.946	-0.724
521.2	54.83	-0.157	27.231	0	-0.6	0	0.222	0.946	-0.724
521.3	54.836	-0.152	26.747	0	-0.51	0	0.222	0.946	-0.724
521.4	54.848	-0.152	25.706	0	0	0	0.222	0.946	-0.724
521.5	54.861	-0.145	25.54	0	0	0	0.222	0.946	-0.724
521.6	54.867	-0.16	25.992	0	0	0	0.222	0.946	-0.724
521.7	54.873	-0.162	26.387	0	0	0	0.222	0.946	-0.724
521.8	54.886	-0.162	26.214	0	0	0	0.222	0.946	-0.724
521.9	54.898	-0.137	25.677	0	0	0	0.222	0.946	-0.724
522	54.904	-0.137	25.607	0	-0.66	0	0.222	0.946	-0.724
522.1	54.911	-0.137	25.653	0	0	0	0.222	0.946	-0.724
522.2	54.923	-0.155	25.999	0	0	0	0.222	0.946	-0.724
522.3	54.929	-0.15	26.2	0	0	0	0.222	0.946	-0.724
522.4	54.942	-0.15	25.377	0	0	0	0.222	0.946	-0.724
522.5	54.948	-0.14	25.808	0	0	0	0.222	0.946	-0.724
522.6	54.954	-0.145	25.568	0	0	0	0.222	0.946	-0.724
522.7	54.96	-0.145	25.638	0	0	0	0.222	0.946	-0.724
522.8	54.966	-0.155	26.09	0	0	0	0.222	0.946	-0.724
522.9	54.979	-0.155	25.868	0	0	0	0.222	0.946	-0.724
523	54.985	-0.142	24.837	0	0	0	0.222	0.946	-0.724
523.1	54.991	-0.162	25.928	0	0	0	0.222	0.946	-0.724
523.2	54.998	-0.155	26.175	0	0	0	0.222	0.946	-0.724
523.3	55.01	-0.155	25.116	0	0	0	0.222	0.946	-0.724
523.4	55.016	-0.152	25.197	0	0	0	0.222	0.946	-0.724
523.5	55.029	-0.165	25.744	0	0	0	0.222	0.946	-0.724
523.6	55.041	-0.165	25.928	0	0	0	0.222	0.946	-0.724
523.7	55.047	-0.172	25.568	0	0	0	0.222	0.946	-0.724
523.8	55.053	-0.162	25.773	0	0	0	0.222	0.946	-0.724
523.9	55.066	-0.162	25.79	0	0	0	0.222	0.946	-0.724
524	55.078	-0.145	25.829	0	0	0	0.222	0.946	-0.724
524.1	55.085	-0.137	26.189	0	0	0	0.222	0.946	-0.724
524.2	55.091	-0.137	26.052	0	0	0	0.222	0.946	-0.724
524.3	55.103	-0.135	26.733	0	0	0	0.222	0.946	-0.724
524.4	55.116	-0.135	26.249	0	0	0	0.222	0.946	-0.724
524.5	55.122	-0.132	25.928	0	0	0	0.222	0.946	-0.724
524.6	55.128	-0.16	26.189	0	0	0	0.222	0.946	-0.724
524.7	55.14	-0.147	26.733	0	0	0	0.222	0.946	-0.724
524.8	55.153	-0.147	26.288	0	0	0	0.222	0.946	-0.724
524.9	55.159	-0.152	26.009	0	0	0	0.222	0.946	-0.724
525	55.172	-0.145	26.899	0	0	0	0.222	0.946	-0.724
525.1	55.184	-0.145	26.288	0	0	0	0.222	0.946	-0.724
525.2	55.19	-0.132	26.362	0	0	0	0.222	0.946	-0.724
525.3	55.203	-0.127	26.535	0	0	0	0.222	0.946	-0.724
525.4	55.215	-0.127	26.278	0	0	0	0.222	0.946	-0.724
525.5	55.227	-0.145	26.666	0	0	0	0.222	0.946	-0.724
525.6	55.24	-0.13	27.161	0	0	0	0.222	0.946	-0.724
525.7	55.252	-0.13	26.882	0	0	0	0.222	0.946	-0.724

525.8	55.265	-0.122	26.723	0	0	0	0.222	0.946	-0.724
525.9	55.277	-0.122	27.256	0	-0.71	0	0.222	0.946	-0.724
526	55.283	-0.13	28.269	0	-0.71	0	0.222	0.946	-0.724
526.1	55.302	-0.11	27.514	0	-0.72	0	0.222	0.946	-0.724
526.2	55.314	-0.115	27.235	0	-0.71	0	0.222	0.946	-0.724
526.3	55.327	-0.115	27.771	0	-0.73	0	0.222	0.946	-0.724
526.4	55.339	-0.125	28.05	0	-0.73	0	0.222	0.946	-0.724
526.5	55.352	-0.122	27.93	0	-0.73	0	0.222	0.946	-0.724
526.6	55.364	-0.122	28.411	0	-0.73	0	0.222	0.946	-0.724
526.7	55.383	-0.105	27.609	0	-0.71	0	0.222	0.946	-0.724
526.8	55.395	-0.11	28.51	0	-0.72	0	0.222	0.946	-0.724
526.9	55.408	-0.11	28.736	0	-0.73	0	0.222	0.946	-0.724
527	55.42	-0.11	28.834	0	-0.72	0	0.222	0.946	-0.724
527.1	55.439	-0.102	28.425	0	-0.72	0	0.222	0.946	-0.724
527.2	55.451	-0.102	28.824	0	-0.72	0	0.222	0.946	-0.724
527.3	55.464	-0.115	28.287	0	-0.72	0	0.222	0.946	-0.724
527.4	55.476	-0.115	28.651	0	-0.72	0	0.222	0.946	-0.724
527.5	55.488	-0.112	28.333	0	-0.73	0	0.222	0.946	-0.724
527.6	55.501	-0.097	28.347	0	-0.77	0	0.222	0.946	-0.724
527.7	55.513	-0.095	28.513	0	-0.72	0	0.222	0.946	-0.724
527.8	55.526	-0.095	28.527	0	-0.7	0	0.222	0.946	-0.724
527.9	55.538	-0.112	28.375	0	-0.71	0	0.221	0.946	-0.724
528	55.544	-0.115	29.025	0	-0.73	0	0.221	0.946	-0.724
528.1	55.563	-0.115	28.541	0	-0.71	0	0.221	0.946	-0.724
528.2	55.569	-0.115	28.287	0	-0.71	0	0.221	0.946	-0.724
528.3	55.582	-0.107	28.319	0	-0.86	0	0.221	0.946	-0.725
528.4	55.6	-0.107	27.976	0	-0.9	0	0.221	0.946	-0.725
528.5	55.613	-0.115	28.054	0	-0.88	0	0.221	0.946	-0.725
528.6	55.625	-0.11	28.997	0	-0.66	0	0.221	0.946	-0.725
528.7	55.644	-0.11	28.781	0	-0.57	0	0.221	0.946	-0.725
528.8	55.65	-0.097	28.093	0	0	0	0.221	0.946	-0.725
528.9	55.669	-0.097	28.34	0	0	0	0.221	0.946	-0.725
529	55.681	-0.115	28.273	0	-0.51	0	0.221	0.946	-0.725
529.1	55.7	-0.105	29.096	0	0	0	0.221	0.946	-0.725
529.2	55.712	-0.087	28.248	0	0	0	0.221	0.946	-0.725
529.3	55.725	-0.087	27.694	0	-0.51	0	0.221	0.946	-0.725
529.4	55.737	-0.1	28.866	0	-0.5	0	0.221	0.946	-0.725
529.5	55.749	-0.087	28.958	0	0	0	0.221	0.946	-0.725
529.6	55.762	-0.087	27.959	0	-0.56	0	0.221	0.946	-0.725
529.7	55.774	-0.102	28.418	0	-0.95	0	0.221	0.946	-0.725
529.8	55.787	-0.112	28.488	0	-0.51	0	0.221	0.946	-0.725
529.9	55.799	-0.112	28.933	0	-0.57	0	0.221	0.946	-0.725
530	55.812	-0.12	28.972	0	-1.01	0	0.221	0.946	-0.725
530.1	55.83	-0.115	28.972	0	-0.99	0	0.221	0.946	-0.725
530.2	55.836	-0.115	28.068	0	-1	0	0.221	0.946	-0.725
530.3	55.849	-0.09	28.22	0	-1.04	0	0.221	0.946	-0.725
530.4	55.849	-0.09	28.001	0	-1.55	0	0.221	0.946	-0.725

530.5	55.88	-0.095	28.488	0	-1.53	0	0.221	0.946	-0.725
530.6	55.892	-0.097	28.799	0	-1.36	0	0.221	0.946	-0.725
530.7	55.905	-0.107	29.05	0	-1.14	0	0.221	0.946	-0.725
530.8	55.917	-0.107	29.082	0	-1.06	0	0.221	0.946	-0.725
530.9	55.923	-0.09	29.17	0	-1.06	0	0.221	0.946	-0.725
531	55.942	-0.092	28.601	0	-1.62	0	0.221	0.946	-0.725
531.1	55.954	-0.092	28.845	0	-1.06	0	0.221	0.946	-0.725
531.2	55.954	-0.102	28.043	0	-0.96	0	0.221	0.946	-0.725
531.3	55.973	-0.115	28.368	0	-0.97	0	0.221	0.946	-0.725
531.4	55.986	-0.115	28.199	0	-0.93	0	0.221	0.946	-0.725
531.5	55.998	-0.12	27.68	0	-1	0	0.221	0.946	-0.725
531.6	56.004	-0.115	27.422	0	-1.25	0	0.221	0.946	-0.725
531.7	56.017	-0.115	27.754	0	-1.11	0	0.221	0.946	-0.725
531.8	56.029	-0.125	28.029	0	-1	0	0.221	0.946	-0.725
531.9	56.035	-0.125	27.655	0	-1.48	0	0.22	0.946	-0.725
532	56.041	-0.122	27.334	0	-1.48	0	0.22	0.946	-0.725
532.1	56.054	-0.12	27.641	0	-1.69	0	0.22	0.946	-0.726
532.2	56.054	-0.122	27.418	0	-1.75	0	0.22	0.946	-0.726
532.3	56.066	-0.122	27.394	0	-1.91	0	0.22	0.946	-0.726
532.4	56.073	-0.13	27.115	0	-1.5	0	0.22	0.946	-0.726
532.5	56.073	-0.145	26.839	0	-1.17	0	0.22	0.946	-0.726
532.6	56.079	-0.145	26.532	0	-0.78	0	0.22	0.946	-0.726
532.7	56.085	-0.162	26.751	0	-0.68	0	0.22	0.946	-0.726
532.8	56.091	-0.167	26.631	0	0	0	0.22	0.946	-0.726
532.9	56.097	-0.167	26.158	0	0	0	0.22	0.946	-0.726
533	56.104	-0.15	25.811	0	-0.54	0	0.22	0.946	-0.726
533.1	56.11	-0.152	25.317	0	-3.22	0	0.22	0.946	-0.726
533.2	56.104	-0.152	25.232	0	-2.77	0	0.22	0.946	-0.726
533.3	56.104	-0.177	25.303	0	-2.1	0	0.22	0.946	-0.726
533.4	56.104	-0.177	24.914	0	-1.73	0	0.22	0.946	-0.726
533.5	56.097	-0.2	25.246	0	-1.45	0	0.22	0.946	-0.726
533.6	56.091	-0.202	24.282	0	-0.57	0	0.22	0.946	-0.726
533.7	56.091	-0.202	22.894	0	0	0	0.22	0.946	-0.726
533.8	56.085	-0.202	22.781	0	0	0	0.22	0.946	-0.726
533.9	56.079	-0.222	22.563	0	0	0	0.22	0.946	-0.726
534	56.079	-0.227	22.432	0	0	0	0.22	0.946	-0.726
534.1	56.073	-0.227	22.389	0	0	0	0.22	0.946	-0.726
534.2	56.073	-0.195	21.503	0	0	0	0.22	0.946	-0.726
534.3	56.073	-0.192	21.697	0	0	0	0.22	0.946	-0.726
534.4	56.073	-0.192	22.195	0	0	0	0.22	0.946	-0.726
534.5	56.073	-0.205	23.138	0	-0.55	0	0.22	0.946	-0.726
534.6	56.073	-0.2	23.636	0	-0.54	0	0.22	0.946	-0.726
534.7	56.073	-0.2	22.965	0	-0.55	0	0.22	0.946	-0.726
534.8	56.073	-0.18	23.142	0	-0.53	0	0.22	0.946	-0.726
534.9	56.073	-0.18	23.294	0	-0.57	0	0.22	0.946	-0.726
535	56.073	-0.175	23.894	0	-0.6	0	0.22	0.946	-0.726
535.1	56.073	-0.177	24.155	0	-0.56	0	0.22	0.946	-0.726

535.2	56.066	-0.18	24.706	0	-0.57	0	0.22	0.946	-0.726
535.3	56.073	-0.18	24.325	0	-0.58	0	0.22	0.946	-0.726
535.4	56.066	-0.17	24.106	0	-0.57	0	0.22	0.946	-0.726
535.5	56.066	-0.192	23.664	0	-0.57	0	0.22	0.946	-0.726
535.6	56.073	-0.192	24.409	0	-0.6	0	0.22	0.946	-0.726
535.7	56.066	-0.205	24.381	0	-0.75	0	0.22	0.946	-0.726
535.8	56.066	-0.205	23.707	0	-0.63	0	0.22	0.946	-0.726
535.9	56.06	-0.205	23.689	0	-1.27	0	0.22	0.946	-0.726
536	56.06	-0.205	23.862	0	-1.27	0	0.219	0.946	-0.726
536.1	56.054	-0.197	23.608	0	-1.14	0	0.219	0.946	-0.726
536.2	56.054	-0.197	23.604	0	-0.85	0	0.219	0.946	-0.726
536.3	56.054	-0.207	23.375	0	-0.6	0	0.219	0.946	-0.727
536.4	56.054	-0.207	23.633	0	-0.59	0	0.219	0.946	-0.727
536.5	56.048	-0.207	23.191	0	-0.61	0	0.219	0.946	-0.727
536.6	56.041	-0.202	23.332	0	-0.6	0	0.219	0.946	-0.727
536.7	56.041	-0.192	23.149	0	-0.61	0	0.219	0.946	-0.727
536.8	56.041	-0.192	22.686	0	-0.6	0	0.219	0.946	-0.727
536.9	56.041	-0.212	22.919	0	-0.64	0	0.219	0.946	-0.727
537	56.035	-0.21	23.548	0	-0.78	0	0.219	0.946	-0.727
537.1	56.035	-0.21	23.442	0	-0.82	0	0.219	0.946	-0.727
537.2	56.029	-0.187	22.824	0	-0.78	0	0.219	0.946	-0.727
537.3	56.029	-0.185	23.244	0	0	0	0.219	0.946	-0.727
537.4	56.029	-0.185	23.361	0	0	0	0.219	0.946	-0.727
537.5	56.029	-0.185	23.399	0	-0.79	0	0.219	0.946	-0.727
537.6	56.029	-0.172	23.442	0	0	0	0.219	0.946	-0.727
537.7	56.023	-0.172	23.138	0	0	0	0.219	0.946	-0.727
537.8	56.023	-0.192	23.703	0	-0.65	0	0.219	0.946	-0.727
537.9	56.029	-0.192	23.904	0	-0.84	0	0.219	0.946	-0.727
538	56.023	-0.17	23.004	0	-0.64	0	0.219	0.946	-0.727
538.1	56.023	-0.195	23.615	0	-0.81	0	0.219	0.946	-0.727
538.2	56.023	-0.182	24.784	0	0	0	0.219	0.946	-0.727
538.3	56.023	-0.182	23.152	0	-0.51	0	0.219	0.946	-0.727
538.4	56.023	-0.195	23.601	0	-0.85	0	0.219	0.946	-0.727
538.5	56.017	-0.215	24.014	0	0	0	0.219	0.946	-0.727
538.6	56.017	-0.215	23.53	0	0	0	0.219	0.946	-0.727
538.7	56.017	-0.205	23.029	0	0	0	0.219	0.946	-0.727
538.8	56.017	-0.2	23.488	0	0	0	0.219	0.946	-0.727
538.9	56.017	-0.2	23.929	0	0	0	0.219	0.946	-0.727
539	56.017	-0.182	23.057	0	0	0	0.219	0.946	-0.727
539.1	56.017	-0.205	23.385	0	0	0	0.219	0.946	-0.727
539.2	56.017	-0.205	24.183	0	0	0	0.219	0.946	-0.727
539.3	56.01	-0.197	23.756	0	-0.86	0	0.219	0.946	-0.727
539.4	56.01	-0.197	23.301	0	0	0	0.219	0.946	-0.727
539.5	56.01	-0.177	23.152	0	0	0	0.219	0.946	-0.727
539.6	56.01	-0.207	22.817	0	0	0	0.219	0.946	-0.727
539.7	56.01	-0.207	24.127	0	0	0	0.219	0.946	-0.727
539.8	56.004	-0.207	23.283	0	0	0	0.219	0.946	-0.727

539.9	56.004	-0.205	22.902	0	-0.92	0	0.219	0.946	-0.727
540	55.998	-0.212	23.428	0	-0.93	0	0.219	0.946	-0.727
540.1	55.998	-0.212	23.626	0	-0.91	0	0.219	0.946	-0.727
540.2	55.992	-0.21	23.64	0	-0.92	0	0.219	0.946	-0.727
540.3	55.986	-0.192	23.41	0	-0.9	0	0.219	0.946	-0.727
540.4	55.986	-0.192	23.011	0	0	0	0.219	0.946	-0.727
540.5	55.986	-0.182	23.092	0	-0.89	0	0.219	0.946	-0.727
540.6	55.979	-0.2	23.071	0	0	0	0.219	0.946	-0.727
540.7	55.979	-0.2	23.852	0	0	0	0.219	0.946	-0.727
540.8	55.979	-0.19	23.781	0	-0.88	0	0.219	0.946	-0.727
540.9	55.979	-0.19	23.078	0	0	0	0.219	0.946	-0.727
541	55.979	-0.2	23.64	0	-0.88	0	0.219	0.946	-0.727
541.1	55.973	-0.19	23.996	0	0	0	0.219	0.946	-0.727
541.2	55.979	-0.182	23.643	0	-0.95	0	0.219	0.946	-0.727
541.3	55.973	-0.182	23.124	0	-0.95	0	0.219	0.946	-0.727
541.4	55.973	-0.195	23.597	0	-0.95	0	0.219	0.946	-0.727
541.5	55.973	-0.175	23.241	0	-0.87	0	0.218	0.946	-0.727
541.6	55.973	-0.175	22.884	0	-0.93	0	0.218	0.946	-0.727
541.7	55.967	-0.197	23.325	0	-0.92	0	0.218	0.946	-0.727
541.8	55.967	-0.19	23.837	0	-0.94	0	0.218	0.946	-0.728
541.9	55.967	-0.19	23.392	0	-0.92	0	0.218	0.946	-0.728
542	55.961	-0.205	23.11	0	-0.92	0	0.218	0.946	-0.728
542.1	55.961	-0.207	23.269	0	-0.89	0	0.218	0.946	-0.728
542.2	55.954	-0.207	22.877	0	-0.54	0	0.218	0.946	-0.728
542.3	55.954	-0.192	22.916	0	-1.01	0	0.218	0.946	-0.728
542.4	55.954	-0.192	23.177	0	-0.94	0	0.218	0.946	-0.728
542.5	55.954	-0.197	23.149	0	-0.55	0	0.218	0.946	-0.728
542.6	55.948	-0.212	23.876	0	-0.95	0	0.218	0.946	-0.728
542.7	55.948	-0.215	23.495	0	-0.58	0	0.218	0.946	-0.728
542.8	55.954	-0.215	23.428	0	-0.99	0	0.218	0.946	-0.728
542.9	55.948	-0.207	23.025	0	-0.86	0	0.218	0.946	-0.728
543	55.942	-0.215	23.068	0	-0.86	0	0.218	0.946	-0.728
543.1	55.942	-0.215	23.537	0	-0.85	0	0.218	0.946	-0.728
543.2	55.936	-0.19	23.096	0	-0.83	0	0.218	0.946	-0.728
543.3	55.936	-0.2	22.912	0	-0.84	0	0.218	0.946	-0.728
543.4	55.936	-0.2	23.537	0	-0.82	0	0.218	0.946	-0.728
543.5	55.923	-0.21	23.597	0	-0.82	0	0.218	0.946	-0.728
543.6	55.923	-0.192	23.181	0	-0.83	0	0.218	0.946	-0.728
543.7	55.923	-0.192	23.364	0	-0.83	0	0.218	0.946	-0.728
543.8	55.917	-0.18	22.534	0	-0.82	0	0.218	0.946	-0.728
543.9	55.911	-0.18	23.096	0	-0.82	0	0.218	0.946	-0.728
544	55.911	-0.2	23.626	0	-0.82	0	0.218	0.946	-0.728
544.1	55.905	-0.185	23.551	0	-0.81	0	0.218	0.946	-0.728
544.2	55.899	-0.182	22.767	0	-0.82	0	0.218	0.946	-0.728
544.3	55.899	-0.182	23.149	0	-0.82	0	0.218	0.946	-0.728
544.4	55.899	-0.18	22.912	0	-0.81	0	0.218	0.946	-0.728
544.5	55.892	-0.195	22.577	0	-0.82	0	0.218	0.946	-0.728

544.6	55.886	-0.195	23.339	0	-0.82	0	0.218	0.946	-0.728
544.7	55.886	-0.207	23.269	0	-0.8	0	0.218	0.946	-0.728
544.8	55.886	-0.195	23.022	0	-0.81	0	0.218	0.946	-0.728
544.9	55.88	-0.195	22.382	0	-0.81	0	0.218	0.946	-0.728
545	55.88	-0.2	22.577	0	-0.81	0	0.218	0.946	-0.728
545.1	55.874	-0.2	23.106	0	-0.81	0	0.218	0.946	-0.728
545.2	55.874	-0.2	23.096	0	-0.8	0	0.218	0.946	-0.728
545.3	55.874	-0.21	23.191	0	-0.79	0	0.218	0.946	-0.728
545.4	55.874	-0.21	23.626	0	-0.79	0	0.218	0.946	-0.728
545.5	55.861	-0.217	23.106	0	-0.79	0	0.218	0.946	-0.728
545.6	55.861	-0.22	22.792	0	-0.86	0	0.218	0.946	-0.728
545.7	55.855	-0.22	23.106	0	-0.97	0	0.218	0.946	-0.728
545.8	55.855	-0.22	22.965	0	-0.94	0	0.217	0.946	-0.728
545.9	55.849	-0.2	22.94	0	-0.53	0	0.217	0.946	-0.728
546	55.843	-0.217	22.577	0	-0.56	0	0.217	0.946	-0.728
546.1	55.843	-0.217	23.106	0	-0.99	0	0.217	0.946	-0.728
546.2	55.836	-0.217	23.693	0	-0.99	0	0.217	0.946	-0.729
546.3	55.836	-0.217	22.616	0	-0.98	0	0.217	0.946	-0.729
546.4	55.83	-0.217	22.764	0	-0.99	0	0.217	0.946	-0.729
546.5	55.83	-0.205	23.149	0	-0.98	0	0.217	0.946	-0.729
546.6	55.83	-0.197	22.792	0	-0.99	0	0.217	0.946	-0.729
546.7	55.824	-0.197	22.806	0	-1	0	0.217	0.946	-0.729
546.8	55.824	-0.2	22.725	0	-1	0	0.217	0.946	-0.729
546.9	55.818	-0.2	23.106	0	-1.03	0	0.217	0.946	-0.729
547	55.812	-0.21	23.64	0	-1.04	0	0.217	0.946	-0.729
547.1	55.812	-0.202	22.94	0	-0.99	0	0.217	0.946	-0.729
547.2	55.812	-0.197	22.877	0	-0.57	0	0.217	0.946	-0.729
547.3	55.805	-0.197	22.955	0	-0.55	0	0.217	0.946	-0.729
547.4	55.812	-0.185	22.577	0	-0.62	0	0.217	0.946	-0.729
547.5	55.799	-0.21	22.534	0	-1	0	0.217	0.946	-0.729
547.6	55.799	-0.21	23.739	0	-0.59	0	0.217	0.946	-0.729
547.7	55.793	-0.197	23.322	0	-1.04	0	0.217	0.946	-0.729
547.8	55.793	-0.215	22.577	0	-1	0	0.217	0.946	-0.729
547.9	55.787	-0.215	23.364	0	-0.59	0	0.217	0.946	-0.729
548	55.787	-0.212	23.336	0	-1.04	0	0.217	0.946	-0.729
548.1	55.78	-0.212	22.979	0	-0.99	0	0.217	0.946	-0.729
548.2	55.774	-0.212	22.63	0	-0.57	0	0.217	0.946	-0.729
548.3	55.774	-0.202	23.121	0	-1.04	0	0.217	0.946	-0.729
548.4	55.774	-0.202	22.548	0	-0.99	0	0.217	0.946	-0.729
548.5	55.768	-0.2	22.093	0	-0.54	0	0.217	0.946	-0.729
548.6	55.768	-0.215	22.792	0	-0.59	0	0.217	0.946	-0.729
548.7	55.762	-0.205	22.965	0	-1.04	0	0.217	0.946	-0.729
548.8	55.762	-0.205	22.88	0	-0.99	0	0.217	0.946	-0.729
548.9	55.756	-0.215	22.63	0	-0.55	0	0.217	0.946	-0.729
549	55.756	-0.215	22.979	0	-0.6	0	0.217	0.946	-0.729
549.1	55.756	-0.215	22.435	0	-1	0	0.217	0.946	-0.729
549.2	55.756	-0.212	22.778	0	-0.59	0	0.217	0.946	-0.729

549.3	55.749	-0.202	22.63	0	-1.05	0	0.217	0.946	-0.729
549.4	55.749	-0.202	22.979	0	-0.99	0	0.217	0.946	-0.729
549.5	55.743	-0.197	22.764	0	-0.55	0	0.217	0.946	-0.729
549.6	55.743	-0.2	23.159	0	-0.6	0	0.217	0.946	-0.729
549.7	55.743	-0.2	22.965	0	-1	0	0.217	0.946	-0.729
549.8	55.743	-0.212	22.965	0	-0.55	0	0.217	0.946	-0.729
549.9	55.737	-0.212	23.322	0	-0.59	0	0.217	0.946	-0.729
550	55.737	-0.21	23.022	0	-0.99	0	0.217	0.946	-0.729
550.1	55.737	-0.197	23.488	0	-0.54	0	0.216	0.946	-0.729
550.2	55.737	-0.2	23.322	0	-0.55	0	0.216	0.946	-0.729
550.3	55.731	-0.2	22.979	0	-0.55	0	0.216	0.946	-0.729
550.4	55.731	-0.207	23.392	0	-0.55	0	0.216	0.946	-0.729
550.5	55.725	-0.195	22.94	0	-0.55	0	0.216	0.946	-0.729
550.6	55.725	-0.195	22.63	0	-0.57	0	0.216	0.946	-0.73
550.7	55.725	-0.215	22.99	0	-0.91	0	0.216	0.946	-0.73
550.8	55.718	-0.195	23.435	0	-1.2	0	0.216	0.946	-0.73
550.9	55.718	-0.195	22.75	0	-2.05	0	0.216	0.946	-0.73
551	55.712	-0.21	22.531	0	-2.9	0	0.216	0.946	-0.73
551.1	55.7	-0.225	23.35	0	-3.3	0	0.216	0.946	-0.73
551.2	55.7	-0.225	23.258	0	-3.69	0	0.216	0.946	-0.73
551.3	55.675	-0.217	22.577	0	-2.88	0	0.216	0.946	-0.73
551.4	55.662	-0.217	21.567	0	-2.46	0	0.216	0.946	-0.73
551.5	55.644	-0.207	21.125	0	-1.84	0	0.216	0.946	-0.73
551.6	55.631	-0.255	21.567	0	-1.56	0	0.216	0.946	-0.73
551.7	55.619	-0.282	20.959	0	-1.14	0	0.216	0.946	-0.73
551.8	55.6	-0.282	20.504	0	-1.03	0	0.216	0.946	-0.73
551.9	55.588	-0.28	19.017	0	-0.98	0	0.216	0.946	-0.73
552	55.575	-0.29	18.41	0	-0.93	0	0.216	0.946	-0.73
552.1	55.563	-0.29	18.664	0	-0.88	0	0.216	0.946	-0.73
552.2	55.563	-0.307	18.487	0	-0.85	0	0.216	0.946	-0.73
552.3	55.532	-0.295	18.123	0	-0.9	0	0.216	0.946	-0.73
552.4	55.52	-0.295	18.314	0	-0.85	0	0.216	0.946	-0.73
552.5	55.507	-0.265	18.088	0	-0.78	0	0.216	0.946	-0.73
552.6	55.488	-0.287	18.851	0	-0.77	0	0.216	0.946	-0.73
552.7	55.476	-0.287	18.851	0	-0.63	0	0.216	0.946	-0.73
552.8	55.457	-0.285	18.922	0	0	0	0.216	0.946	-0.73
552.9	55.445	-0.285	18.773	0	0	0	0.215	0.946	-0.73
553	55.433	-0.28	17.735	0	0	0	0.215	0.946	-0.73
553.1	55.42	-0.31	19.229	0	-0.51	0	0.215	0.946	-0.73
553.2	55.401	-0.287	19.49	0	-0.52	0	0.215	0.946	-0.73
553.3	55.389	-0.287	17.848	0	-1.22	0	0.215	0.946	-0.731
553.4	55.377	-0.297	18.427	0	-2.32	0	0.215	0.946	-0.731
553.5	55.358	-0.27	18.96	0	-2.21	0	0.215	0.946	-0.731
553.6	55.339	-0.27	18.088	0	-1.63	0	0.215	0.946	-0.731
553.7	55.327	-0.272	18.357	0	-1.3	0	0.215	0.946	-0.731
553.8	55.302	-0.3	19.257	0	-1.1	0	0.215	0.946	-0.731
553.9	55.283	-0.3	18.717	0	-1.43	0	0.215	0.946	-0.731

554	55.265	-0.322	18.625	0	-1.13	0	0.215	0.946	-0.731
554.1	55.246	-0.335	17.089	0	-0.74	0	0.215	0.946	-0.731
554.2	55.246	-0.335	16.661	0	-0.77	0	0.215	0.946	-0.731
554.3	55.209	-0.32	17.145	0	-1.16	0	0.215	0.946	-0.731
554.4	55.184	-0.32	16.52	0	-1.72	0	0.215	0.946	-0.731
554.5	55.159	-0.332	16.669	0	-1.65	0	0.215	0.946	-0.731
554.6	55.134	-0.337	15.998	0	-1.52	0	0.215	0.946	-0.731
554.7	55.109	-0.335	15.966	0	-1.66	0	0.215	0.946	-0.731
554.8	55.085	-0.335	16.358	0	-1.35	0	0.215	0.946	-0.731
554.9	55.06	-0.357	16.368	0	-0.85	0	0.215	0.946	-0.731
555	55.035	-0.347	16.022	0	0	0	0.215	0.946	-0.731
555.1	55.016	-0.347	14.973	0	0	0	0.215	0.946	-0.731
555.2	54.991	-0.377	15.161	0	0	0	0.215	0.946	-0.731
555.3	54.991	-0.395	15.355	0	0	0	0.215	0.946	-0.731
555.4	54.942	-0.395	14.73	0	0	0	0.215	0.946	-0.731
555.5	54.917	-0.403	14.341	0	0	0	0.215	0.946	-0.731
555.6	54.886	-0.375	14.066	0	0	0	0.215	0.946	-0.731
555.7	54.861	-0.375	13.96	0	0	0	0.215	0.946	-0.731
555.8	54.842	-0.367	13.805	0	0	0	0.215	0.946	-0.731
555.9	54.811	-0.367	14.278	0	0	0	0.215	0.946	-0.731
556	54.786	-0.355	13.865	0	0	0	0.215	0.946	-0.731
556.1	54.761	-0.383	13.829	0	-0.6	0	0.215	0.946	-0.731
556.2	54.761	-0.383	14.147	0	-0.58	0	0.215	0.946	-0.731
556.3	54.712	-0.383	14.928	0	-0.58	0	0.215	0.946	-0.731
556.4	54.687	-0.362	14.189	0	-0.59	0	0.215	0.946	-0.731
556.5	54.662	-0.362	14.285	0	-0.59	0	0.215	0.946	-0.731
556.6	54.637	-0.362	14.617	0	-0.6	0	0.215	0.946	-0.731
556.7	54.612	-0.355	14.144	0	-0.63	0	0.215	0.946	-0.731
556.8	54.587	-0.36	14.384	0	-0.61	0	0.215	0.946	-0.731
556.9	54.569	-0.36	14.811	0	-0.61	0	0.215	0.946	-0.731
557	54.544	-0.32	14.716	0	-0.61	0	0.215	0.946	-0.731
557.1	54.519	-0.347	14.412	0	-0.62	0	0.215	0.946	-0.731
557.2	54.519	-0.347	15.154	0	-0.61	0	0.215	0.946	-0.731
557.3	54.476	-0.357	16.488	0	-0.61	0	0.214	0.946	-0.731
557.4	54.445	-0.357	15.196	0	0	0	0.214	0.946	-0.731
557.5	54.42	-0.335	14.412	0	0	0	0.214	0.946	-0.731
557.6	54.401	-0.38	15.475	0	0	0	0.214	0.946	-0.731
557.7	54.376	-0.377	16.167	0	0	0	0.214	0.946	-0.731
557.8	54.351	-0.377	15.38	0	0	0	0.214	0.946	-0.731
557.9	54.326	-0.362	14.779	0	0	0	0.214	0.946	-0.731
558	54.308	-0.352	15.168	0	0	0	0.214	0.946	-0.731
558.1	54.283	-0.352	14.779	0	0	0	0.214	0.946	-0.731
558.2	54.283	-0.355	14.596	0	0	0	0.214	0.946	-0.732
558.3	54.239	-0.355	15.115	0	0	0	0.214	0.946	-0.732
558.4	54.215	-0.355	14.557	0	0	0	0.214	0.946	-0.732
558.5	54.19	-0.367	14.988	0	0	0	0.214	0.946	-0.732
558.6	54.171	-0.355	14.853	0	0	0	0.214	0.946	-0.732

558.7	54.146	-0.355	14.408	0	0	0	0.214	0.946	-0.732
558.8	54.121	-0.365	14.758	0	0	0	0.214	0.946	-0.732
558.9	54.103	-0.365	15.623	0	0	0	0.214	0.946	-0.732
559	54.078	-0.35	15.182	0	0	0	0.214	0.946	-0.732
559.1	54.059	-0.34	14.832	0	0	0	0.214	0.946	-0.732
559.2	54.059	-0.347	14.754	0	0	0	0.214	0.946	-0.732
559.3	54.01	-0.347	15.613	0	0	0	0.214	0.946	-0.732
559.4	53.991	-0.342	15.613	0	0	0	0.214	0.946	-0.732
559.5	53.966	-0.327	14.832	0	0	0	0.214	0.946	-0.732
559.6	53.947	-0.327	15.168	0	0	0	0.214	0.946	-0.732
559.7	53.923	-0.335	15.041	0	0	0	0.214	0.946	-0.732
559.8	53.904	-0.337	15.556	0	0	0	0.214	0.946	-0.732
559.9	53.879	-0.337	15.733	0	0	0	0.214	0.946	-0.732
560	53.86	-0.337	15.263	0	0	0	0.214	0.946	-0.732
560.1	53.836	-0.355	15.182	0	0	0	0.214	0.946	-0.732
560.2	53.817	-0.355	15.21	0	0	0	0.214	0.946	-0.732
560.3	53.798	-0.352	15.401	0	-0.65	0	0.214	0.946	-0.732
560.4	53.773	-0.352	15.192	0	-0.65	0	0.214	0.946	-0.732
560.5	53.749	-0.357	14.885	0	-0.65	0	0.214	0.946	-0.732
560.6	53.73	-0.365	15.757	0	-0.66	0	0.214	0.946	-0.732
560.7	53.711	-0.383	14.98	0	-0.64	0	0.214	0.946	-0.732
560.8	53.693	-0.383	15.284	0	-0.65	0	0.214	0.946	-0.732
560.9	53.668	-0.345	15.369	0	-0.63	0	0.214	0.946	-0.732
561	53.649	-0.347	14.769	0	-0.63	0	0.214	0.946	-0.732
561.1	53.631	-0.347	15.411	0	-0.62	0	0.214	0.946	-0.732
561.2	53.631	-0.335	15.927	0	-0.62	0	0.214	0.946	-0.732
561.3	53.587	-0.332	15.623	0	-0.62	0	0.214	0.946	-0.732
561.4	53.568	-0.332	15.394	0	-0.61	0	0.214	0.946	-0.732
561.5	53.55	-0.335	15.839	0	-0.62	0	0.214	0.946	-0.732
561.6	53.531	-0.357	15.454	0	-0.6	0	0.214	0.946	-0.732
561.7	53.506	-0.357	15.327	0	-0.62	0	0.214	0.946	-0.732
561.8	53.494	-0.322	16.273	0	-0.65	0	0.214	0.946	-0.732
561.9	53.475	-0.322	15.312	0	-0.64	0	0.214	0.946	-0.732
562	53.457	-0.307	15.662	0	-0.56	0	0.214	0.946	-0.732
562.1	53.438	-0.307	16.488	0	-0.64	0	0.214	0.946	-0.732
562.2	53.438	-0.322	16.591	0	-0.64	0	0.214	0.946	-0.732
562.3	53.413	-0.322	16.955	0	-0.64	0	0.214	0.946	-0.732
562.4	53.394	-0.312	17.219	0	-0.63	0	0.214	0.946	-0.732
562.5	53.382	-0.285	16.432	0	-0.62	0	0.214	0.946	-0.732
562.6	53.37	-0.285	17.64	0	-0.62	0	0.214	0.946	-0.732
562.7	53.357	-0.295	18.162	0	-0.62	0	0.214	0.946	-0.732
562.8	53.345	-0.302	18.568	0	-0.77	0	0.214	0.946	-0.732
562.9	53.326	-0.302	18.6	0	-0.79	0	0.214	0.946	-0.732
563	53.314	-0.28	18.614	0	-0.76	0	0.214	0.946	-0.732
563.1	53.301	-0.287	18.176	0	0	0	0.214	0.946	-0.732
563.2	53.301	-0.287	18.191	0	0	0	0.214	0.946	-0.732
563.3	53.283	-0.292	18.699	0	0	0	0.214	0.946	-0.732

563.4	53.27	-0.292	18.576	0	0	0	0.214	0.946	-0.732
563.5	53.264	-0.29	17.915	0	-0.85	0	0.214	0.946	-0.732
563.6	53.252	-0.297	18.78	0	-1.21	0	0.214	0.946	-0.732
563.7	53.239	-0.287	18.35	0	-1.69	0	0.214	0.946	-0.732
563.8	53.227	-0.287	18.233	0	-1.92	0	0.214	0.946	-0.732
563.9	53.214	-0.3	18.219	0	-2.41	0	0.213	0.946	-0.732
564	53.196	-0.29	18.699	0	-2.61	0	0.213	0.946	-0.733
564.1	53.177	-0.29	18.374	0	-2.48	0	0.213	0.946	-0.733
564.2	53.177	-0.325	17.739	0	-2.09	0	0.213	0.946	-0.733
564.3	53.133	-0.32	18.392	0	-1.69	0	0.213	0.946	-0.733
564.4	53.109	-0.32	17.354	0	-1.82	0	0.213	0.946	-0.733
564.5	53.084	-0.325	15.955	0	-2.19	0	0.213	0.946	-0.733
564.6	53.059	-0.355	15.782	0	-2.08	0	0.213	0.946	-0.733
564.7	53.034	-0.355	15.553	0	-1.87	0	0.213	0.946	-0.733
564.8	53.015	-0.355	15.609	0	-2.08	0	0.213	0.946	-0.733
564.9	52.991	-0.355	14.317	0	-1.59	0	0.213	0.946	-0.733
565	52.966	-0.357	14.543	0	-1.31	0	0.213	0.946	-0.733
565.1	52.941	-0.377	14.384	0	-1.12	0	0.213	0.946	-0.733
565.2	52.941	-0.375	14.384	0	-1.07	0	0.213	0.946	-0.733
565.3	52.91	-0.375	13.787	0	-0.72	0	0.213	0.946	-0.733
565.4	52.86	-0.395	13.469	0	0	0	0.213	0.946	-0.733
565.5	52.829	-0.388	13.444	0	0	0	0.213	0.946	-0.733
565.6	52.81	-0.388	12.494	0	0	0	0.213	0.946	-0.733
565.7	52.779	-0.375	11.837	0	0	0	0.213	0.946	-0.733
565.8	52.748	-0.385	12.41	0	0	0	0.213	0.946	-0.733
565.9	52.723	-0.385	12.54	0	0	0	0.213	0.946	-0.733
566	52.692	-0.41	11.982	0	0	0	0.213	0.946	-0.733
566.1	52.667	-0.418	12.523	0	-0.57	0	0.213	0.946	-0.733
566.2	52.667	-0.418	12.568	0	-1.26	0	0.213	0.946	-0.733
566.3	52.63	-0.388	11.558	0	-1.68	0	0.213	0.946	-0.733
566.4	52.574	-0.388	12.18	0	-1	0	0.213	0.946	-0.733
566.5	52.543	-0.383	12.166	0	-0.58	0	0.213	0.946	-0.733
566.6	52.512	-0.383	12.392	0	0	0	0.213	0.946	-0.733
566.7	52.481	-0.398	12.494	0	0	0	0.213	0.946	-0.733
566.8	52.45	-0.398	12.554	0	0	0	0.213	0.946	-0.733
566.9	52.419	-0.413	12.106	0	0	0	0.213	0.946	-0.733
567	52.388	-0.41	11.315	0	0	0	0.213	0.946	-0.733
567.1	52.357	-0.41	11.35	0	0	0	0.212	0.946	-0.733
567.2	52.357	-0.405	11.336	0	0	0	0.212	0.946	-0.733
567.3	52.301	-0.4	11.011	0	0	0	0.212	0.946	-0.733
567.4	52.276	-0.4	11.438	0	0	0	0.212	0.946	-0.733
567.5	52.245	-0.415	11.647	0	0	0	0.212	0.946	-0.733
567.6	52.22	-0.393	11.936	0	-0.52	0	0.212	0.946	-0.733
567.7	52.195	-0.393	11.792	0	-0.53	0	0.212	0.946	-0.734
567.8	52.17	-0.393	11.781	0	-0.52	0	0.212	0.946	-0.734
567.9	52.145	-0.393	13.088	0	0	0	0.212	0.946	-0.734
568	52.127	-0.398	13.349	0	3.81	0	0.213	0.946	-0.734

568.1	52.108	-0.39	13.264	0	3.6	0	0.213	0.946	-0.734
568.2	52.108	-0.377	13.631	0	2.79	0	0.213	0.946	-0.734
568.3	52.09	-0.377	13.522	0	1.7	0	0.213	0.946	-0.734
568.4	52.077	-0.362	13.773	0	0	0	0.213	0.946	-0.734
568.5	52.052	-0.34	14.144	0	-0.56	0	0.213	0.946	-0.734
568.6	52.04	-0.34	14.956	0	0	0	0.213	0.946	-0.734
568.7	52.021	-0.32	15.485	0	0	0	0.213	0.946	-0.734
568.8	52.009	-0.315	16.245	0	-0.52	0	0.213	0.946	-0.734
568.9	51.996	-0.315	16.658	0	-0.93	0	0.213	0.946	-0.734
569	51.978	-0.322	16.729	0	-0.93	0	0.213	0.946	-0.734
569.1	51.965	-0.322	16.757	0	-0.93	0	0.213	0.946	-0.734
569.2	51.965	-0.322	17.347	0	-0.93	0	0.213	0.946	-0.734
569.3	51.953	-0.307	17.071	0	-0.91	0	0.213	0.946	-0.734
569.4	51.928	-0.307	17.325	0	-0.91	0	0.213	0.946	-0.734
569.5	51.916	-0.297	16.898	0	-0.91	0	0.212	0.946	-0.734
569.6	51.909	-0.287	17.505	0	-0.9	0	0.212	0.946	-0.734
569.7	51.897	-0.285	17.435	0	-0.93	0	0.212	0.946	-0.734
569.8	51.884	-0.285	17.075	0	-0.93	0	0.212	0.946	-0.734
569.9	51.872	-0.317	17.943	0	-0.92	0	0.212	0.946	-0.734
570	51.86	-0.305	18.078	0	0	0	0.212	0.946	-0.734
570.1	51.853	-0.305	17.463	0	1.79	0	0.212	0.946	-0.734
570.2	51.853	-0.292	17.216	0	1.4	0	0.212	0.946	-0.734
570.3	51.847	-0.287	17.654	0	-0.89	0	0.212	0.946	-0.734
570.4	51.841	-0.287	17.989	0	-0.91	0	0.212	0.946	-0.734
570.5	51.835	-0.27	17.83	0	-0.93	0	0.212	0.946	-0.734
570.6	51.829	-0.262	18.526	0	-0.98	0	0.212	0.946	-0.734
570.7	51.822	-0.262	18.71	0	-0.96	0	0.212	0.946	-0.734
570.8	51.816	-0.26	19.225	0	-0.97	0	0.212	0.946	-0.734
570.9	51.816	-0.26	19.211	0	1.79	0	0.212	0.946	-0.734
571	51.816	-0.265	19.211	0	3.96	0	0.212	0.947	-0.734
571.1	51.822	-0.272	19.833	0	2.59	0	0.213	0.947	-0.734
571.2	51.829	-0.245	19.766	0	1.87	0	0.213	0.947	-0.734
571.3	51.829	-0.245	19.593	0	1.2	0	0.213	0.947	-0.734
571.4	51.835	-0.222	19.9	0	-0.94	0	0.213	0.947	-0.734
571.5	51.835	-0.23	21.171	0	-1.12	0	0.213	0.947	-0.734
571.6	51.841	-0.23	22.185	0	-1.14	0	0.213	0.947	-0.734
571.7	51.847	-0.212	22.414	0	-1.1	0	0.213	0.947	-0.734
571.8	51.853	-0.212	22.51	0	-0.69	0	0.212	0.947	-0.734
571.9	51.86	-0.212	22.803	0	-0.72	0	0.212	0.947	-0.734
572	51.86	-0.235	23.474	0	-0.72	0	0.212	0.947	-0.734
572.1	51.872	-0.225	23.389	0	-0.73	0	0.212	0.947	-0.734
572.2	51.878	-0.225	22.873	0	-0.72	0	0.212	0.947	-0.734
572.3	51.878	-0.2	23.025	0	-0.72	0	0.212	0.947	-0.734
572.4	51.891	-0.2	23.011	0	-0.72	0	0.212	0.947	-0.734
572.5	51.891	-0.195	22.259	0	-0.72	0	0.212	0.947	-0.734
572.6	51.903	-0.195	23.389	0	-0.73	0	0.212	0.947	-0.734
572.7	51.903	-0.205	22.803	0	-0.72	0	0.212	0.947	-0.734

572.8	51.909	-0.205	22.697	0	-0.74	0	0.212	0.947	-0.734
572.9	51.916	-0.205	23.198	0	-0.73	0	0.212	0.947	-0.734
573	51.928	-0.197	22.82	0	-0.73	0	0.212	0.947	-0.734
573.1	51.934	-0.197	22.672	0	-0.75	0	0.212	0.947	-0.734
573.2	51.94	-0.212	22.626	0	-1.12	0	0.212	0.947	-0.734
573.3	51.94	-0.22	22.986	0	-0.99	0	0.212	0.947	-0.735
573.4	51.947	-0.22	23.491	0	-1.29	0	0.212	0.947	-0.735
573.5	51.953	-0.19	22.347	0	-1.3	0	0.212	0.947	-0.735
573.6	51.953	-0.195	22.573	0	-1.58	0	0.212	0.947	-0.735
573.7	51.959	-0.195	23.103	0	-1.49	0	0.212	0.947	-0.735
573.8	51.959	-0.222	22.792	0	-1.6	0	0.212	0.947	-0.735
573.9	51.959	-0.222	22.714	0	-1.34	0	0.212	0.947	-0.735
574	51.959	-0.232	22.725	0	-1.18	0	0.212	0.947	-0.735
574.1	51.959	-0.23	21.8	0	-1.07	0	0.212	0.947	-0.735
574.2	51.959	-0.222	21.842	0	-0.93	0	0.212	0.947	-0.735
574.3	51.965	-0.222	21.743	0	-0.84	0	0.212	0.947	-0.735
574.4	51.965	-0.23	21.443	0	-0.73	0	0.212	0.947	-0.735
574.5	51.971	-0.25	21.701	0	-0.75	0	0.212	0.947	-0.735
574.6	51.971	-0.25	21.136	0	-1.43	0	0.212	0.947	-0.735
574.7	51.965	-0.227	20.663	0	-4.3	0	0.212	0.947	-0.735
574.8	51.959	-0.232	21.055	0	-4.13	0	0.212	0.947	-0.735
574.9	51.953	-0.232	21.5	0	-3.44	0	0.211	0.947	-0.735
575	51.94	-0.24	20.656	0	-2.8	0	0.211	0.947	-0.735
575.1	51.934	-0.265	20.931	0	-2.33	0	0.211	0.947	-0.735
575.2	51.922	-0.265	21.256	0	-2.01	0	0.211	0.947	-0.735
575.3	51.922	-0.292	20.094	0	-1.6	0	0.211	0.947	-0.736
575.4	51.903	-0.292	19.186	0	-1.32	0	0.211	0.947	-0.736
575.5	51.897	-0.287	17.883	0	-0.98	0	0.211	0.947	-0.736
575.6	51.884	-0.315	17.897	0	-0.68	0	0.211	0.947	-0.736
575.7	51.872	-0.312	17.869	0	0	0	0.211	0.947	-0.736
575.8	51.86	-0.312	17.05	0	0	0	0.211	0.947	-0.736
575.9	51.853	-0.305	17.184	0	0	0	0.211	0.947	-0.736
576	51.841	-0.31	16.884	0	0	0	0.211	0.947	-0.736
576.1	51.835	-0.31	17.138	0	0	0	0.211	0.947	-0.736
576.2	51.822	-0.3	17.096	0	-0.58	0	0.211	0.947	-0.736
576.3	51.816	-0.287	16.45	0	-0.76	0	0.211	0.947	-0.736
576.4	51.804	-0.287	16.679	0	-0.54	0	0.211	0.947	-0.736
576.5	51.791	-0.3	17.184	0	0	0	0.211	0.947	-0.736
576.6	51.779	-0.3	18.286	0	0	0	0.211	0.947	-0.736
576.7	51.766	-0.3	17.332	0	0	0	0.211	0.947	-0.736
576.8	51.754	-0.317	17.594	0	0	0	0.211	0.947	-0.736
576.9	51.742	-0.317	17.417	0	0	0	0.211	0.947	-0.736
577	51.729	-0.305	16.979	0	0	0	0.211	0.947	-0.736
577.1	51.717	-0.31	17.269	0	0	0	0.211	0.947	-0.736
577.2	51.704	-0.317	17.551	0	0	0	0.211	0.947	-0.736
577.3	51.698	-0.317	17.332	0	-0.84	0	0.211	0.947	-0.736
577.4	51.686	-0.32	17.509	0	-2.15	0	0.211	0.947	-0.736

577.5	51.686	-0.3	17.096	0	-2.52	0	0.211	0.947	-0.736
577.6	51.648	-0.3	16.979	0	-2.17	0	0.211	0.947	-0.736
577.7	51.63	-0.312	17.145	0	-1.53	0	0.211	0.947	-0.736
577.8	51.617	-0.332	17.46	0	-1.08	0	0.211	0.947	-0.736
577.9	51.599	-0.332	17.537	0	-1.05	0	0.211	0.947	-0.736
578	51.58	-0.32	16.69	0	-1.35	0	0.211	0.947	-0.736
578.1	51.561	-0.342	15.666	0	-1.74	0	0.21	0.947	-0.736
578.2	51.537	-0.342	15.56	0	-1.8	0	0.21	0.947	-0.736
578.3	51.518	-0.352	15.228	0	-1.41	0	0.21	0.947	-0.736
578.4	51.499	-0.352	14.698	0	-1.15	0	0.21	0.947	-0.736
578.5	51.481	-0.362	14.892	0	-1	0	0.21	0.947	-0.736
578.6	51.462	-0.372	15.493	0	-0.92	0	0.21	0.947	-0.736
578.7	51.443	-0.37	14.196	0	-0.79	0	0.21	0.947	-0.736
578.8	51.425	-0.37	14.278	0	-0.78	0	0.21	0.947	-0.736
578.9	51.4	-0.385	13.96	0	-0.71	0	0.21	0.947	-0.736
579	51.381	-0.372	14.267	0	-0.69	0	0.21	0.947	-0.736
579.1	51.363	-0.372	13.589	0	-0.65	0	0.21	0.947	-0.736
579.2	51.344	-0.365	13.423	0	-0.63	0	0.21	0.947	-0.736
579.3	51.319	-0.375	14.105	0	-0.69	0	0.21	0.947	-0.737
579.4	51.307	-0.375	14.641	0	-0.58	0	0.21	0.947	-0.737
579.5	51.307	-0.362	13.949	0	-0.7	0	0.21	0.947	-0.737
579.6	51.257	-0.367	14.048	0	-0.95	0	0.21	0.947	-0.737
579.7	51.238	-0.367	14.249	0	-2.29	0	0.21	0.947	-0.737
579.8	51.22	-0.335	13.833	0	-4.27	0	0.21	0.947	-0.737
579.9	51.182	-0.335	13.575	0	-4.93	0	0.21	0.947	-0.737
580	51.157	-0.342	14.048	0	-4.48	0	0.21	0.947	-0.737
580.1	51.126	-0.337	14.811	0	-2.92	0	0.21	0.947	-0.737
580.2	51.095	-0.347	14.119	0	-1.95	0	0.21	0.947	-0.737
580.3	51.058	-0.347	15.101	0	-1.33	0	0.209	0.947	-0.737
580.4	51.033	-0.383	15.291	0	-1.27	0	0.209	0.947	-0.737
580.5	51.033	-0.435	13.035	0	-1.73	0	0.209	0.947	-0.737
580.6	50.965	-0.435	11.506	0	-1.78	0	0.209	0.947	-0.737
580.7	50.928	-0.443	10.248	0	-1.98	0	0.209	0.947	-0.737
580.8	50.897	-0.44	10.075	0	-1.84	0	0.209	0.947	-0.737
580.9	50.859	-0.44	10.026	0	-1.26	0	0.209	0.947	-0.737
581	50.816	-0.445	10.079	0	-1.04	0	0.209	0.947	-0.737
581.1	50.778	-0.498	10.149	0	-1.32	0	0.209	0.947	-0.738
581.2	50.735	-0.498	10.736	0	-1.71	0	0.209	0.947	-0.738
581.3	50.691	-0.49	8.882	0	-1.97	0	0.209	0.947	-0.738
581.4	50.691	-0.49	7.427	0	-1.73	0	0.209	0.947	-0.738
581.5	50.654	-0.49	7.441	0	1.33	0	0.209	0.947	-0.738
581.6	50.561	-0.493	7.596	0	0.54	0	0.209	0.947	-0.738
581.7	50.511	-0.52	7.003	0	0	0	0.209	0.947	-0.738
581.8	50.455	-0.52	7.427	0	0	0	0.209	0.947	-0.738
581.9	50.406	-0.72	7.78	0	0	0	0.209	0.947	-0.738
582	50.356	-0.66	4.167	0	0	0	0.209	0.947	-0.738
582.1	50.306	-0.66	-3.373	0	0	0	0.209	0.947	-0.738

582.2	50.25	-0.665	-3.072	0	0	0	0.209	0.947	-0.738
582.3	50.201	-0.64	0.583	0	0	0	0.209	0.947	-0.738
582.4	50.151	-0.64	-0.565	0	0	0	0.209	0.947	-0.738
582.5	50.101	-0.63	-1.752	0	0	0	0.209	0.947	-0.738
582.6	50.045	-0.658	-1.25	0	0	0	0.209	0.947	-0.738
582.7	49.996	-0.658	-0.632	0	0	0	0.209	0.947	-0.738
582.8	49.94	-0.665	-1.137	0	0	0	0.209	0.947	-0.738
582.9	49.89	-0.665	-1.794	0	0	0	0.209	0.947	-0.738
583	49.84	-0.678	-3.129	0	0	0	0.209	0.947	-0.738
583.1	49.79	-0.678	-2.613	0	0	0	0.209	0.947	-0.738
583.2	49.741	-0.723	-3.404	0	0	0	0.209	0.947	-0.738
583.3	49.685	-0.723	-1.935	0	0	0	0.209	0.947	-0.738
583.4	49.635	-0.72	-4.259	0	0	0	0.209	0.947	-0.738
583.5	49.635	-0.658	-4.669	0	0	0	0.209	0.947	-0.738
583.6	49.536	-0.658	-2.924	0	0	0	0.209	0.947	-0.738
583.7	49.486	-0.678	-2.405	0	0	0	0.209	0.947	-0.738
583.8	49.443	-0.68	-1.589	0	0	0	0.209	0.947	-0.738
583.9	49.387	-0.68	-1.787	0	0	0	0.209	0.947	-0.738
584	49.337	-0.643	-1.893	0	0	0	0.209	0.947	-0.738
584.1	49.287	-0.63	-2.274	0	0	0	0.209	0.947	-0.738
584.2	49.237	-0.63	-2.108	0	0	0	0.209	0.947	-0.738
584.3	49.182	-0.673	-1.183	0	0	0	0.209	0.947	-0.738
584.4	49.138	-0.673	-0.692	0	0	0	0.209	0.947	-0.738
584.5	49.138	-0.665	-1.508	0	0	0	0.209	0.947	-0.738
584.6	49.039	-0.663	-1.483	0	0	0	0.209	0.947	-0.738
584.7	48.989	-0.655	-1.278	0	0	0	0.209	0.947	-0.738
584.8	48.939	-0.655	-1.455	0	0	0	0.209	0.947	-0.738
584.9	48.896	-0.65	-1.458	0	0	0	0.209	0.947	-0.738
585	48.84	-0.643	-1.13	0	0	0	0.209	0.947	-0.738
585.1	48.796	-0.643	-1.021	0	0	0	0.209	0.947	-0.738
585.2	48.747	-0.65	-1.36	0	0	0	0.209	0.947	-0.738
585.3	48.697	-0.66	-0.946	0	0	0	0.209	0.947	-0.738
585.4	48.647	-0.66	-0.505	0	0	0	0.209	0.947	-0.738
585.5	48.647	-0.65	-1.049	0	0	0	0.209	0.947	-0.738
585.6	48.548	-0.648	-0.876	0	0	0	0.21	0.947	-0.738
585.7	48.498	-0.648	-1.049	0	0	0	0.21	0.947	-0.738
585.8	48.448	-0.63	-0.865	0	0	0	0.21	0.947	-0.738
585.9	48.399	-0.63	-1.024	0	0	0	0.21	0.947	-0.738
586	48.349	-0.655	-1.024	0	0.94	0	0.21	0.947	-0.738
586.1	48.299	-0.678	-0.205	0	2.4	0	0.21	0.947	-0.738
586.2	48.256	-0.658	-0.968	0	4.02	0	0.21	0.947	-0.738
586.3	48.212	-0.658	-1.49	0	6.36	0	0.21	0.948	-0.738
586.4	48.181	-0.663	-0.727	0	10.37	0	0.21	0.948	-0.738
586.5	48.181	-0.653	-0.795	0	11.8	0	0.211	0.948	-0.738
586.6	48.125	-0.653	-1.141	0	14.61	0	0.211	0.949	-0.738
586.7	48.1	-0.673	-0.484	0	15.17	0	0.211	0.949	-0.738
586.8	48.082	-0.673	-0.855	0	16.57	0	0.212	0.95	-0.738

586.9	48.063	-0.673	-0.614	0	17.33	0	0.212	0.95	-0.738
587	48.044	-0.66	-1.271	0	17.69	0	0.213	0.95	-0.738
587.1	48.032	-0.66	-0.699	0	17.7	0	0.213	0.951	-0.738
587.2	48.013	-0.66	-1.084	0	17.66	0	0.214	0.951	-0.738
587.3	47.995	-0.648	-0.858	0	17.71	0	0.214	0.952	-0.738
587.4	47.982	-0.648	-1.144	0	17.66	0	0.215	0.952	-0.738
587.5	47.982	-0.67	-0.177	0	18.15	0	0.215	0.953	-0.738
587.6	47.945	-0.633	-0.562	0	20.51	0	0.216	0.954	-0.738
587.7	47.933	-0.643	-1.826	0	23.47	0	0.216	0.954	-0.738
587.8	47.926	-0.643	-0.802	0	23.98	0	0.217	0.955	-0.738
587.9	47.92	-0.663	-0.466	0	24.65	0	0.218	0.956	-0.738
588	47.92	-0.648	-0.374	0	24.92	0	0.219	0.956	-0.738
588.1	47.914	-0.648	-1.501	0	25.48	0	0.219	0.957	-0.738
588.2	47.914	-0.658	-1.028	0	26.12	0	0.22	0.958	-0.738
588.3	47.908	-0.653	-0.759	0	26.93	0	0.221	0.958	-0.738
588.4	47.902	-0.653	-0.717	0	27.07	0	0.221	0.959	-0.738
588.5	47.902	-0.64	-1.519	0	30.32	0	0.222	0.96	-0.738
588.6	47.914	-0.653	-0.883	0	32.41	0	0.223	0.961	-0.738
588.7	47.92	-0.653	-0.692	0	33.09	0	0.224	0.962	-0.738
588.8	47.926	-0.66	-0.692	0	33.8	0	0.225	0.963	-0.738
588.9	47.939	-0.66	-0.678	0	36.18	0	0.226	0.964	-0.738
589	47.951	-0.66	-0.664	0	37.73	0	0.227	0.965	-0.738
589.1	47.97	-0.64	-0.65	0	38.68	0	0.228	0.966	-0.738
589.2	47.988	-0.635	-1.07	0	39.87	0	0.229	0.967	-0.738
589.3	48.007	-0.635	-1.141	0	42.21	0	0.23	0.968	-0.738
589.4	48.032	-0.638	-0.809	0	52.68	0	0.232	0.97	-0.738
589.5	48.032	-0.658	-1.049	0	67.14	0	0.234	0.971	-0.738
589.6	48.094	-0.658	-0.498	0	56.53	0	0.235	0.973	-0.738
589.7	48.138	-0.63	-0.48	0	58.31	0	0.237	0.975	-0.738
589.8	48.175	-0.64	-1.278	0	59.85	0	0.239	0.976	-0.738
589.9	48.218	-0.64	-0.996	0	61.78	0	0.24	0.978	-0.738
590	48.262	-0.665	-0.625	0	66.14	0	0.242	0.98	-0.738
590.1	48.305	-0.683	-0.607	0	67.27	0	0.244	0.982	-0.738
590.2	48.355	-0.683	-0.939	0	68.57	0	0.246	0.984	-0.738
590.3	48.392	-0.678	-0.201	0	68.02	0	0.248	0.986	-0.738
590.4	48.436	-0.678	-0.855	0	89.6	0	0.25	0.988	-0.738
590.5	48.436	-0.663	-1.345	0	93.05	0	0.253	0.991	-0.738
590.6	48.473	-0.638	-0.727	0	88.53	0	0.255	0.993	-0.738
590.7	48.473	-0.57	-0.576	0	81.3	0	0.258	0.995	-0.738
590.8	48.473	-0.57	-0.215	0	49.37	0	0.259	0.997	-0.738
590.9	48.473	-0.05	2.137	0	3.63	0	0.259	0.997	-0.738
591	48.467	0.05	6.452	0	3.52	0	0.259	0.997	-0.738
591.1	48.467	0.05	24.247	0	10.08	0	0.26	0.997	-0.738
591.2	48.473	-0.275	37.363	0	16.99	0	0.26	0.998	-0.738
591.3	48.479	-0.528	35.279	0	19.62	0	0.261	0.998	-0.738
591.4	48.492	-0.528	28.005	0	17.94	0	0.261	0.999	-0.738
591.5	48.492	-0.355	12.081	0	16.75	0	0.261	0.999	-0.738

591.6	48.517	-0.352	10.104	0	13.92	0	0.262	1	-0.738
591.7	48.542	-0.352	14.37	0	11.38	0	0.262	1	-0.738
591.8	48.554	-0.267	16.185	0	9.28	0	0.262	1	-0.738
591.9	48.573	-0.267	17.004	0	7.26	0	0.263	1	-0.738
592	48.591	-0.235	19.254	0	5.49	0	0.263	1	-0.738
592.1	48.616	-0.185	21.457	0	4	0	0.263	1.001	-0.738
592.2	48.641	-0.187	22.721	0	2.7	0	0.263	1.001	-0.738
592.3	48.653	-0.187	24.275	0	1.54	0	0.263	1.001	-0.738
592.4	48.672	-0.177	25.713	0	0.68	0	0.263	1.001	-0.738
592.5	48.684	-0.19	25.183	0	0	0	0.263	1.001	-0.738
592.6	48.703	-0.19	26.242	0	0	0	0.263	1.001	-0.738
592.7	48.722	-0.157	25.561	0	-0.89	0	0.263	1.001	-0.738
592.8	48.74	-0.155	24.77	0	-1.5	0	0.263	1.001	-0.738
592.9	48.759	-0.155	25.896	0	-2.34	0	0.263	1.001	-0.738
593	48.778	-0.145	26.437	0	-2.95	0	0.263	1.001	-0.738
593.1	48.778	-0.145	26.61	0	-3.35	0	0.263	1.001	-0.738
593.2	48.821	-0.145	27.75	0	-3.76	0	0.263	1.001	-0.738
593.3	48.821	-0.135	27.182	0	-4.22	0	0.263	1.001	-0.738
593.4	48.858	-0.135	27.528	0	-4.73	0	0.262	1.001	-0.738
593.5	48.877	-0.137	27.863	0	-5	0	0.262	1.001	-0.739
593.6	48.902	-0.11	28.223	0	-5.1	0	0.262	1.001	-0.739
593.7	48.914	-0.09	28.284	0	-5.26	0	0.262	1.001	-0.739
593.8	48.939	-0.09	28.033	0	-7.67	0	0.262	1.001	-0.739
593.9	48.939	-0.1	28.75	0	-8.34	0	0.262	1.001	-0.739
594	48.958	-0.11	28.661	0	-11.55	0	0.261	1.001	-0.74
594.1	48.964	-0.11	28.884	0	-13.78	0	0.261	1.001	-0.74
594.2	48.97	-0.125	29.488	0	-13.93	0	0.26	1.001	-0.74
594.3	48.97	-0.102	28.969	0	-13.21	0	0.26	1.001	-0.741
594.4	48.97	-0.102	28.022	0	-12.61	0	0.26	1.001	-0.741
594.5	48.97	-0.16	27.538	0	-12.26	0	0.259	1.001	-0.741
594.6	48.97	-0.17	28.344	0	-11.79	0	0.259	1.001	-0.742
594.7	48.976	-0.17	27.658	0	-11.33	0	0.259	1.001	-0.742
594.8	48.976	-0.165	25.977	0	-10.99	0	0.258	1.001	-0.742
594.9	48.976	-0.165	25.949	0	-10.71	0	0.258	1.001	-0.743
595	48.976	-0.172	25.769	0	-10.37	0	0.258	1.001	-0.743
595.1	48.976	-0.185	25.388	0	-10.16	0	0.258	1.001	-0.743
595.2	48.97	-0.187	24.876	0	-10.02	0	0.257	1.001	-0.743
595.3	48.976	-0.187	24.431	0	-9.84	0	0.257	1.001	-0.744
595.4	48.976	-0.192	24.445	0	-9.86	0	0.257	1.001	-0.744
595.5	48.976	-0.18	24.512	0	-10	0	0.256	1.001	-0.744
595.6	48.97	-0.18	23.633	0	-11.99	0	0.256	1.001	-0.745
595.7	48.964	-0.17	23.675	0	-14.75	0	0.256	1.001	-0.745
595.8	48.958	-0.18	23.982	0	-15.85	0	0.255	1.001	-0.745
595.9	48.939	-0.18	24.551	0	-15.65	0	0.255	1.001	-0.746
596	48.921	-0.21	24.643	0	-15	0	0.254	1.001	-0.746
596.1	48.914	-0.222	24.349	0	-14.42	0	0.254	1.001	-0.747
596.2	48.902	-0.222	24.349	0	-13.59	0	0.254	1.001	-0.747

596.3	48.889	-0.195	22.923	0	-13.17	0	0.253	1.001	-0.747
596.4	48.877	-0.195	22.683	0	-13.11	0	0.253	1.001	-0.748
596.5	48.865	-0.2	23.255	0	-13.08	0	0.253	1.001	-0.748
596.6	48.852	-0.205	22.584	0	-12.98	0	0.252	1.001	-0.749
596.7	48.84	-0.212	22.513	0	-12.55	0	0.252	1.001	-0.749
596.8	48.827	-0.212	22.301	0	-11.72	0	0.252	1.001	-0.749
596.9	48.815	-0.227	22.827	0	-11.72	0	0.251	1.001	-0.75
597	48.809	-0.202	22.453	0	-11.73	0	0.251	1.001	-0.75
597.1	48.809	-0.202	21.606	0	-11.73	0	0.251	1.001	-0.75
597.2	48.79	-0.19	21.733	0	-11.72	0	0.25	1.001	-0.751
597.3	48.778	-0.195	22.111	0	-11.72	0	0.25	1.001	-0.751
597.4	48.771	-0.195	22.464	0	-11.72	0	0.25	1.001	-0.751
597.5	48.759	-0.225	22.644	0	-11.65	0	0.249	1.001	-0.752
597.6	48.753	-0.202	23.258	0	-12.14	0	0.249	1.001	-0.752
597.7	48.74	-0.202	21.923	0	-12.34	0	0.249	1.001	-0.752
597.8	48.728	-0.207	22.082	0	-12.85	0	0.248	1.001	-0.753
597.9	48.716	-0.207	23.092	0	-13.44	0	0.248	1.001	-0.753
598	48.703	-0.192	22.276	0	-14.06	0	0.247	1.001	-0.753
598.1	48.684	-0.217	22.577	0	-14.36	0	0.247	1.001	-0.754
598.2	48.666	-0.225	22.619	0	-14.29	0	0.247	1.001	-0.754
598.3	48.647	-0.225	22.792	0	-14.35	0	0.246	1.001	-0.755
598.4	48.635	-0.212	21.994	0	-15.24	0	0.246	1.001	-0.755
598.5	48.616	-0.217	21.482	0	-15.95	0	0.245	1.001	-0.755
598.6	48.597	-0.217	22.764	0	-16.7	0	0.245	1.001	-0.756
598.7	48.573	-0.202	22.058	0	-18.52	0	0.244	1.001	-0.756
598.8	48.548	-0.222	21.704	0	-19.75	0	0.244	1.001	-0.757
598.9	48.517	-0.222	22.082	0	-19.9	0	0.243	1.001	-0.757
599	48.486	-0.227	22.022	0	-19.91	0	0.243	1.001	-0.758
599.1	48.455	-0.222	21.323	0	-19.74	0	0.242	1.001	-0.759
599.2	48.423	-0.222	21.231	0	-19.77	0	0.242	1.001	-0.759
599.3	48.392	-0.215	21.146	0	-21.46	0	0.241	1.001	-0.76
599.4	48.355	-0.215	21.146	0	-22.55	0	0.24	1.001	-0.76
599.5	48.318	-0.22	20.521	0	-22.38	0	0.24	1.001	-0.761
599.6	48.281	-0.235	21.288	0	-21.78	0	0.239	1.001	-0.762
599.7	48.237	-0.235	20.906	0	-21.44	0	0.239	1.001	-0.762
599.8	48.2	-0.235	20.606	0	-21.11	0	0.238	1.001	-0.763
599.9	48.162	-0.262	20.196	0	-21.39	0	0.237	1.001	-0.763
600	48.125	-0.252	20.023	0	-21.39	0	0.237	1.001	-0.764
600.1	48.088	-0.252	19.186	0	-21.53	0	0.236	1.001	-0.765
600.2	48.057	-0.267	18.703	0	-20.64	0	0.236	1.001	-0.765
600.3	48.02	-0.255	19.324	0	-18.39	0	0.235	1.001	-0.766
600.4	47.988	-0.255	18.837	0	-16.74	0	0.235	1.001	-0.766
600.5	47.964	-0.25	19.367	0	-16.2	0	0.234	1.001	-0.767
600.6	47.939	-0.24	19.97	0	-15.86	0	0.234	1.001	-0.767
600.7	47.914	-0.24	19.769	0	-15.04	0	0.233	1.001	-0.767
600.8	47.895	-0.237	20.087	0	-12.99	0	0.233	1.001	-0.768
600.9	47.883	-0.237	20.592	0	-11.3	0	0.233	1.001	-0.768

601	47.87	-0.227	19.999	0	-10.43	0	0.232	1.001	-0.768
601.1	47.864	-0.222	20.327	0	-10.27	0	0.232	1.001	-0.769
601.2	47.858	-0.225	20.906	0	-10.22	0	0.232	1.001	-0.769
601.3	47.852	-0.225	21.083	0	-10.02	0	0.232	1.001	-0.769
601.4	47.846	-0.227	21.404	0	-9.47	0	0.231	1.001	-0.769
601.5	47.839	-0.205	21.221	0	-9.52	0	0.231	1.001	-0.77
601.6	47.839	-0.205	21.408	0	-9.53	0	0.231	1.001	-0.77
601.7	47.833	-0.21	22.061	0	-9.54	0	0.23	1.001	-0.77
601.8	47.833	-0.217	22.146	0	-9.74	0	0.23	1.001	-0.771
601.9	47.827	-0.217	22.909	0	-10.08	0	0.23	1.001	-0.771
602	47.821	-0.207	23.286	0	-10.12	0	0.23	1.001	-0.771
602.1	47.821	-0.197	22.866	0	-10.04	0	0.229	1.001	-0.771
602.2	47.821	-0.197	22.672	0	-10.03	0	0.229	1.001	-0.772
602.3	47.821	-0.192	22.866	0	-10.03	0	0.229	1.001	-0.772
602.4	47.808	-0.192	23.029	0	-10	0	0.229	1.001	-0.772
602.5	47.808	-0.197	22.986	0	-10.79	0	0.228	1.001	-0.773
602.6	47.802	-0.207	23	0	-15.15	0	0.228	1.001	-0.773
602.7	47.79	-0.202	22.824	0	-16.5	0	0.227	1.001	-0.773
602.8	47.771	-0.202	22.457	0	-16.52	0	0.227	1.001	-0.774
602.9	47.746	-0.222	22.7	0	-16.03	0	0.226	1.001	-0.774
603	47.728	-0.23	22.672	0	-15.25	0	0.226	1.001	-0.775
603.1	47.715	-0.23	21.704	0	-14.44	0	0.226	1.001	-0.775
603.2	47.696	-0.242	20.43	0	-12.89	0	0.225	1.001	-0.775
603.3	47.678	-0.255	20.567	0	-12.49	0	0.225	1.001	-0.776
603.4	47.672	-0.255	21.175	0	-12.4	0	0.225	1.001	-0.776
603.5	47.659	-0.23	20.461	0	-12.42	0	0.224	1.001	-0.777
603.6	47.647	-0.227	20.352	0	-12.41	0	0.224	1.001	-0.777
603.7	47.634	-0.227	20.991	0	-11.47	0	0.224	1.001	-0.777
603.8	47.622	-0.225	21.196	0	-10.25	0	0.223	1.001	-0.777
603.9	47.622	-0.225	21.327	0	-9.7	0	0.223	1.001	-0.778
604	47.616	-0.225	21.316	0	-9.44	0	0.223	1.001	-0.778
604.1	47.609	-0.22	21.312	0	-9.17	0	0.223	1.001	-0.778
604.2	47.609	-0.205	21.316	0	-8.69	0	0.222	1.001	-0.778
604.3	47.609	-0.205	21.369	0	-7.14	0	0.222	1.001	-0.779
604.4	47.609	-0.195	21.383	0	-5.17	0	0.222	1.001	-0.779
604.5	47.628	-0.202	22.446	0	-2.8	0	0.222	1.001	-0.779
604.6	47.641	-0.202	22.76	0	-2.31	0	0.222	1.001	-0.779
604.7	47.659	-0.187	22.707	0	-1.59	0	0.222	1.001	-0.779
604.8	47.684	-0.152	23.149	0	-1.35	0	0.222	1.001	-0.779
604.9	47.709	-0.152	23.018	0	-1.47	0	0.222	1.001	-0.779
605	47.734	-0.135	24.134	0	-1.09	0	0.222	1.001	-0.779
605.1	47.765	-0.112	25.78	0	-1.88	0	0.222	1.001	-0.779
605.2	47.796	-0.112	26.288	0	-2.79	0	0.221	1.001	-0.779
605.3	47.827	-0.082	26.67	0	-3.26	0	0.221	1.001	-0.779
605.4	47.858	-0.082	27.997	0	-3.18	0	0.221	1.001	-0.779
605.5	47.889	-0.065	28.661	0	-2.85	0	0.221	1.001	-0.78
605.6	47.926	-0.05	29.7	0	-2.67	0	0.221	1.001	-0.78

605.7	47.964	-0.045	30.335	0	-2.54	0	0.221	1.001	-0.78
605.8	47.995	-0.045	30.36	0	-2.3	0	0.221	1.001	-0.78
605.9	48.038	-0.05	31.077	0	-2.5	0	0.221	1.001	-0.78
606	48.075	-0.047	31.176	0	-4.34	0	0.221	1.001	-0.78
606.1	48.119	-0.047	31.077	0	-2.36	0	0.221	1.001	-0.78
606.2	48.169	-0.01	31.801	0	-1.3	0	0.221	1.001	-0.78
606.3	48.225	0.02	31.889	0	-0.76	0	0.221	1.001	-0.78
606.4	48.287	0.02	33.432	0	0	0	0.221	1.001	-0.78
606.5	48.343	0.05	35.089	0	-2.25	0	0.221	1.001	-0.78
606.6	48.399	0.075	36.537	0	-2.45	0	0.221	1.001	-0.78
606.7	48.455	0.075	36.982	0	-2.44	0	0.221	1.001	-0.78
606.8	48.51	0.075	37.543	0	-2.44	0	0.22	1.001	-0.78
606.9	48.573	0.075	38.853	0	-2.5	0	0.22	1.001	-0.78
607	48.629	0.088	39.305	0	-3.28	0	0.22	1.001	-0.78
607.1	48.684	0.11	39.104	0	-6.15	0	0.22	1.001	-0.781
607.2	48.734	0.108	40.054	0	-14.78	0	0.22	1.001	-0.781
607.3	48.759	0.108	40.206	0	-18.07	0	0.219	1.001	-0.782
607.4	48.771	0.108	40.001	0	-19.26	0	0.219	1.001	-0.782
607.5	48.784	0.025	40.093	0	-17.02	0	0.218	1.001	-0.783
607.6	48.784	0.025	40.319	0	-14.58	0	0.218	1.001	-0.783
607.7	48.79	-0.09	37.79	0	-12.76	0	0.217	1.001	-0.783
607.8	48.796	-0.115	32.942	0	-11.65	0	0.217	1.001	-0.784
607.9	48.802	-0.115	28.721	0	-9.96	0	0.217	1.001	-0.784
608	48.809	-0.177	27.715	0	-9.27	0	0.217	1.001	-0.784
608.1	48.809	-0.17	25.79	0	-8.67	0	0.216	1.001	-0.784
608.2	48.821	-0.17	23.929	0	-8.26	0	0.216	1.001	-0.785
608.3	48.821	-0.195	23.943	0	-8.25	0	0.216	1.001	-0.785
608.4	48.821	-0.195	24.388	0	-8.25	0	0.216	1.001	-0.785
608.5	48.84	-0.177	22.658	0	-8.25	0	0.215	1.001	-0.785
608.6	48.84	-0.18	22.99	0	-8.28	0	0.215	1.001	-0.786
608.7	48.852	-0.172	23.965	0	-8.26	0	0.215	1.001	-0.786
608.8	48.858	-0.172	23.678	0	-8.21	0	0.215	1.001	-0.786
608.9	48.871	-0.162	23.922	0	-7.99	0	0.214	1.001	-0.786
609	48.877	-0.145	24.448	0	-8	0	0.214	1.001	-0.786
609.1	48.889	-0.145	24.639	0	-8.26	0	0.214	1.001	-0.787
609.2	48.896	-0.142	25.631	0	-10.44	0	0.214	1.001	-0.787
609.3	48.902	-0.14	25.889	0	-18.2	0	0.213	1.001	-0.787
609.4	48.883	-0.14	25.85	0	-25.24	0	0.213	1.001	-0.788
609.5	48.846	-0.14	25.674	0	-25.4	0	0.212	1.001	-0.789
609.6	48.802	-0.165	25.769	0	-25.39	0	0.211	1.001	-0.79
609.7	48.759	-0.165	25.628	0	-24.14	0	0.21	1.001	-0.79
609.8	48.709	-0.237	24.692	0	-22.63	0	0.21	1.001	-0.791
609.9	48.66	-0.237	22.241	0	-20.8	0	0.209	1.001	-0.791
610	48.61	-0.235	20.588	0	-19.25	0	0.209	1.001	-0.792
610.1	48.554	-0.312	20.521	0	-17.91	0	0.208	1.001	-0.793
610.2	48.504	-0.347	18.805	0	-16.82	0	0.208	1.001	-0.793
610.3	48.455	-0.347	15.69	0	-16.09	0	0.207	1.001	-0.793

610.4	48.399	-0.383	14.61	0	-15.61	0	0.207	1.001	-0.794
610.5	48.343	-0.385	13.141	0	-14.46	0	0.206	1.001	-0.794
610.6	48.299	-0.385	11.95	0	-4.82	0	0.206	1.001	-0.794
610.7	48.256	-0.423	11.94	0	0.59	0	0.206	1.001	-0.794
610.8	48.206	-0.41	11.696	0	0.58	0	0.206	1.001	-0.794
610.9	48.138	-0.41	10.962	0	-2.64	0	0.206	1.001	-0.794
611	48.063	-0.62	11.075	0	-7.75	0	0.206	1.001	-0.795
611.1	47.982	-0.698	10.111	0	-10.45	0	0.206	1.001	-0.795
611.2	47.895	-0.698	2.204	0	-15.92	0	0.205	1.001	-0.795
611.3	47.783	-0.605	-3.471	0	-20.61	0	0.205	1.001	-0.796
611.4	47.665	-0.605	-3.796	0	-23.47	0	0.204	1.001	-0.797
611.5	47.554	-0.623	-0.869	0	-24.35	0	0.203	1.001	-0.797
611.6	47.448	-0.623	-0.487	0	-24.49	0	0.203	1.001	-0.798
611.7	47.336	-0.633	-1.762	0	-24.78	0	0.202	1.001	-0.799
611.8	47.224	-0.633	-1.681	0	-25.32	0	0.201	1.001	-0.799
611.9	47.112	-0.658	-1.409	0	-25.27	0	0.201	1.001	-0.8
612	47.001	-0.67	-1.519	0	-24.85	0	0.2	1.001	-0.801
612.1	46.895	-0.67	-1.745	0	-21.76	0	0.199	1.001	-0.801
612.2	46.802	-0.673	-3.341	0	-16.31	0	0.199	1.001	-0.802
612.3	46.715	-0.675	-3.556	0	-11.68	0	0.199	1.001	-0.802
612.4	46.715	-0.675	-2.91	0	-5.49	0	0.198	1.001	-0.802
612.5	46.584	-0.723	-2.38	0	0	0	0.198	1.001	-0.802
612.6	46.534	-0.695	-4.789	0	0	0	0.198	1.001	-0.802
612.7	46.491	-0.695	-4.471	0	0.57	0	0.198	1.001	-0.802
612.8	46.441	-0.653	-2.567	0	0.58	0	0.198	1.001	-0.802
612.9	46.398	-0.653	-3.037	0	0.57	0	0.199	1.001	-0.802
613	46.348	-0.625	-3.676	0	0.58	0	0.199	1.001	-0.802
613.1	46.305	-0.653	-1.72	0	0.57	0	0.199	1.001	-0.802
613.2	46.255	-0.64	-1.685	0	0.57	0	0.199	1.001	-0.802
613.3	46.211	-0.64	-2.235	0	0.57	0	0.199	1.001	-0.802
613.4	46.162	-0.658	-1.476	0	0.57	0	0.199	1.001	-0.802
613.5	46.118	-0.663	-1.635	0	0.75	0	0.199	1.001	-0.802
613.6	46.068	-0.663	-1.752	0	1.97	0	0.199	1.001	-0.802
613.7	46.025	-0.66	-1.409	0	3.92	0	0.199	1.001	-0.802
613.8	45.988	-0.648	-1.501	0	9.69	0	0.199	1.001	-0.802
613.9	45.963	-0.648	-1.451	0	16.92	0	0.2	1.002	-0.802
614	45.95	-0.66	-1.582	0	18.8	0	0.2	1.002	-0.802
614.1	45.938	-0.65	-0.999	0	22.56	0	0.201	1.003	-0.802
614.2	45.938	-0.65	-1.536	0	26.53	0	0.201	1.004	-0.802
614.3	45.938	-0.643	-1.836	0	29.14	0	0.202	1.005	-0.802
614.4	45.944	-0.643	-1.095	0	30.2	0	0.203	1.005	-0.802
614.5	45.95	-0.64	-1.367	0	34.63	0	0.204	1.006	-0.802
614.6	45.969	-0.64	-1.18	0	37.22	0	0.205	1.007	-0.802
614.7	45.988	-0.625	-0.826	0	37.17	0	0.206	1.008	-0.802
614.8	46.006	-0.625	-1.656	0	37.18	0	0.207	1.009	-0.802
614.9	46.031	-0.668	-1.54	0	37.25	0	0.208	1.01	-0.802
615	46.05	-0.675	-0.727	0	37.32	0	0.209	1.012	-0.802

615.1	46.068	-0.675	-0.932	0	37.31	0	0.21	1.013	-0.802
615.2	46.093	-0.643	-1.317	0	37.33	0	0.211	1.014	-0.802
615.3	46.112	-0.623	-1.561	0	37.37	0	0.212	1.015	-0.802
615.4	46.131	-0.623	-1.889	0	38.18	0	0.213	1.016	-0.802
615.5	46.155	-0.663	-1.275	0	38.99	0	0.214	1.017	-0.802
615.6	46.18	-0.678	-0.622	0	41.91	0	0.216	1.018	-0.802
615.7	46.205	-0.678	-1.119	0	57.68	0	0.217	1.02	-0.802
615.8	46.242	-0.698	-0.749	0	64.89	0	0.219	1.021	-0.802
615.9	46.28	-0.698	-0.622	0	61.02	0	0.221	1.023	-0.802
616	46.317	-0.663	-1.579	0	72.95	0	0.223	1.025	-0.802
616.1	46.367	-0.63	-2.073	0	117.98	0	0.226	1.028	-0.802
616.2	46.423	-0.64	-1.211	0	121.61	0	0.229	1.032	-0.802
616.3	46.479	-0.64	-1.197	0	95.87	0	0.232	1.034	-0.802
616.4	46.479	-0.603	-0.646	0	31.19	0	0.233	1.035	-0.802
616.5	46.597	0.018	0.833	0	30.02	0	0.234	1.036	-0.802
616.6	46.653	0.018	4.252	0	36.9	0	0.235	1.037	-0.802
616.7	46.715	-0.24	20.465	0	36.47	0	0.236	1.038	-0.802
616.8	46.771	-0.43	48.501	0	32.75	0	0.237	1.039	-0.802
616.9	46.833	-0.43	35.915	0	30.16	0	0.238	1.04	-0.802
617	46.895	-0.175	14.988	0	28	0	0.238	1.041	-0.802
617.1	46.957	-0.195	17.498	0	26.59	0	0.239	1.041	-0.802
617.2	47.025	-0.195	23.968	0	25.27	0	0.24	1.042	-0.802
617.3	47.094	-0.105	24.092	0	24.58	0	0.24	1.043	-0.802
617.4	47.162	-0.105	25.335	0	24.18	0	0.241	1.043	-0.802
617.5	47.243	-0.067	28.206	0	25.91	0	0.242	1.044	-0.802
617.6	47.324	-0.052	29.551	0	27.34	0	0.243	1.045	-0.802
617.7	47.411	-0.045	30.445	0	28.17	0	0.243	1.046	-0.802
617.8	47.504	-0.045	30.83	0	26.83	0	0.244	1.046	-0.802
617.9	47.591	-0.045	32.045	0	24.16	0	0.245	1.047	-0.802
618	47.69	-0.037	31.826	0	22.47	0	0.245	1.048	-0.802
618.1	47.783	-0.037	31.67	0	19.77	0	0.246	1.048	-0.802
618.2	47.877	0.06	31.924	0	18.65	0	0.246	1.049	-0.802
618.3	47.97	0.08	34.312	0	18.36	0	0.247	1.049	-0.802
618.4	48.069	0.08	36.777	0	19.73	0	0.248	1.05	-0.802
618.5	48.169	0.141	38.814	0	19.01	0	0.248	1.05	-0.802
618.6	48.274	0.138	39.687	0	18.21	0	0.249	1.051	-0.802
618.7	48.38	0.138	41.558	0	16.29	0	0.249	1.051	-0.802
618.8	48.486	0.168	43.027	0	15.77	0	0.249	1.052	-0.802
618.9	48.591	0.168	43.186	0	13.97	0	0.25	1.052	-0.802
619	48.697	0.188	43.896	0	12.47	0	0.25	1.053	-0.802
619.1	48.802	0.201	44.74	0	10.87	0	0.25	1.053	-0.802
619.2	48.914	0.226	46.128	0	9.41	0	0.251	1.053	-0.802
619.3	49.02	0.226	46.792	0	7.66	0	0.251	1.053	-0.802
619.4	49.126	0.243	47.724	0	4.7	0	0.251	1.053	-0.802
619.5	49.225	0.293	48.353	0	3.38	0	0.251	1.054	-0.802
619.6	49.331	0.293	49.38	0	3.09	0	0.251	1.054	-0.802
619.7	49.436	0.311	50.521	0	3	0	0.251	1.054	-0.802

619.8	49.536	0.291	51.39	0	2.63	0	0.251	1.054	-0.802
619.9	49.648	0.291	52.237	0	1.66	0	0.251	1.054	-0.802
620	49.747	0.321	53.544	0	0	0	0.251	1.054	-0.802
620.1	49.846	0.286	53.484	0	-0.56	0	0.251	1.054	-0.802
620.2	49.94	0.286	54.201	0	-0.76	0	0.251	1.054	-0.802
620.3	50.039	0.323	55.659	0	-0.79	0	0.251	1.054	-0.802
620.4	50.039	0.323	53.184	0	-0.87	0	0.251	1.054	-0.802
620.5	50.238	0.321	52.612	0	-0.93	0	0.251	1.054	-0.802
620.6	50.331	0.338	53.685	0	-0.81	0	0.251	1.054	-0.802
620.7	50.43	0.321	52.728	0	-0.77	0	0.251	1.054	-0.803
620.8	50.524	0.321	53.689	0	-0.8	0	0.251	1.054	-0.803
620.9	50.617	0.276	54.152	0	-0.79	0	0.251	1.054	-0.803
621	50.71	0.276	53.611	0	-0.6	0	0.251	1.054	-0.803
621.1	50.803	0.276	53.212	0	-0.63	0	0.251	1.054	-0.803
621.2	50.897	0.288	51.718	0	-0.69	0	0.251	1.054	-0.803
621.3	50.984	0.278	51.916	0	-0.88	0	0.251	1.054	-0.803
621.4	51.077	0.278	51.828	0	0	0	0.251	1.054	-0.803
621.5	51.164	0.216	51.997	0	1.01	0	0.251	1.054	-0.803
621.6	51.257	0.228	51.344	0	0.65	0	0.251	1.054	-0.803
621.7	51.35	0.228	50.828	0	0	0	0.251	1.054	-0.803
621.8	51.443	0.296	49.607	0	0	0	0.251	1.054	-0.803
621.9	51.537	0.296	49.857	0	-1.11	0	0.251	1.054	-0.803
622	51.624	0.268	51.139	0	-1.13	0	0.251	1.054	-0.803
622.1	51.711	0.246	52.033	0	-2.32	0	0.251	1.054	-0.803
622.2	51.791	0.281	51.256	0	-8.14	0	0.251	1.054	-0.803
622.3	51.866	0.281	50.228	0	-13.48	0	0.25	1.054	-0.803
622.4	51.928	0.286	49.511	0	-12.94	0	0.25	1.054	-0.804
622.5	51.99	0.251	51.849	0	-11.02	0	0.25	1.054	-0.804
622.6	52.052	0.236	52.46	0	-9.25	0	0.25	1.054	-0.804
622.7	52.121	0.248	52.559	0	-7.82	0	0.249	1.054	-0.805
622.8	52.183	0.233	51.408	0	-6.6	0	0.249	1.054	-0.805
622.9	52.239	0.233	49.317	0	-5.13	0	0.249	1.054	-0.805
623	52.301	0.125	48.992	0	-4.66	0	0.249	1.054	-0.805
623.1	52.363	0.181	47.449	0	-4.31	0	0.249	1.054	-0.805
623.2	52.425	0.181	43.857	0	-4.02	0	0.249	1.054	-0.805
623.3	52.425	0.131	43.063	0	-3.94	0	0.249	1.054	-0.805
623.4	52.549	0.131	44.779	0	-3.65	0	0.248	1.054	-0.805
623.5	52.611	0.1	43.765	0	-3.51	0	0.248	1.054	-0.806
623.6	52.667	0.156	42.265	0	-3.62	0	0.248	1.054	-0.806
623.7	52.723	0.158	41.145	0	-5.68	0	0.248	1.054	-0.806
623.8	52.779	0.158	42.286	0	-8.98	0	0.248	1.054	-0.806
623.9	52.829	0.171	42.639	0	-10.63	0	0.248	1.054	-0.806
624	52.86	0.125	42.65	0	-8.65	0	0.247	1.054	-0.807
624.1	52.904	0.125	43.006	0	-7.7	0	0.247	1.054	-0.807
624.2	52.941	0.09	43.645	0	-7.11	0	0.247	1.054	-0.807
624.3	52.941	0.053	42.3	0	-6.91	0	0.247	1.054	-0.807
624.4	53.015	0.053	40.001	0	-7.11	0	0.247	1.054	-0.807

624.5	53.053	0.085	37.268	0	-7.51	0	0.246	1.054	-0.808
624.6	53.09	0.095	36.007	0	-7.35	0	0.246	1.054	-0.808
624.7	53.133	0.095	36.84	0	-7.18	0	0.246	1.054	-0.808
624.8	53.177	0.113	36.752	0	-7.03	0	0.246	1.054	-0.808
624.9	53.214	0.113	38.627	0	-7.04	0	0.245	1.054	-0.808
625	53.252	0.105	39.535	0	-7.31	0	0.245	1.054	-0.809
625.1	53.295	0.103	38.98	0	-8.62	0	0.245	1.054	-0.809
625.2	53.332	0.108	39.167	0	-11.45	0	0.245	1.054	-0.809
625.3	53.332	0.108	39.143	0	-12.03	0	0.244	1.054	-0.809
625.4	53.388	0.105	39.189	0	-11.94	0	0.244	1.054	-0.81
625.5	53.413	0.09	39.521	0	-13.03	0	0.244	1.054	-0.81
625.6	53.432	0.09	39.337	0	-12.49	0	0.243	1.054	-0.811
625.7	53.45	0.043	38.578	0	-11.96	0	0.243	1.054	-0.811
625.8	53.475	0.035	37.797	0	-10.83	0	0.243	1.054	-0.811
625.9	53.494	0.035	36.452	0	-10.54	0	0.242	1.054	-0.811
626	53.512	0.038	35.777	0	-10.56	0	0.242	1.054	-0.812
626.1	53.537	0.04	35.509	0	-10.56	0	0.242	1.054	-0.812
626.2	53.556	0.04	35.103	0	-10.61	0	0.242	1.054	-0.812
626.3	53.556	0.038	35.17	0	-10.61	0	0.241	1.054	-0.813
626.4	53.593	0.038	35.184	0	-10.61	0	0.241	1.054	-0.813
626.5	53.612	0.053	34.626	0	-10.63	0	0.241	1.054	-0.813
626.6	53.637	0.043	34.728	0	-10.64	0	0.24	1.054	-0.814
626.7	53.655	0.038	35.329	0	-10.64	0	0.24	1.054	-0.814
626.8	53.674	0.038	35.124	0	-10.74	0	0.24	1.054	-0.814
626.9	53.699	0.04	35.113	0	-10.66	0	0.239	1.054	-0.814
627	53.724	0.043	35.304	0	-10.59	0	0.239	1.054	-0.815
627.1	53.742	0.043	35.565	0	-10.41	0	0.239	1.054	-0.815
627.2	53.767	0.05	35.629	0	-10.62	0	0.239	1.054	-0.815
627.3	53.792	0.07	35.618	0	-11.04	0	0.238	1.054	-0.816
627.4	53.817	0.07	35.689	0	-10.77	0	0.238	1.054	-0.816
627.5	53.848	0.085	36.318	0	-10.86	0	0.238	1.054	-0.816
627.6	53.873	0.108	36.752	0	-10.97	0	0.237	1.054	-0.816
627.7	53.898	0.108	37.126	0	-11.1	0	0.237	1.054	-0.817
627.8	53.929	0.083	38.525	0	-11.2	0	0.237	1.054	-0.817
627.9	53.954	0.083	38.715	0	-11.24	0	0.236	1.054	-0.817
628	53.954	0.103	37.402	0	-11.44	0	0.236	1.054	-0.818
628.1	54.003	0.09	38.147	0	-11.27	0	0.236	1.054	-0.818
628.2	54.034	0.095	39.312	0	-11.16	0	0.236	1.054	-0.818
628.3	54.034	0.095	38.931	0	-11.09	0	0.235	1.054	-0.819
628.4	54.084	0.1	38.256	0	-11.14	0	0.235	1.054	-0.819
628.5	54.115	0.103	38.32	0	-11.18	0	0.235	1.054	-0.819
628.6	54.14	0.103	38.295	0	-11.2	0	0.234	1.054	-0.82
628.7	54.171	0.088	38.295	0	-11.01	0	0.234	1.054	-0.82
628.8	54.202	0.095	38.715	0	-10.78	0	0.234	1.054	-0.82
628.9	54.227	0.095	38.341	0	-11.24	0	0.233	1.054	-0.821
629	54.258	0.095	38.232	0	-10.88	0	0.233	1.054	-0.821
629.1	54.289	0.108	38.341	0	-10.77	0	0.233	1.054	-0.821

629.2	54.32	0.108	38.32	0	-10.79	0	0.232	1.054	-0.821
629.3	54.345	0.113	38.952	0	-10.21	0	0.232	1.054	-0.822
629.4	54.382	0.113	39.457	0	-9.75	0	0.232	1.054	-0.822
629.5	54.413	0.105	39.563	0	-8.35	0	0.232	1.054	-0.822
629.6	54.457	0.115	39.552	0	-7.74	0	0.231	1.054	-0.822
629.7	54.494	0.118	39.507	0	-6.84	0	0.231	1.054	-0.823
629.8	54.525	0.118	39.93	0	-6.34	0	0.231	1.054	-0.823
629.9	54.569	0.12	39.376	0	-6.2	0	0.231	1.054	-0.823
630	54.606	0.105	39.422	0	-6.22	0	0.231	1.054	-0.823
630.1	54.65	0.105	39.902	0	-6.26	0	0.231	1.054	-0.823
630.2	54.687	0.138	39.718	0	-6.55	0	0.23	1.054	-0.823
630.3	54.724	0.136	40.089	0	-6.55	0	0.23	1.054	-0.824
630.4	54.768	0.136	41.417	0	-6.58	0	0.23	1.054	-0.824
630.5	54.817	0.143	42.296	0	-6.61	0	0.23	1.054	-0.824
630.6	54.855	0.148	41.459	0	-6.69	0	0.23	1.054	-0.824
630.7	54.898	0.148	41.406	0	-6.85	0	0.229	1.054	-0.824
630.8	54.935	0.153	42.106	0	-6.84	0	0.229	1.054	-0.825
630.9	54.979	0.153	41.717	0	-6.72	0	0.229	1.054	-0.825
631	55.016	0.141	41.95	0	-6.69	0	0.229	1.054	-0.825
631.1	55.053	0.146	41.647	0	-6.67	0	0.229	1.054	-0.825
631.2	55.097	0.136	41.862	0	-7.08	0	0.229	1.054	-0.825
631.3	55.097	0.136	41.562	0	-8.82	0	0.228	1.054	-0.826
631.4	55.165	0.128	40.93	0	-11.34	0	0.228	1.054	-0.826
631.5	55.196	0.133	40.728	0	-13.26	0	0.228	1.054	-0.826
631.6	55.215	0.133	40.799	0	-13.78	0	0.227	1.054	-0.827
631.7	55.24	0.105	41.096	0	-14.37	0	0.227	1.054	-0.827
631.8	55.252	0.088	40.238	0	-14.61	0	0.226	1.054	-0.827
631.9	55.271	0.088	39.683	0	-15.47	0	0.226	1.054	-0.828
632	55.283	0.058	38.602	0	-16.55	0	0.226	1.054	-0.828
632.1	55.29	0.04	37.85	0	-16.79	0	0.225	1.054	-0.829
632.2	55.296	0.04	37.85	0	-15.72	0	0.225	1.054	-0.829
632.3	55.296	0.033	36.678	0	-14.87	0	0.224	1.054	-0.83
632.4	55.302	0.033	36.046	0	-14.36	0	0.224	1.054	-0.83
632.5	55.308	0.015	35.424	0	-14.3	0	0.223	1.054	-0.83
632.6	55.314	0.02	34.329	0	-14.86	0	0.223	1.054	-0.831
632.7	55.321	0.013	33.86	0	-15.71	0	0.223	1.054	-0.831
632.8	55.327	0.013	33.75	0	-17.25	0	0.222	1.054	-0.832
632.9	55.327	0.01	33.895	0	-18.59	0	0.222	1.054	-0.832
633	55.321	0.013	33.648	0	-18.41	0	0.221	1.054	-0.833
633.1	55.314	0.013	33.273	0	-18.41	0	0.221	1.054	-0.833
633.2	55.308	-0.037	33.199	0	-18.78	0	0.22	1.054	-0.834
633.3	55.308	-0.047	32.931	0	-20.75	0	0.219	1.054	-0.834
633.4	55.283	-0.047	32.263	0	-22.17	0	0.219	1.054	-0.835
633.5	55.265	-0.067	30.713	0	-24	0	0.218	1.054	-0.836
633.6	55.234	-0.082	30.533	0	-27.67	0	0.217	1.054	-0.836
633.7	55.196	-0.082	30.148	0	-28.21	0	0.217	1.054	-0.837
633.8	55.147	-0.132	28.93	0	-27.57	0	0.216	1.054	-0.838

633.9	55.103	-0.132	27.588	0	-27.99	0	0.215	1.054	-0.839
634	55.066	-0.157	26.603	0	-27.12	0	0.214	1.054	-0.84
634.1	55.016	-0.182	24.526	0	-26.48	0	0.214	1.054	-0.84
634.2	54.966	-0.18	23.834	0	-26.01	0	0.213	1.054	-0.841
634.3	54.966	-0.18	23	0	-25.75	0	0.212	1.054	-0.842
634.4	54.88	-0.19	22.368	0	-26.42	0	0.211	1.054	-0.842
634.5	54.83	-0.22	22.315	0	-27.25	0	0.211	1.054	-0.843
634.6	54.78	-0.235	22.1	0	-26.63	0	0.21	1.054	-0.844
634.7	54.724	-0.247	21.595	0	-26.64	0	0.209	1.054	-0.845
634.8	54.668	-0.2	21.814	0	-24.18	0	0.208	1.054	-0.845
634.9	54.612	-0.2	20.966	0	-22.42	0	0.208	1.054	-0.846
635	54.556	-0.225	20.514	0	-20.94	0	0.207	1.054	-0.847
635.1	54.494	-0.31	22.34	0	-19.83	0	0.207	1.054	-0.847
635.2	54.438	-0.31	21.623	0	-18.72	0	0.206	1.054	-0.848
635.3	54.438	-0.34	18.141	0	-17.98	0	0.206	1.054	-0.848
635.4	54.314	-0.34	14.956	0	-17.37	0	0.205	1.054	-0.849
635.5	54.258	-0.342	13.907	0	-17.07	0	0.205	1.054	-0.849
635.6	54.202	-0.352	13.405	0	-15.17	0	0.204	1.054	-0.85
635.7	54.146	-0.377	12.823	0	-4.4	0	0.204	1.054	-0.85
635.8	54.09	-0.377	12.978	0	0	0	0.204	1.054	-0.85
635.9	54.022	-0.36	12.805	0	-4.9	0	0.204	1.054	-0.85
636	53.929	-0.478	11.894	0	-12.41	0	0.204	1.054	-0.85
636.1	53.829	-0.478	12.41	0	-20.33	0	0.203	1.054	-0.851
636.2	53.829	-0.638	9.885	0	-23.24	0	0.203	1.054	-0.851
636.3	53.718	-0.6	1.536	0	-24.12	0	0.202	1.054	-0.852
636.4	53.494	-0.6	-2.74	0	-24.12	0	0.201	1.054	-0.853
636.5	53.388	-0.668	-0.297	0	-24.33	0	0.201	1.054	-0.853
636.6	53.27	-0.64	0.36	0	-26.28	0	0.2	1.054	-0.854
636.7	53.146	-0.64	-2.197	0	-29.34	0	0.199	1.054	-0.855
636.8	53.009	-0.628	-2.949	0	-40.24	0	0.198	1.054	-0.856
636.9	52.841	-0.628	-1.978	0	-52.57	0	0.196	1.054	-0.857
637	52.649	-0.643	-1.632	0	-63.36	0	0.195	1.054	-0.859
637.1	52.444	-0.668	-1.939	0	-68.25	0	0.193	1.054	-0.861
637.2	52.232	-0.665	-1.833	0	-69.11	0	0.191	1.054	-0.863
637.3	52.232	-0.665	-2.532	0	-68.7	0	0.189	1.054	-0.865
637.4	51.822	-0.635	-4.538	0	-68.73	0	0.187	1.054	-0.867
637.5	51.617	-0.648	-3.747	0	-70.59	0	0.185	1.054	-0.869
637.6	51.425	-0.648	-2.045	0	-71.96	0	0.183	1.054	-0.871
637.7	51.189	-0.713	-1.794	0	-72.06	0	0.181	1.054	-0.873
637.8	50.977	-0.668	-4.312	0	-70.36	0	0.179	1.054	-0.875
637.9	50.766	-0.668	-5.513	0	-67.3	0	0.177	1.054	-0.877
638	50.561	-0.668	-3.613	0	-63.26	0	0.175	1.054	-0.878
638.1	50.381	-0.663	-2.19	0	-48.45	0	0.174	1.054	-0.88
638.2	50.225	-0.663	-2.119	0	-47.98	0	0.173	1.054	-0.881
638.3	50.225	-0.648	-2.179	0	-49.17	0	0.171	1.054	-0.882
638.4	49.909	-0.648	-2.341	0	-51.44	0	0.17	1.054	-0.884
638.5	49.716	-0.66	-1.762	0	-60.02	0	0.168	1.054	-0.886

638.6	49.529	-0.655	-1.384	0	-65.9	0	0.166	1.054	-0.887
638.7	49.331	-0.66	-2.016	0	-67.31	0	0.165	1.054	-0.889
638.8	49.119	-0.66	-1.66	0	-69.53	0	0.163	1.054	-0.891
638.9	48.902	-0.655	-0.975	0	-71.77	0	0.161	1.054	-0.893
639	48.66	-0.648	-1.413	0	-71.96	0	0.159	1.054	-0.895
639.1	48.455	-0.648	-1.434	0	-71.19	0	0.157	1.054	-0.897
639.2	48.212	-0.653	-1.353	0	-61.97	0	0.155	1.054	-0.899
639.3	48.212	-0.648	-1.349	0	-50.2	0	0.154	1.054	-0.9
639.4	47.889	-0.648	-1.172	0	-46.2	0	0.152	1.054	-0.902
639.5	47.709	-0.638	-1.063	0	-45.81	0	0.151	1.054	-0.903
639.6	47.566	-0.655	-1.162	0	-43.51	0	0.15	1.054	-0.904
639.7	47.417	-0.655	-0.968	0	-39.93	0	0.149	1.054	-0.905
639.8	47.274	-0.68	-0.886	0	-35.51	0	0.148	1.054	-0.906
639.9	47.143	-0.68	-0.742	0	-33.07	0	0.147	1.054	-0.907
640	47.019	-0.66	-1.43	0	-24.28	0	0.146	1.054	-0.908
640.1	46.92	-0.653	-1.448	0	-12.53	0	0.146	1.054	-0.908
640.2	46.851	-0.638	-0.738	0	-4.02	0	0.146	1.054	-0.908
640.3	46.795	-0.638	-0.879	0	0.7	0	0.146	1.054	-0.908
640.4	46.795	-0.648	-1.268	0	0	0	0.146	1.054	-0.908
640.5	46.69	-0.663	-0.565	0	0	0	0.146	1.054	-0.908
640.6	46.646	-0.663	-0.498	0	0	0	0.146	1.054	-0.908
640.7	46.603	-0.673	-1.158	0	0	0	0.146	1.054	-0.908
640.8	46.547	-0.678	-0.816	0	0	0	0.146	1.054	-0.908
640.9	46.503	-0.678	0.025	0	0	0	0.146	1.054	-0.908
641	46.46	-0.643	-1.36	0	0	0	0.146	1.054	-0.908
641.1	46.41	-0.66	-1.451	0	0	0	0.146	1.054	-0.908
641.2	46.367	-0.66	-0.763	0	0	0	0.146	1.054	-0.908
641.3	46.367	-0.663	-0.265	0	0	0	0.146	1.054	-0.908
641.4	46.267	-0.663	-0.982	0	0	0	0.146	1.054	-0.908
641.5	46.224	-0.658	-0.837	0	0.64	0	0.146	1.054	-0.908
641.6	46.18	-0.633	-1.201	0	2.02	0	0.146	1.054	-0.908
641.7	46.137	-0.658	-1.261	0	3.64	0	0.146	1.054	-0.908
641.8	46.106	-0.658	-1.017	0	5.15	0	0.146	1.054	-0.908
641.9	46.068	-0.683	0.17	0	8.12	0	0.146	1.055	-0.908
642	46.031	-0.653	-0.833	0	13.31	0	0.147	1.055	-0.908
642.1	46.013	-0.653	-1.455	0	16.28	0	0.147	1.055	-0.908
642.2	46	-0.663	-1.307	0	16.92	0	0.148	1.056	-0.908
642.3	46	-0.673	-0.611	0	16.95	0	0.148	1.056	-0.908
642.4	45.969	-0.673	-0.441	0	16.94	0	0.149	1.057	-0.908
642.5	45.957	-0.64	-0.911	0	17.95	0	0.149	1.057	-0.908
642.6	45.944	-0.65	-1.042	0	20.54	0	0.15	1.058	-0.908
642.7	45.938	-0.65	-0.897	0	23.9	0	0.15	1.059	-0.908
642.8	45.938	-0.665	-0.275	0	25.86	0	0.151	1.059	-0.908
642.9	45.938	-0.665	-0.632	0	29.32	0	0.152	1.06	-0.908
643	45.95	-0.65	-1.102	0	30.25	0	0.153	1.061	-0.908
643.1	45.957	-0.655	-0.675	0	32.26	0	0.154	1.062	-0.908
643.2	45.969	-0.663	-0.946	0	33.56	0	0.155	1.063	-0.908

643.3	45.969	-0.663	-0.579	0	33.88	0	0.156	1.064	-0.908
643.4	46	-0.65	-0.879	0	34.18	0	0.156	1.065	-0.908
643.5	46.013	-0.67	-1.391	0	35.66	0	0.157	1.066	-0.908
643.6	46.031	-0.67	-0.117	0	38.44	0	0.159	1.067	-0.908
643.7	46.056	-0.655	-0.625	0	39.94	0	0.16	1.068	-0.908
643.8	46.081	-0.658	-0.869	0	41.71	0	0.161	1.069	-0.908
643.9	46.112	-0.658	-1.119	0	43.24	0	0.162	1.07	-0.908
644	46.143	-0.675	-0.71	0	46.21	0	0.163	1.071	-0.908
644.1	46.168	-0.663	-0.795	0	58.93	0	0.165	1.073	-0.908
644.2	46.205	-0.663	-0.724	0	62.01	0	0.167	1.075	-0.908
644.3	46.205	-0.665	-0.759	0	53.1	0	0.168	1.076	-0.908
644.4	46.28	-0.665	-0.657	0	55.55	0	0.17	1.078	-0.908
644.5	46.323	-0.658	-0.816	0	57.91	0	0.171	1.079	-0.908
644.6	46.367	-0.658	-1.19	0	62.87	0	0.173	1.081	-0.908
644.7	46.367	-0.66	-0.77	0	66.49	0	0.175	1.083	-0.908
644.8	46.466	-0.66	-0.915	0	69.89	0	0.177	1.085	-0.908
644.9	46.522	-0.655	-0.675	0	72.25	0	0.179	1.087	-0.908
645	46.572	-0.655	-0.915	0	78.94	0	0.181	1.089	-0.908
645.1	46.628	-0.655	-1.151	0	114.67	0	0.184	1.092	-0.908
645.2	46.628	-0.658	-0.205	0	117.97	0	0.187	1.096	-0.908
645.3	46.677	-0.623	-0.65	0	118.77	0	0.191	1.099	-0.908
645.4	46.789	-0.623	-0.706	0	116.38	0	0.194	1.102	-0.908
645.5	46.845	-0.262	0.353	0	48.85	0	0.195	1.104	-0.908
645.6	46.907	0.033	3.68	0	37.31	0	0.196	1.105	-0.908
645.7	46.963	0.033	13.296	0	37.46	0	0.197	1.106	-0.908
645.8	47.013	-0.107	31.871	0	39.56	0	0.199	1.107	-0.908
645.9	47.069	-0.107	36.152	0	36.85	0	0.2	1.108	-0.908
646	47.119	-0.43	34.781	0	31.91	0	0.2	1.109	-0.908
646.1	47.168	-0.327	19.928	0	27.71	0	0.201	1.109	-0.908
646.2	47.224	-0.26	8.479	0	25.28	0	0.202	1.11	-0.908
646.3	47.224	-0.26	14.468	0	22.65	0	0.203	1.111	-0.908
646.4	47.33	-0.22	20.288	0	19.82	0	0.203	1.111	-0.908
646.5	47.386	-0.125	22.114	0	17.63	0	0.204	1.112	-0.908
646.6	47.435	-0.125	25.19	0	15.98	0	0.204	1.112	-0.908
646.7	47.491	-0.112	27.729	0	14.47	0	0.204	1.113	-0.908
646.8	47.491	-0.09	28.954	0	14.12	0	0.205	1.113	-0.908
646.9	47.597	-0.09	28.919	0	13.51	0	0.205	1.113	-0.908
647	47.653	-0.105	29.523	0	14.31	0	0.206	1.114	-0.908
647.1	47.715	-0.087	30.752	0	14.14	0	0.206	1.114	-0.908
647.2	47.771	-0.087	30.318	0	13.29	0	0.206	1.115	-0.908
647.3	47.771	-0.097	30.169	0	12.75	0	0.207	1.115	-0.908
647.4	47.895	-0.097	30.392	0	12.04	0	0.207	1.115	-0.908
647.5	47.964	-0.072	30.364	0	11.24	0	0.207	1.116	-0.908
647.6	47.964	-0.052	31.14	0	8.54	0	0.208	1.116	-0.908
647.7	48.107	-0.02	32.419	0	6.9	0	0.208	1.116	-0.908
647.8	48.181	-0.02	32.698	0	5.74	0	0.208	1.116	-0.908
647.9	48.256	0.105	33.295	0	4.33	0	0.208	1.116	-0.908

648	48.33	0.108	36.311	0	3.42	0	0.208	1.116	-0.908
648.1	48.405	0.108	40.209	0	2.98	0	0.208	1.116	-0.908
648.2	48.486	0.133	41.47	0	2.92	0	0.208	1.117	-0.908
648.3	48.486	0.148	42.416	0	2.2	0	0.208	1.117	-0.908
648.4	48.647	0.148	43.652	0	0	0	0.208	1.117	-0.908
648.5	48.728	0.183	44.581	0	-0.59	0	0.208	1.117	-0.908
648.6	48.802	0.171	44.747	0	-0.58	0	0.208	1.117	-0.908
648.7	48.883	0.171	45.81	0	-0.59	0	0.208	1.117	-0.908
648.8	48.964	0.208	46.449	0	-0.62	0	0.208	1.117	-0.908
648.9	49.045	0.208	45.348	0	-0.99	0	0.208	1.117	-0.908
649	49.119	0.206	46.128	0	-0.86	0	0.208	1.117	-0.908
649.1	49.2	0.188	47.445	0	-0.85	0	0.208	1.117	-0.908
649.2	49.2	0.206	47.481	0	-1.05	0	0.208	1.117	-0.908
649.3	49.356	0.206	46.728	0	-1.89	0	0.208	1.117	-0.908
649.4	49.436	0.208	46.086	0	-2.69	0	0.208	1.117	-0.909
649.5	49.511	0.161	46.361	0	-3.79	0	0.208	1.117	-0.909
649.6	49.579	0.161	47.131	0	-4.63	0	0.208	1.117	-0.909
649.7	49.654	0.183	47.855	0	-4.42	0	0.208	1.117	-0.909
649.8	49.722	0.201	45.57	0	-4.26	0	0.208	1.117	-0.909
649.9	49.79	0.201	45.619	0	-4.86	0	0.207	1.117	-0.909
650	49.79	0.191	45.729	0	-5.32	0	0.207	1.117	-0.909
650.1	49.927	0.178	45.623	0	-5.73	0	0.207	1.117	-0.909
650.2	49.989	0.178	45.252	0	-6.09	0	0.207	1.117	-0.91
650.3	50.051	0.168	44.998	0	-6.32	0	0.207	1.117	-0.91
650.4	50.114	0.168	44.352	0	-5.95	0	0.207	1.117	-0.91
650.5	50.163	0.176	43.765	0	-6.17	0	0.206	1.117	-0.91
650.6	50.225	0.138	43.017	0	-6.2	0	0.206	1.117	-0.91
650.7	50.288	0.128	43.324	0	-5.99	0	0.206	1.117	-0.91
650.8	50.288	0.128	42.476	0	-5.7	0	0.206	1.117	-0.911
650.9	50.406	0.143	41.756	0	-5.47	0	0.206	1.117	-0.911
651	50.455	0.133	42.028	0	-5.41	0	0.206	1.117	-0.911
651.1	50.511	0.133	41.745	0	-5.25	0	0.206	1.117	-0.911
651.2	50.567	0.136	41.414	0	-5.17	0	0.205	1.117	-0.911
651.3	50.623	0.118	41.177	0	-5.1	0	0.205	1.117	-0.911
651.4	50.673	0.118	41.184	0	-5.14	0	0.205	1.117	-0.911
651.5	50.729	0.093	41.527	0	-4.99	0	0.205	1.117	-0.912
651.6	50.729	0.113	41.502	0	-4.85	0	0.205	1.117	-0.912
651.7	50.834	0.113	40.714	0	-4.81	0	0.205	1.117	-0.912
651.8	50.89	0.113	40.88	0	-4.96	0	0.205	1.117	-0.912
651.9	50.94	0.113	40.63	0	-4.05	0	0.204	1.117	-0.912
652	50.996	0.103	41.025	0	-3.97	0	0.204	1.117	-0.912
652.1	51.052	0.123	40.979	0	-4.12	0	0.204	1.117	-0.912
652.2	51.114	0.093	40.421	0	-4.11	0	0.204	1.117	-0.912
652.3	51.164	0.093	41.262	0	-4.05	0	0.204	1.117	-0.913
652.4	51.226	0.053	42.032	0	-4.18	0	0.204	1.117	-0.913
652.5	51.226	0.105	40.905	0	-4.27	0	0.204	1.117	-0.913
652.6	51.331	0.105	39.545	0	-4.24	0	0.204	1.117	-0.913

652.7	51.387	0.115	41.293	0	-4.25	0	0.204	1.117	-0.913
652.8	51.45	0.133	42.063	0	-4.39	0	0.203	1.117	-0.913
652.9	51.512	0.133	40.87	0	-4.4	0	0.203	1.117	-0.913
653	51.561	0.136	41.428	0	-4.36	0	0.203	1.117	-0.913
653.1	51.617	0.136	41.318	0	-4.44	0	0.203	1.117	-0.914
653.2	51.617	0.136	41.032	0	-4.58	0	0.203	1.117	-0.914
653.3	51.735	0.146	41.65	0	-4.62	0	0.203	1.117	-0.914
653.4	51.791	0.146	41.809	0	-4.58	0	0.203	1.117	-0.914
653.5	51.847	0.158	41.555	0	-4.67	0	0.203	1.117	-0.914
653.6	51.891	0.158	42.236	0	-4.78	0	0.202	1.117	-0.914
653.7	51.953	0.158	42.48	0	-5.21	0	0.202	1.117	-0.914
653.8	52.003	0.158	42.402	0	-5.56	0	0.202	1.117	-0.914
653.9	52.058	0.128	42.137	0	-5.45	0	0.202	1.117	-0.915
654	52.108	0.143	42.229	0	-5.83	0	0.202	1.117	-0.915
654.1	52.158	0.148	41.505	0	-6.82	0	0.202	1.117	-0.915
654.2	52.208	0.146	41.474	0	-8.32	0	0.201	1.117	-0.915
654.3	52.251	0.146	41.435	0	-9.77	0	0.201	1.117	-0.915
654.4	52.295	0.146	41.594	0	-10.25	0	0.201	1.117	-0.916
654.5	52.319	0.131	41.806	0	-10.56	0	0.201	1.117	-0.916
654.6	52.351	0.098	40.901	0	-14.14	0	0.2	1.117	-0.916
654.7	52.369	0.098	40.269	0	-17.18	0	0.2	1.117	-0.917
654.8	52.382	0.028	39.326	0	-19.21	0	0.199	1.117	-0.917
654.9	52.388	0.028	37.077	0	-21.09	0	0.199	1.117	-0.918
655	52.382	0.03	35.089	0	-23.06	0	0.198	1.117	-0.919
655.1	52.369	-0.035	34.909	0	-24.08	0	0.197	1.117	-0.919
655.2	52.351	-0.072	34.488	0	-25.08	0	0.197	1.117	-0.92
655.3	52.319	-0.072	32.387	0	-26.01	0	0.196	1.117	-0.921
655.4	52.288	-0.107	30.148	0	-24.7	0	0.195	1.117	-0.921
655.5	52.251	-0.202	28.276	0	-24.58	0	0.194	1.117	-0.922
655.6	52.214	-0.21	26.595	0	-24.19	0	0.194	1.117	-0.923
655.7	52.177	-0.197	23.654	0	-23.57	0	0.193	1.117	-0.923
655.8	52.139	-0.202	21.793	0	-23.23	0	0.192	1.117	-0.924
655.9	52.096	-0.202	21.355	0	-23.19	0	0.192	1.117	-0.925
656	52.058	-0.242	20.853	0	-24.03	0	0.191	1.117	-0.925
656.1	52.021	-0.247	20.514	0	-25.48	0	0.19	1.117	-0.926
656.2	51.971	-0.247	19.903	0	-25.31	0	0.19	1.117	-0.927
656.3	51.922	-0.235	19.6	0	-24.6	0	0.189	1.117	-0.928
656.4	51.878	-0.235	19.875	0	-23.63	0	0.188	1.117	-0.928
656.5	51.829	-0.23	20.585	0	-22.34	0	0.188	1.117	-0.929
656.6	51.779	-0.26	20.228	0	-20.49	0	0.187	1.117	-0.929
656.7	51.723	-0.29	20.143	0	-19.31	0	0.187	1.117	-0.93
656.8	51.667	-0.29	19.303	0	-18.14	0	0.186	1.117	-0.93
656.9	51.611	-0.375	17.361	0	-17.1	0	0.186	1.117	-0.931
657	51.561	-0.38	15.966	0	-16.39	0	0.185	1.117	-0.931
657.1	51.518	-0.38	13.575	0	-7.94	0	0.185	1.117	-0.932
657.2	51.468	-0.393	12.526	0	2.59	0	0.185	1.117	-0.932
657.3	51.431	-0.38	12.487	0	3.85	0	0.185	1.117	-0.932

657.4	51.381	-0.38	12.148	0	4.94	0	0.185	1.117	-0.932
657.5	51.338	-0.458	11.958	0	6.67	0	0.186	1.117	-0.932
657.6	51.3	-0.623	15.344	0	10.46	0	0.186	1.117	-0.932
657.7	51.263	-0.623	10.393	0	12.78	0	0.186	1.118	-0.932
657.8	51.226	-0.608	1.441	0	16.19	0	0.187	1.118	-0.932
657.9	51.207	-0.608	-1.589	0	18.73	0	0.187	1.119	-0.932
658	51.189	-0.643	-0.48	0	21.15	0	0.188	1.119	-0.932
658.1	51.17	-0.64	-1.102	0	21.8	0	0.188	1.12	-0.932
658.2	51.151	-0.648	-1.921	0	21.84	0	0.189	1.121	-0.932
658.3	51.139	-0.648	-2.55	0	21.81	0	0.19	1.121	-0.932
658.4	51.12	-0.648	-1.914	0	21.84	0	0.19	1.122	-0.932
658.5	51.108	-0.64	-2.013	0	22.7	0	0.191	1.122	-0.932
658.6	51.089	-0.64	-1.942	0	24.21	0	0.191	1.123	-0.932
658.7	51.083	-0.7	-2.027	0	25.06	0	0.192	1.124	-0.932
658.8	51.07	-0.675	-2.613	0	25.32	0	0.193	1.124	-0.932
658.9	51.064	-0.675	-3.916	0	25.34	0	0.194	1.125	-0.932
659	51.052	-0.66	-4.121	0	25.27	0	0.194	1.126	-0.932
659.1	51.046	-0.725	-3.436	0	25.35	0	0.195	1.127	-0.932
659.2	51.033	-0.725	-0.908	0	26	0	0.196	1.127	-0.932
659.3	51.027	-0.67	-4.986	0	25.98	0	0.196	1.128	-0.932
659.4	51.015	-0.67	-5.989	0	26.5	0	0.197	1.129	-0.932
659.5	51.008	-0.643	-3.733	0	27.53	0	0.198	1.129	-0.932
659.6	51.002	-0.65	-2.716	0	28.67	0	0.199	1.13	-0.932
659.7	50.996	-0.663	-2.348	0	29.69	0	0.2	1.131	-0.932
659.8	50.996	-0.663	-1.882	0	30.54	0	0.2	1.132	-0.932
659.9	50.996	-0.665	-1.829	0	31.8	0	0.201	1.133	-0.932
660	50.996	-0.678	-2.147	0	32.71	0	0.202	1.134	-0.932
660.1	50.996	-0.678	-1.448	0	32.69	0	0.203	1.135	-0.932
660.2	50.996	-0.628	-1.423	0	32.69	0	0.204	1.136	-0.932
660.3	50.996	-0.628	-2.345	0	32.73	0	0.205	1.136	-0.932
660.4	50.996	-0.628	-2.355	0	33.02	0	0.206	1.137	-0.932
660.5	51.002	-0.643	-0.727	0	35.37	0	0.207	1.138	-0.932
660.6	51.008	-0.64	-1.031	0	36.72	0	0.208	1.139	-0.932
660.7	51.015	-0.64	-1.805	0	38.55	0	0.209	1.14	-0.932
660.8	51.027	-0.635	-0.717	0	47.63	0	0.21	1.142	-0.932
660.9	51.046	-0.635	-1.434	0	65.81	0	0.212	1.144	-0.932
661	51.064	-0.64	-1.737	0	59.06	0	0.214	1.145	-0.932
661.1	51.089	-0.663	-0.554	0	64.56	0	0.215	1.147	-0.932
661.2	51.12	-0.65	-1.024	0	105.56	0	0.218	1.15	-0.932
661.3	51.145	-0.65	-1.533	0	109.73	0	0.221	1.153	-0.932
661.4	51.164	-0.638	-1.448	0	82.6	0	0.224	1.155	-0.932
661.5	51.189	-0.518	-0.957	0	29.89	0	0.225	1.156	-0.932
661.6	51.213	-0.518	0.554	0	11.75	0	0.225	1.156	-0.932
661.7	51.232	0.293	3.588	0	18.31	0	0.225	1.157	-0.932
661.8	51.251	-0.19	20.013	0	21.72	0	0.226	1.158	-0.932
661.9	51.263	-0.19	46.449	0	18.83	0	0.227	1.158	-0.932
662	51.276	-0.325	37.419	0	14.81	0	0.227	1.159	-0.932

662.1	51.288	-0.272	16.337	0	11.26	0	0.227	1.159	-0.932
662.2	51.3	-0.272	14.147	0	8.08	0	0.227	1.159	-0.932
662.3	51.307	-0.227	18.025	0	5.54	0	0.228	1.159	-0.932
662.4	51.319	-0.227	19.444	0	3.35	0	0.228	1.159	-0.932
662.5	51.331	-0.19	21.655	0	1.77	0	0.228	1.159	-0.932
662.6	51.344	-0.127	23.922	0	0.78	0	0.228	1.159	-0.932
662.7	51.356	-0.105	25.292	0	0	0	0.228	1.159	-0.932
662.8	51.369	-0.105	26.175	0	0	0	0.228	1.159	-0.932
662.9	51.375	-0.132	27.259	0	0	0	0.228	1.159	-0.932
663	51.394	-0.15	28.326	0	0	0	0.228	1.159	-0.932
663.1	51.406	-0.15	28.103	0	-0.86	0	0.228	1.159	-0.932
663.2	51.425	-0.13	27.062	0	-1	0	0.228	1.159	-0.932
663.3	51.443	-0.092	26.327	0	-1.28	0	0.228	1.159	-0.932
663.4	51.456	-0.092	26.327	0	-1.73	0	0.228	1.159	-0.932
663.5	51.481	-0.102	27.786	0	0.61	0	0.228	1.159	-0.932
663.6	51.505	-0.097	28.012	0	1.43	0	0.228	1.159	-0.932
663.7	51.537	-0.097	28.492	0	2.86	0	0.228	1.16	-0.932
663.8	51.574	-0.037	29.346	0	2.65	0	0.228	1.16	-0.932
663.9	51.605	-0.037	29.392	0	1.09	0	0.228	1.16	-0.932
664	51.642	-0.027	30.84	0	0	0	0.228	1.16	-0.932
664.1	51.679	-0.027	32.348	0	-1.24	0	0.228	1.16	-0.932
664.2	51.717	-0.012	32.896	0	-2.27	0	0.228	1.16	-0.932
664.3	51.748	-0.012	32.677	0	-3.12	0	0.228	1.16	-0.932
664.4	51.785	-0.01	33.429	0	-3.18	0	0.228	1.16	-0.932
664.5	51.816	0.013	34.531	0	-4.14	0	0.227	1.16	-0.932
664.6	51.847	0.013	35.057	0	-5.22	0	0.227	1.16	-0.932
664.7	51.884	0.028	35.661	0	-5.87	0	0.227	1.16	-0.932
664.8	51.916	0.038	36.392	0	-7.96	0	0.227	1.16	-0.933
664.9	51.947	0.038	36.378	0	-8.07	0	0.227	1.16	-0.933
665	51.971	0.038	36.152	0	-8.08	0	0.227	1.16	-0.933
665.1	52.003	0.028	37.087	0	-8.07	0	0.226	1.16	-0.933
665.2	52.034	0.028	37.137	0	-8.09	0	0.226	1.16	-0.934
665.3	52.065	0.04	36.625	0	-8.11	0	0.226	1.16	-0.934
665.4	52.09	0.04	36.236	0	-8.14	0	0.226	1.16	-0.934
665.5	52.114	0.025	37.073	0	-8.16	0	0.225	1.16	-0.934
665.6	52.152	0.033	36.876	0	-8.16	0	0.225	1.16	-0.934
665.7	52.177	0.028	36.176	0	-8.5	0	0.225	1.16	-0.935
665.8	52.208	0.028	36.388	0	-8.52	0	0.225	1.16	-0.935
665.9	52.239	0.038	36.692	0	-8.51	0	0.224	1.16	-0.935
666	52.27	0.045	36.155	0	-8.52	0	0.224	1.16	-0.935
666.1	52.307	0.045	36.311	0	-8.54	0	0.224	1.16	-0.936
666.2	52.326	0.03	36.752	0	-9.04	0	0.224	1.16	-0.936
666.3	52.357	0.025	36.879	0	-9	0	0.223	1.16	-0.936
666.4	52.382	0.025	37.218	0	-8.98	0	0.223	1.16	-0.936
666.5	52.413	0.05	36.494	0	-8.89	0	0.223	1.16	-0.937
666.6	52.444	0.043	36.014	0	-8.82	0	0.223	1.16	-0.937
666.7	52.475	0.043	36.522	0	-8.79	0	0.222	1.16	-0.937

666.8	52.5	0.04	36.964	0	-9.05	0	0.222	1.16	-0.937
666.9	52.531	0.04	36.794	0	-9.37	0	0.222	1.16	-0.938
667	52.556	0.043	36.381	0	-9.3	0	0.222	1.16	-0.938
667.1	52.587	0.033	36.307	0	-9.77	0	0.221	1.16	-0.938
667.2	52.605	0.028	36.364	0	-11	0	0.221	1.16	-0.938
667.3	52.63	0.028	36.056	0	-12.63	0	0.221	1.16	-0.939
667.4	52.643	0.025	36.427	0	-12.49	0	0.22	1.16	-0.939
667.5	52.661	0.035	36.113	0	-12.25	0	0.22	1.16	-0.94
667.6	52.674	0.035	35.248	0	-11.88	0	0.22	1.16	-0.94
667.7	52.698	0.015	35.523	0	-12.56	0	0.219	1.16	-0.94
667.8	52.711	0.01	35.795	0	-12.61	0	0.219	1.16	-0.941
667.9	52.723	0.01	35.343	0	-13.36	0	0.219	1.16	-0.941
668	52.73	-0.012	34.566	0	-14.38	0	0.218	1.16	-0.941
668.1	52.742	-0.025	34.107	0	-14.06	0	0.218	1.16	-0.942
668.2	52.748	-0.025	33.157	0	-13.37	0	0.218	1.16	-0.942
668.3	52.761	-0.027	32.606	0	-13.26	0	0.217	1.16	-0.942
668.4	52.767	-0.027	32.98	0	-15.12	0	0.217	1.16	-0.943
668.5	52.773	-0.042	33.143	0	-15.37	0	0.216	1.16	-0.943
668.6	52.773	-0.042	32.401	0	-15.05	0	0.216	1.16	-0.944
668.7	52.779	-0.055	31.289	0	-14.38	0	0.215	1.16	-0.944
668.8	52.773	-0.055	31.451	0	-13.85	0	0.215	1.16	-0.944
668.9	52.773	-0.085	31.596	0	-14.96	0	0.215	1.16	-0.945
669	52.767	-0.077	29.883	0	-15.97	0	0.214	1.16	-0.945
669.1	52.761	-0.077	28.615	0	-17.16	0	0.214	1.16	-0.946
669.2	52.754	-0.1	28.764	0	-17.35	0	0.213	1.16	-0.946
669.3	52.736	-0.107	28.82	0	-17.99	0	0.213	1.16	-0.947
669.4	52.717	-0.107	27.976	0	-19.91	0	0.212	1.16	-0.947
669.5	52.698	-0.13	28.005	0	-19.02	0	0.212	1.16	-0.948
669.6	52.674	-0.147	26.885	0	-18.46	0	0.211	1.16	-0.948
669.7	52.655	-0.147	26.03	0	-17.97	0	0.211	1.16	-0.949
669.8	52.636	-0.18	25.819	0	-17.62	0	0.21	1.16	-0.949
669.9	52.611	-0.18	24.84	0	-17.46	0	0.21	1.16	-0.95
670	52.599	-0.19	24.477	0	-17.31	0	0.209	1.16	-0.95
670.1	52.574	-0.157	23.59	0	-16.8	0	0.209	1.16	-0.951
670.2	52.556	-0.165	22.771	0	-16.11	0	0.208	1.16	-0.951
670.3	52.537	-0.165	23.686	0	-15.39	0	0.208	1.16	-0.952
670.4	52.518	-0.172	23.901	0	-14	0	0.208	1.16	-0.952
670.5	52.506	-0.167	23.431	0	-13.53	0	0.207	1.16	-0.952
670.6	52.493	-0.167	23.83	0	-12.96	0	0.207	1.16	-0.953
670.7	52.481	-0.16	23.777	0	-9.74	0	0.207	1.16	-0.953
670.8	52.475	-0.167	23.791	0	-9.4	0	0.206	1.16	-0.953
670.9	52.475	-0.167	24.304	0	-9.38	0	0.206	1.16	-0.954
671	52.469	-0.145	24.561	0	-10.14	0	0.206	1.16	-0.954
671.1	52.475	-0.137	24.187	0	-12.47	0	0.205	1.16	-0.954
671.2	52.462	-0.137	24.851	0	-12.34	0	0.205	1.16	-0.955
671.3	52.462	-0.132	25.748	0	-12.38	0	0.205	1.16	-0.955
671.4	52.456	-0.132	26.235	0	-12.35	0	0.204	1.16	-0.955

671.5	52.45	-0.112	26.398	0	-12.35	0	0.204	1.16	-0.956
671.6	52.45	-0.107	26.804	0	-12.35	0	0.204	1.16	-0.956
671.7	52.444	-0.11	27.316	0	-12.34	0	0.203	1.16	-0.956
671.8	52.444	-0.11	27.842	0	-12.34	0	0.203	1.16	-0.957
671.9	52.438	-0.087	27.775	0	-12.35	0	0.203	1.16	-0.957
672	52.438	-0.095	27.729	0	-12.35	0	0.202	1.16	-0.957
672.1	52.431	-0.095	28.315	0	-12.35	0	0.202	1.16	-0.958
672.2	52.431	-0.122	27.828	0	-12.35	0	0.202	1.16	-0.958
672.3	52.431	-0.117	28.065	0	-12.35	0	0.201	1.16	-0.958
672.4	52.425	-0.117	27.524	0	-12.37	0	0.201	1.16	-0.959
672.5	52.419	-0.112	27.379	0	-12.37	0	0.201	1.16	-0.959
672.6	52.419	-0.12	27.51	0	-12.35	0	0.2	1.16	-0.959
672.7	52.419	-0.12	27.701	0	-12.34	0	0.2	1.16	-0.96
672.8	52.413	-0.115	27.242	0	-12.35	0	0.2	1.16	-0.96
672.9	52.413	-0.115	27.245	0	-12.35	0	0.199	1.16	-0.96
673	52.406	-0.12	27.701	0	-12.34	0	0.199	1.16	-0.961
673.1	52.406	-0.105	27.341	0	-12.36	0	0.198	1.16	-0.961
673.2	52.4	-0.102	26.896	0	-12.31	0	0.198	1.16	-0.961
673.3	52.4	-0.102	26.98	0	-12.31	0	0.198	1.16	-0.962
673.4	52.394	-0.112	27.584	0	-12.33	0	0.197	1.16	-0.962
673.5	52.394	-0.12	27.5	0	-12.33	0	0.197	1.16	-0.962
673.6	52.388	-0.12	27.161	0	-12.33	0	0.197	1.16	-0.963
673.7	52.388	-0.105	26.934	0	-12.32	0	0.196	1.16	-0.963
673.8	52.388	-0.107	26.786	0	-12.31	0	0.196	1.16	-0.964
673.9	52.382	-0.107	27.302	0	-12.32	0	0.196	1.16	-0.964
674	52.382	-0.122	26.885	0	-12.34	0	0.195	1.16	-0.964
674.1	52.375	-0.122	27.538	0	-12.31	0	0.195	1.16	-0.965
674.2	52.375	-0.122	27.51	0	-12.32	0	0.195	1.16	-0.965
674.3	52.369	-0.107	27.136	0	-12.34	0	0.194	1.16	-0.965
674.4	52.369	-0.115	27.524	0	-12.31	0	0.194	1.16	-0.966
674.5	52.369	-0.115	27.524	0	-12.31	0	0.194	1.16	-0.966
674.6	52.363	-0.122	27.5	0	-12.3	0	0.193	1.16	-0.966
674.7	52.363	-0.117	27.701	0	-12.3	0	0.193	1.16	-0.967
674.8	52.357	-0.117	27.379	0	-12.33	0	0.193	1.16	-0.967
674.9	52.357	-0.097	26.62	0	-12.31	0	0.192	1.16	-0.967
675	52.357	-0.105	26.98	0	-12.31	0	0.192	1.16	-0.968
675.1	52.351	-0.115	27.51	0	-12.3	0	0.192	1.16	-0.968
675.2	52.351	-0.11	27.779	0	-12.3	0	0.191	1.16	-0.968
675.3	52.344	-0.11	27.8	0	-12.46	0	0.191	1.16	-0.969
675.4	52.344	-0.11	27.15	0	-13.19	0	0.191	1.16	-0.969
675.5	52.338	-0.105	27.432	0	-14.2	0	0.19	1.16	-0.969
675.6	52.332	-0.122	26.98	0	-15.6	0	0.19	1.16	-0.97
675.7	52.319	-0.122	27.161	0	-16.7	0	0.189	1.16	-0.97
675.8	52.307	-0.127	27.341	0	-17.37	0	0.189	1.16	-0.971
675.9	52.288	-0.127	26.956	0	-18.48	0	0.188	1.16	-0.971
676	52.27	-0.122	26.8	0	-20.91	0	0.188	1.16	-0.972
676.1	52.239	-0.16	26.26	0	-21.56	0	0.187	1.16	-0.972

676.2	52.214	-0.167	26.479	0	-21.93	0	0.187	1.16	-0.973
676.3	52.183	-0.167	25.056	0	-21.92	0	0.186	1.16	-0.974
676.4	52.145	-0.175	23.943	0	-21.88	0	0.185	1.16	-0.974
676.5	52.145	-0.202	24.353	0	-22.2	0	0.185	1.16	-0.975
676.6	52.077	-0.2	24.07	0	-22.41	0	0.184	1.16	-0.976
676.7	52.04	-0.215	22.594	0	-23.69	0	0.183	1.16	-0.976
676.8	52.009	-0.21	23.156	0	-23.94	0	0.183	1.16	-0.977
676.9	51.965	-0.21	22.647	0	-23.67	0	0.182	1.16	-0.978
677	51.928	-0.21	22.118	0	-23.52	0	0.181	1.16	-0.978
677.1	51.891	-0.2	21.842	0	-23.7	0	0.181	1.16	-0.979
677.2	51.853	-0.2	21.722	0	-24.92	0	0.18	1.16	-0.98
677.3	51.81	-0.202	21.118	0	-24.98	0	0.179	1.16	-0.98
677.4	51.76	-0.202	21.584	0	-24.17	0	0.179	1.16	-0.981
677.5	51.717	-0.22	22.238	0	-22.84	0	0.178	1.16	-0.982
677.6	51.667	-0.237	21.485	0	-21	0	0.178	1.16	-0.982
677.7	51.617	-0.265	21.228	0	-19.69	0	0.177	1.16	-0.983
677.8	51.568	-0.265	20.518	0	-17.44	0	0.176	1.16	-0.983
677.9	51.518	-0.327	19.462	0	-7.48	0	0.176	1.16	-0.983
678	51.481	-0.355	17.226	0	2.45	0	0.176	1.16	-0.983
678.1	51.443	-0.355	15.941	0	1.49	0	0.176	1.16	-0.983
678.2	51.387	-0.36	14.903	0	0.83	0	0.176	1.16	-0.983
678.3	51.331	-0.51	13.783	0	0.64	0	0.176	1.16	-0.983
678.4	51.288	-0.51	15.839	0	0.65	0	0.176	1.16	-0.983
678.5	51.232	-0.603	7.925	0	0.65	0	0.176	1.16	-0.983
678.6	51.182	-0.598	0.618	0	0.64	0	0.176	1.16	-0.983
678.7	51.133	-0.598	0.177	0	0.64	0	0.176	1.16	-0.983
678.8	51.083	-0.665	0.724	0	0.65	0	0.177	1.16	-0.983
678.9	51.021	-0.665	-1.921	0	0.64	0	0.177	1.16	-0.983
679	50.971	-0.658	-2.74	0	0.63	0	0.177	1.16	-0.983
679.1	50.915	-0.678	-2.797	0	0.63	0	0.177	1.16	-0.983
679.2	50.872	-0.673	-2.49	0	0.54	0	0.177	1.16	-0.983
679.3	50.816	-0.673	-2.387	0	0	0	0.177	1.16	-0.983
679.4	50.754	-0.663	-3.263	0	0	0	0.177	1.16	-0.983
679.5	50.704	-0.69	-3.079	0	0	0	0.177	1.16	-0.983
679.6	50.654	-0.69	-3.577	0	0	0	0.177	1.16	-0.983
679.7	50.604	-0.66	-4.534	0	0	0	0.177	1.16	-0.983
679.8	50.555	-0.63	-4.135	0	0	0	0.177	1.16	-0.983
679.9	50.499	-0.63	-3.733	0	0.59	0	0.177	1.16	-0.983
680	50.449	-0.723	-1.324	0	0.93	0	0.177	1.16	-0.983
680.1	50.399	-0.673	-3.881	0	2.25	0	0.177	1.16	-0.983
680.2	50.356	-0.673	-5.777	0	3.9	0	0.177	1.16	-0.983
680.3	50.312	-0.658	-3.45	0	5.6	0	0.177	1.16	-0.983
680.4	50.269	-0.658	-2.433	0	7.49	0	0.177	1.161	-0.983
680.5	50.238	-0.655	-2.479	0	8.16	0	0.177	1.161	-0.983
680.6	50.201	-0.675	-2.299	0	8.59	0	0.178	1.161	-0.983
680.7	50.163	-0.678	-2.098	0	9.03	0	0.178	1.161	-0.983
680.8	50.126	-0.678	-1.603	0	9.92	0	0.178	1.162	-0.983

680.9	50.089	-0.653	-1.748	0	11.26	0	0.179	1.162	-0.983
681	50.064	-0.635	-1.882	0	11.83	0	0.179	1.162	-0.983
681.1	50.033	-0.635	-2.045	0	11.9	0	0.179	1.163	-0.983
681.2	50.002	-0.678	-1.183	0	11.89	0	0.18	1.163	-0.983
681.3	49.971	-0.673	-1.158	0	11.9	0	0.18	1.163	-0.983
681.4	49.94	-0.673	-1.314	0	11.91	0	0.18	1.164	-0.983
681.5	49.915	-0.653	-1.925	0	13.08	0	0.181	1.164	-0.983
681.6	49.884	-0.643	-1.572	0	14.59	0	0.181	1.164	-0.983
681.7	49.859	-0.643	-1.353	0	15.25	0	0.181	1.165	-0.983
681.8	49.828	-0.635	-1.723	0	15.26	0	0.182	1.165	-0.983
681.9	49.803	-0.635	-1.522	0	15.64	0	0.182	1.166	-0.983
682	49.784	-0.64	-1.236	0	17.02	0	0.183	1.166	-0.983
682.1	49.766	-0.653	-1.229	0	18.61	0	0.183	1.167	-0.983
682.2	49.741	-0.653	-1.169	0	20.14	0	0.184	1.167	-0.983
682.3	49.728	-0.653	-1.554	0	22.1	0	0.184	1.168	-0.983
682.4	49.716	-0.67	-1.13	0	23.23	0	0.185	1.168	-0.983
682.5	49.703	-0.655	-0.936	0	23.25	0	0.186	1.169	-0.983
682.6	49.697	-0.655	-1.706	0	23.25	0	0.186	1.17	-0.983
682.7	49.691	-0.663	-1.391	0	23.27	0	0.187	1.17	-0.983
682.8	49.679	-0.66	-1.063	0	23.64	0	0.188	1.171	-0.983
682.9	49.666	-0.66	-1.526	0	24.22	0	0.188	1.172	-0.983
683	49.66	-0.643	-0.964	0	24.18	0	0.189	1.172	-0.983
683.1	49.648	-0.655	-1.677	0	24.75	0	0.19	1.173	-0.983
683.2	49.641	-0.655	-1.487	0	25.59	0	0.19	1.174	-0.983
683.3	49.641	-0.648	-0.639	0	25.56	0	0.191	1.174	-0.983
683.4	49.629	-0.648	-1.61	0	25.58	0	0.192	1.175	-0.983
683.5	49.629	-0.65	-1.059	0	26.05	0	0.193	1.176	-0.983
683.6	49.623	-0.655	-1.215	0	27.12	0	0.193	1.177	-0.983
683.7	49.616	-0.665	-1.434	0	28.61	0	0.194	1.177	-0.983
683.8	49.616	-0.665	-1.017	0	29.18	0	0.195	1.178	-0.983
683.9	49.616	-0.648	-1.017	0	30.78	0	0.196	1.179	-0.983
684	49.616	-0.658	-1.462	0	30.71	0	0.197	1.18	-0.983
684.1	49.623	-0.658	-1.038	0	30.68	0	0.197	1.181	-0.983
684.2	49.616	-0.663	-1.024	0	30.75	0	0.198	1.182	-0.983
684.3	49.616	-0.67	-1.271	0	30.52	0	0.199	1.182	-0.983
684.4	49.616	-0.67	-1.232	0	29.4	0	0.2	1.183	-0.983
684.5	49.616	-0.658	-1.451	0	28.14	0	0.201	1.184	-0.983
684.6	49.616	-0.66	-1.398	0	27.96	0	0.202	1.185	-0.983
684.7	49.61	-0.66	-0.957	0	27.98	0	0.202	1.186	-0.983
684.8	49.61	-0.66	-0.929	0	28.32	0	0.203	1.186	-0.983
684.9	49.604	-0.66	-1.289	0	28.98	0	0.204	1.187	-0.983
685	49.604	-0.665	-1.307	0	29.39	0	0.205	1.188	-0.983
685.1	49.604	-0.643	-0.932	0	29.36	0	0.206	1.189	-0.983
685.2	49.604	-0.648	-1.275	0	29.37	0	0.206	1.19	-0.983
685.3	49.604	-0.648	-1.063	0	29.37	0	0.207	1.19	-0.983
685.4	49.604	-0.653	-0.622	0	29.36	0	0.208	1.191	-0.983
685.5	49.604	-0.653	-0.689	0	29.35	0	0.209	1.192	-0.983

685.6	49.604	-0.653	-1.165	0	29.35	0	0.21	1.193	-0.983
685.7	49.604	-0.68	-0.879	0	29.92	0	0.21	1.194	-0.983
685.8	49.604	-0.668	-0.551	0	30.04	0	0.211	1.195	-0.983
685.9	49.604	-0.668	-0.939	0	30.08	0	0.212	1.195	-0.983
686	49.604	-0.64	-1.593	0	30.16	0	0.213	1.196	-0.983
686.1	49.604	-0.663	-1.155	0	30.17	0	0.214	1.197	-0.983
686.2	49.604	-0.663	-0.996	0	30.2	0	0.215	1.198	-0.983
686.3	49.604	-0.65	-0.335	0	30.19	0	0.215	1.199	-0.983
686.4	49.604	-0.65	-1.24	0	30.19	0	0.216	1.2	-0.983
686.5	49.61	-0.658	-1.321	0	30.82	0	0.217	1.2	-0.983
686.6	49.61	-0.668	-0.558	0	31.21	0	0.218	1.201	-0.983
686.7	49.61	-0.668	-0.424	0	39.74	0	0.219	1.202	-0.983
686.8	49.616	-0.668	-1.257	0	56.16	0	0.221	1.204	-0.983
686.9	49.629	-0.665	-0.692	0	48.56	0	0.222	1.205	-0.983
687	49.641	-0.663	-1.102	0	54.78	0	0.224	1.207	-0.983
687.1	49.654	-0.663	-0.946	0	95.13	0	0.226	1.21	-0.983
687.2	49.672	-0.665	-1.172	0	100.36	0	0.229	1.212	-0.983
687.3	49.685	-0.658	-0.816	0	75.43	0	0.231	1.214	-0.983
687.4	49.697	-0.658	-0.664	0	28.55	0	0.232	1.215	-0.983
687.5	49.716	-0.027	0.127	0	7.08	0	0.232	1.215	-0.983
687.6	49.728	0.311	3.839	0	11.2	0	0.232	1.216	-0.983
687.7	49.741	0.311	18.939	0	16.1	0	0.233	1.216	-0.983
687.8	49.747	-0.468	48.063	0	14.73	0	0.233	1.217	-0.983
687.9	49.753	-0.468	41.491	0	12.53	0	0.234	1.217	-0.983
688	49.766	-0.357	17.032	0	10.41	0	0.234	1.217	-0.983
688.1	49.772	-0.29	13.54	0	8.01	0	0.234	1.217	-0.983
688.2	49.784	-0.242	18.802	0	5.35	0	0.234	1.218	-0.983
688.3	49.797	-0.242	19.042	0	3.54	0	0.234	1.218	-0.983
688.4	49.809	-0.2	19.501	0	2.53	0	0.234	1.218	-0.983
688.5	49.822	-0.175	22.361	0	1.15	0	0.234	1.218	-0.983
688.6	49.834	-0.175	24.272	0	0	0	0.234	1.218	-0.983
688.7	49.846	-0.147	24.872	0	0	0	0.234	1.218	-0.983
688.8	49.859	-0.15	25.656	0	1.59	0	0.234	1.218	-0.983
688.9	49.877	-0.15	26.521	0	2.13	0	0.235	1.218	-0.983
689	49.89	-0.192	26.648	0	4.03	0	0.235	1.218	-0.983
689.1	49.921	-0.182	26.196	0	5.52	0	0.235	1.218	-0.983
689.2	49.946	-0.182	25.363	0	3.86	0	0.235	1.218	-0.983
689.3	49.977	-0.122	24.819	0	3.74	0	0.235	1.218	-0.983
689.4	50.008	-0.122	26.419	0	2.87	0	0.235	1.218	-0.983
689.5	50.045	-0.11	28.234	0	1.62	0	0.235	1.218	-0.983
689.6	50.076	-0.082	28.566	0	1.73	0	0.235	1.219	-0.983
689.7	50.114	-0.07	28.764	0	0.86	0	0.235	1.219	-0.983
689.8	50.151	-0.07	30.035	0	0.63	0	0.235	1.219	-0.983
689.9	50.188	-0.062	31.465	0	1.88	0	0.235	1.219	-0.983
690	50.188	-0.057	31.744	0	1.75	0	0.235	1.219	-0.983
690.1	50.281	-0.057	32.186	0	2.37	0	0.235	1.219	-0.983
690.2	50.319	-0.017	33.04	0	2.93	0	0.235	1.219	-0.983

690.3	50.375	-0.002	33.238	0	3.98	0	0.236	1.219	-0.983
690.4	50.424	-0.002	33.584	0	4.94	0	0.236	1.219	-0.983
690.5	50.48	0.028	34.69	0	3.79	0	0.236	1.219	-0.983
690.6	50.542	0.045	35.216	0	3.27	0	0.236	1.219	-0.983
690.7	50.598	0.045	35.643	0	3.28	0	0.236	1.219	-0.983
690.8	50.654	0.053	37.08	0	3.25	0	0.236	1.219	-0.983
690.9	50.71	0.053	37.264	0	3.25	0	0.236	1.22	-0.983
691	50.772	0.058	37.465	0	0.51	0	0.236	1.22	-0.983
691.1	50.834	0.08	38.044	0	-0.75	0	0.236	1.22	-0.983
691.2	50.903	0.128	39.03	0	-0.74	0	0.236	1.22	-0.983
691.3	50.971	0.128	39.309	0	-1.12	0	0.236	1.22	-0.983
691.4	51.039	0.188	40.799	0	-0.75	0	0.236	1.22	-0.983
691.5	51.108	0.171	44.309	0	-1.18	0	0.236	1.22	-0.983
691.6	51.17	0.171	45.701	0	-1.85	0	0.236	1.22	-0.984
691.7	51.17	0.186	45.662	0	-3.97	0	0.236	1.22	-0.984
691.8	51.307	0.208	45.086	0	-6.49	0	0.236	1.22	-0.984
691.9	51.363	0.208	45.605	0	-7.63	0	0.236	1.22	-0.984
692	51.418	0.211	45.909	0	-7.53	0	0.235	1.22	-0.984
692.1	51.474	0.178	46.389	0	-8.33	0	0.235	1.22	-0.984
692.2	51.53	0.178	46.905	0	-9.63	0	0.235	1.22	-0.985
692.3	51.58	0.186	46.287	0	-10.69	0	0.235	1.22	-0.985
692.4	51.624	0.186	45.602	0	-9.4	0	0.234	1.22	-0.985
692.5	51.667	0.098	45.348	0	-12.45	0	0.234	1.22	-0.986
692.6	51.692	0.06	45.478	0	-16.67	0	0.233	1.22	-0.986
692.7	51.717	0.008	43.557	0	-15.13	0	0.233	1.22	-0.987
692.8	51.735	0.008	42.801	0	-13.52	0	0.233	1.22	-0.987
692.9	51.754	0.038	39.298	0	-12.2	0	0.232	1.22	-0.987
693	51.773	0	36.028	0	-10.85	0	0.232	1.22	-0.988
693.1	51.791	0	35.813	0	-9.77	0	0.232	1.22	-0.988
693.2	51.81	-0.05	34.114	0	-9.51	0	0.231	1.22	-0.988
693.3	51.829	-0.04	32.691	0	-9.77	0	0.231	1.22	-0.988
693.4	51.847	-0.04	31.582	0	-9.91	0	0.231	1.22	-0.989
693.5	51.866	-0.03	31.352	0	-10.9	0	0.231	1.22	-0.989
693.6	51.884	-0.01	31.494	0	-11.09	0	0.23	1.22	-0.989
693.7	51.903	-0.01	31.741	0	-11.54	0	0.23	1.22	-0.99
693.8	51.922	-0.017	32.613	0	-12.92	0	0.23	1.22	-0.99
693.9	51.934	-0.017	33.097	0	-13.57	0	0.229	1.22	-0.99
694	51.947	-0.025	33.153	0	-13.24	0	0.229	1.22	-0.991
694.1	51.959	-0.012	33.03	0	-12.09	0	0.229	1.22	-0.991
694.2	51.978	-0.032	32.959	0	-11.33	0	0.228	1.22	-0.991
694.3	51.99	-0.032	33.457	0	-10.66	0	0.228	1.22	-0.992
694.4	52.003	-0.02	33.669	0	-10.35	0	0.228	1.22	-0.992
694.5	52.021	-0.022	32.059	0	-10.29	0	0.227	1.22	-0.992
694.6	52.04	-0.04	31.578	0	-8.79	0	0.227	1.22	-0.992
694.7	52.058	-0.052	32.581	0	-7.27	0	0.227	1.22	-0.993
694.8	52.077	-0.04	32.073	0	-6.52	0	0.227	1.22	-0.993
694.9	52.102	-0.04	31.928	0	-5.95	0	0.227	1.22	-0.993

695	52.127	-0.025	31.451	0	-4.82	0	0.226	1.22	-0.993
695.1	52.158	0.008	32.115	0	-4.59	0	0.226	1.22	-0.993
695.2	52.189	0.008	32.348	0	-4.94	0	0.226	1.22	-0.993
695.3	52.22	0.033	33.079	0	-6.75	0	0.226	1.22	-0.994
695.4	52.251	0.033	34.372	0	-8.31	0	0.226	1.22	-0.994
695.5	52.282	0.038	34.947	0	-8.31	0	0.226	1.22	-0.994
695.6	52.313	0.058	35.135	0	-8.33	0	0.225	1.22	-0.994
695.7	52.313	0.075	35.477	0	-8.32	0	0.225	1.22	-0.994
695.8	52.369	0.075	36.406	0	-8.32	0	0.225	1.22	-0.995
695.9	52.4	0.06	37.299	0	-8.32	0	0.225	1.22	-0.995
696	52.431	0.06	37.257	0	-8.38	0	0.224	1.22	-0.995
696.1	52.462	0.06	37.158	0	-8.43	0	0.224	1.22	-0.995
696.2	52.493	0.055	36.635	0	-8.59	0	0.224	1.22	-0.996
696.3	52.525	0.065	36.681	0	-9	0	0.224	1.22	-0.996
696.4	52.562	0.065	36.985	0	-8.98	0	0.223	1.22	-0.996
696.5	52.593	0.083	37.049	0	-8.95	0	0.223	1.22	-0.996
696.6	52.624	0.088	37.434	0	-8.8	0	0.223	1.22	-0.997
696.7	52.655	0.088	38.154	0	-8.84	0	0.223	1.22	-0.997
696.8	52.686	0.08	37.578	0	-8.14	0	0.222	1.22	-0.997
696.9	52.717	0.08	37.773	0	-8.29	0	0.222	1.22	-0.997
697	52.748	0.083	37.306	0	-8.51	0	0.222	1.22	-0.998
697.1	52.785	0.06	37.342	0	-8.8	0	0.222	1.22	-0.998
697.2	52.81	0.065	37.638	0	-8.45	0	0.222	1.22	-0.998
697.3	52.81	0.065	37.462	0	-8.07	0	0.221	1.22	-0.998
697.4	52.879	0.09	37.949	0	-7.49	0	0.221	1.22	-0.998
697.5	52.91	0.1	38.147	0	-7.32	0	0.221	1.22	-0.999
697.6	52.953	0.08	38.341	0	-7.12	0	0.221	1.22	-0.999
697.7	52.991	0.055	38.341	0	-7.03	0	0.22	1.22	-0.999
697.8	53.022	0.055	38.874	0	-6.87	0	0.22	1.22	-0.999
697.9	53.059	0.055	38.062	0	-6.95	0	0.22	1.22	-0.999
698	53.102	0.063	37.328	0	-7	0	0.22	1.22	-1
698.1	53.14	0.028	38.309	0	-6.77	0	0.22	1.22	-1
698.2	53.183	0.028	40.206	0	-6.63	0	0.22	1.22	-1
698.3	53.22	0.12	39.263	0	-6.27	0	0.219	1.22	-1
698.4	53.258	0.12	38.394	0	-6.27	0	0.219	1.22	-1
698.5	53.301	0.118	40.043	0	-6.51	0	0.219	1.22	-1.001
698.6	53.345	0.143	40.329	0	-5.85	0	0.219	1.22	-1.001
698.7	53.388	0.143	39.217	0	-5.59	0	0.219	1.22	-1.001
698.8	53.432	0.143	39.531	0	-5.79	0	0.219	1.22	-1.001
698.9	53.432	0.113	40.848	0	-5.14	0	0.218	1.22	-1.001
699	53.525	0.118	40.983	0	-4.86	0	0.218	1.22	-1.001
699.1	53.575	0.118	40.714	0	-4.99	0	0.218	1.22	-1.001
699.2	53.631	0.143	40.873	0	-4.39	0	0.218	1.22	-1.002
699.3	53.668	0.138	40.796	0	-3.77	0	0.218	1.22	-1.002
699.4	53.718	0.138	41.64	0	-3.5	0	0.218	1.22	-1.002
699.5	53.773	0.163	41.936	0	-3.74	0	0.218	1.22	-1.002
699.6	53.823	0.153	41.452	0	-3.98	0	0.218	1.22	-1.002

699.7	53.823	0.153	42.275	0	-4.18	0	0.217	1.22	-1.002
699.8	53.929	0.191	42.505	0	-4.38	0	0.217	1.22	-1.002
699.9	53.979	0.191	41.883	0	-4.53	0	0.217	1.22	-1.002
700	54.034	0.183	43.419	0	-4.56	0	0.217	1.22	-1.002
700.1	54.084	0.196	44.814	0	-4.58	0	0.217	1.22	-1.003
700.2	54.14	0.206	43.97	0	-4.72	0	0.217	1.22	-1.003
700.3	54.19	0.206	43.529	0	-4.8	0	0.217	1.22	-1.003
700.4	54.246	0.203	43.783	0	-6.14	0	0.217	1.22	-1.003
700.5	54.246	0.183	43.942	0	-8.19	0	0.216	1.22	-1.003
700.6	54.339	0.183	43.956	0	-10.38	0	0.216	1.22	-1.004
700.7	54.376	0.201	43.589	0	-10.05	0	0.216	1.22	-1.004
700.8	54.42	0.178	43.091	0	-8.92	0	0.215	1.22	-1.004
700.9	54.445	0.178	43.61	0	-9.27	0	0.215	1.22	-1.004
701	54.476	0.095	43.303	0	-9.26	0	0.215	1.22	-1.005
701.1	54.507	0.09	42.021	0	-9.83	0	0.215	1.22	-1.005
701.2	54.538	0.09	39.443	0	-10.33	0	0.214	1.22	-1.005
701.3	54.538	0.075	37.769	0	-10.31	0	0.214	1.22	-1.005
701.4	54.569	0.075	38.172	0	-10.92	0	0.214	1.22	-1.006
701.5	54.625	0.093	37.381	0	-10.81	0	0.214	1.22	-1.006
701.6	54.65	0.078	37.335	0	-10.73	0	0.213	1.22	-1.006
701.7	54.681	0.088	37.981	0	-10.7	0	0.213	1.22	-1.007
701.8	54.706	0.088	37.419	0	-10.64	0	0.213	1.22	-1.007
701.9	54.73	0.075	37.335	0	-9.95	0	0.212	1.22	-1.007
702	54.755	0.068	37.677	0	-9.7	0	0.212	1.22	-1.008
702.1	54.786	0.068	37.282	0	-9.41	0	0.212	1.22	-1.008
702.2	54.817	0.075	37.13	0	-9.52	0	0.212	1.22	-1.008
702.3	54.842	0.093	37.225	0	-9.23	0	0.211	1.22	-1.008
702.4	54.873	0.093	37.073	0	-9.36	0	0.211	1.22	-1.009
702.5	54.904	0.115	38.013	0	-9.65	0	0.211	1.22	-1.009
702.6	54.935	0.136	38.744	0	-9.91	0	0.21	1.22	-1.009
702.7	54.966	0.136	38.355	0	-9.24	0	0.21	1.22	-1.009
702.8	55.004	0.118	39.323	0	-9.17	0	0.21	1.22	-1.01
702.9	55.035	0.118	39.672	0	-9.27	0	0.21	1.22	-1.01
703	55.06	0.09	39.394	0	-8.78	0	0.209	1.22	-1.01
703.1	55.097	0.065	41.039	0	-8.55	0	0.209	1.22	-1.01
703.2	55.128	0.09	40.838	0	-8.14	0	0.209	1.22	-1.011
703.3	55.159	0.09	39.45	0	-7.88	0	0.209	1.22	-1.011
703.4	55.196	0.105	40.238	0	-7.84	0	0.209	1.22	-1.011
703.5	55.221	0.113	40.015	0	-7.38	0	0.208	1.22	-1.011
703.6	55.259	0.113	39.482	0	-7.35	0	0.208	1.22	-1.011
703.7	55.29	0.115	39.27	0	-7.4	0	0.208	1.22	-1.012
703.8	55.327	0.125	39.464	0	-7.54	0	0.208	1.22	-1.012
703.9	55.364	0.125	39.623	0	-7.13	0	0.208	1.22	-1.012
704	55.401	0.128	40.213	0	-7.04	0	0.207	1.22	-1.012
704.1	55.433	0.118	39.934	0	-7.07	0	0.207	1.22	-1.012
704.2	55.476	0.118	40.365	0	-7.09	0	0.207	1.22	-1.013
704.3	55.507	0.136	40.117	0	-7.04	0	0.207	1.22	-1.013

704.4	55.544	0.136	39.68	0	-6.69	0	0.207	1.22	-1.013
704.5	55.582	0.151	39.793	0	-6.76	0	0.206	1.22	-1.013
704.6	55.619	0.141	40.732	0	-6.77	0	0.206	1.22	-1.013
704.7	55.656	0.158	41.964	0	-6.8	0	0.206	1.22	-1.014
704.8	55.7	0.158	40.88	0	-7.23	0	0.206	1.22	-1.014
704.9	55.737	0.148	40.735	0	-8.41	0	0.206	1.22	-1.014
705	55.774	0.141	41.982	0	-10.86	0	0.205	1.22	-1.014
705.1	55.805	0.141	41.996	0	-12.27	0	0.205	1.22	-1.015
705.2	55.83	0.161	41.926	0	-12.57	0	0.205	1.22	-1.015
705.3	55.855	0.148	41.368	0	-14.09	0	0.204	1.22	-1.015
705.4	55.874	0.148	42.032	0	-15.15	0	0.204	1.22	-1.016
705.5	55.892	0.063	41.481	0	-14.46	0	0.203	1.22	-1.016
705.6	55.905	0.048	40.407	0	-13.78	0	0.203	1.22	-1.017
705.7	55.93	0.048	40.647	0	-13.15	0	0.203	1.22	-1.017
705.8	55.942	0.09	37.992	0	-12.79	0	0.202	1.22	-1.017
705.9	55.961	0.09	37.631	0	-12.68	0	0.202	1.22	-1.018
706	55.973	0.075	37.928	0	-12.6	0	0.202	1.22	-1.018
706.1	55.992	0.048	38.14	0	-12.35	0	0.201	1.22	-1.018
706.2	56.01	0.073	37.038	0	-12.28	0	0.201	1.22	-1.019
706.3	56.023	0.073	35.703	0	-12.16	0	0.201	1.22	-1.019
706.4	56.041	0.063	36.12	0	-12.15	0	0.2	1.22	-1.019
706.5	56.06	0.063	36.494	0	-12.62	0	0.2	1.22	-1.02
706.6	56.085	0.063	36.699	0	-13.41	0	0.199	1.22	-1.02
706.7	56.104	0.083	36.865	0	-13.52	0	0.199	1.22	-1.02
706.8	56.128	0.09	36.854	0	-13.26	0	0.199	1.22	-1.021
706.9	56.147	0.09	38.161	0	-13.02	0	0.198	1.22	-1.021
707	56.166	0.141	38.61	0	-12.92	0	0.198	1.22	-1.022
707.1	56.191	0.12	39.309	0	-13.53	0	0.198	1.22	-1.022
707.2	56.209	0.12	40.393	0	-13.16	0	0.197	1.22	-1.022
707.3	56.228	0.108	40.057	0	-13.61	0	0.197	1.22	-1.023
707.4	56.247	0.108	38.811	0	-13.44	0	0.197	1.22	-1.023
707.5	56.265	0.08	38.726	0	-13.3	0	0.196	1.22	-1.023
707.6	56.278	0.083	39.655	0	-13.03	0	0.196	1.22	-1.024
707.7	56.296	0.085	39.115	0	-12.99	0	0.195	1.22	-1.024
707.8	56.315	0.085	38.161	0	-12.98	0	0.195	1.22	-1.024
707.9	56.327	0.058	38.387	0	-13.1	0	0.195	1.22	-1.025
708	56.34	0.065	37.377	0	-13.37	0	0.194	1.22	-1.025
708.1	56.358	0.065	36.801	0	-13.75	0	0.194	1.22	-1.026
708.2	56.365	0.078	36.801	0	-13.45	0	0.194	1.22	-1.026
708.3	56.377	0.068	35.682	0	-13.42	0	0.193	1.22	-1.026
708.4	56.389	0.068	36.137	0	-13.4	0	0.193	1.22	-1.027
708.5	56.402	0.058	36.303	0	-13.41	0	0.192	1.22	-1.027
708.6	56.408	0.053	35.908	0	-13.42	0	0.192	1.22	-1.027
708.7	56.427	0.053	35.205	0	-13.41	0	0.192	1.22	-1.028
708.8	56.433	0.028	35.844	0	-13.67	0	0.191	1.22	-1.028
708.9	56.439	0.028	36.318	0	-14.75	0	0.191	1.22	-1.029
709	56.452	0.038	35.173	0	-14.94	0	0.191	1.22	-1.029

709.1	56.458	0.053	35.336	0	-14.72	0	0.19	1.22	-1.029
709.2	56.464	0.055	35.47	0	-14.07	0	0.19	1.22	-1.03
709.3	56.476	0.05	36.067	0	-13.81	0	0.189	1.22	-1.03
709.4	56.483	0.05	36.003	0	-13.86	0	0.189	1.22	-1.031
709.5	56.489	0.045	35.844	0	-13.64	0	0.189	1.22	-1.031
709.6	56.495	0.045	35.043	0	-13.48	0	0.188	1.22	-1.031
709.7	56.507	0.04	35.241	0	-13.44	0	0.188	1.22	-1.032
709.8	56.514	0.043	34.898	0	-13.45	0	0.187	1.22	-1.032
709.9	56.52	0.043	35.241	0	-13.88	0	0.187	1.22	-1.033
710	56.532	0.063	35.735	0	-13.56	0	0.187	1.22	-1.033
710.1	56.545	0.065	35.565	0	-12.46	0	0.186	1.22	-1.033
710.2	56.557	0.065	35.276	0	-9.82	0	0.186	1.22	-1.034
710.3	56.576	0.048	36.067	0	-8.58	0	0.186	1.22	-1.034
710.4	56.594	0.048	36.081	0	-10.08	0	0.186	1.22	-1.034
710.5	56.613	0.068	35.731	0	-11.42	0	0.185	1.22	-1.034
710.6	56.638	0.078	35.534	0	-12.16	0	0.185	1.22	-1.035
710.7	56.663	0.125	36.635	0	-12.66	0	0.185	1.22	-1.035
710.8	56.688	0.125	37.077	0	-12.34	0	0.184	1.22	-1.035
710.9	56.719	0.171	38.285	0	-12.49	0	0.184	1.22	-1.036
711	56.744	0.168	41.777	0	-12.72	0	0.184	1.22	-1.036
711.1	56.768	0.168	42.816	0	-12.96	0	0.183	1.22	-1.036
711.2	56.793	0.176	42.134	0	-14.47	0	0.183	1.22	-1.037
711.3	56.818	0.161	42.745	0	-15.78	0	0.182	1.22	-1.037
711.4	56.837	0.161	43.688	0	-16.07	0	0.182	1.22	-1.038
711.5	56.855	0.138	43.158	0	-14.13	0	0.181	1.22	-1.038
711.6	56.868	0.113	43.257	0	-13.13	0	0.181	1.22	-1.038
711.7	56.887	0.113	43.497	0	-12.58	0	0.181	1.22	-1.039
711.8	56.905	0.09	41.572	0	-12.32	0	0.18	1.22	-1.039
711.9	56.924	0.09	40.047	0	-12.83	0	0.18	1.22	-1.04
712	56.949	0.075	39.411	0	-13.22	0	0.18	1.22	-1.04
712.1	56.974	0.143	38.136	0	-12.46	0	0.179	1.22	-1.04
712.2	56.998	0.163	38.362	0	-12.47	0	0.179	1.22	-1.041
712.3	57.023	0.163	40.022	0	-12.33	0	0.179	1.22	-1.041
712.4	57.054	0.158	41.848	0	-11.91	0	0.178	1.22	-1.041
712.5	57.079	0.153	41.929	0	-10.69	0	0.178	1.22	-1.042
712.6	57.11	0.153	41.537	0	-9.45	0	0.178	1.22	-1.042
712.7	57.141	0.158	41.237	0	-7.02	0	0.178	1.22	-1.042
712.8	57.172	0.163	41.696	0	-5.47	0	0.177	1.22	-1.042
712.9	57.203	0.163	42.092	0	-3.93	0	0.177	1.22	-1.042
713	57.235	0.06	42.074	0	-1.8	0	0.177	1.22	-1.042
713.1	57.266	0.043	42.212	0	0.54	0	0.177	1.22	-1.042
713.2	57.297	0.043	40.072	0	2.84	0	0.177	1.22	-1.042
713.3	57.334	0.03	37.328	0	3.58	0	0.177	1.22	-1.042
713.4	57.371	0.03	36.303	0	3.61	0	0.178	1.22	-1.042
713.5	57.408	0.018	35.502	0	3.58	0	0.178	1.22	-1.042
713.6	57.446	0.01	34.294	0	3.62	0	0.178	1.22	-1.042
713.7	57.477	0.01	34.195	0	3.6	0	0.178	1.22	-1.042

713.8	57.514	0.01	33.93	0	3.63	0	0.178	1.22	-1.042
713.9	57.551	0.023	34.086	0	3.61	0	0.178	1.22	-1.042
714	57.589	0.06	34.545	0	3.64	0	0.178	1.22	-1.042
714.1	57.626	0.06	34.739	0	3.63	0	0.178	1.221	-1.042
714.2	57.669	0.085	36.095	0	3.64	0	0.178	1.221	-1.042
714.3	57.719	0.088	37.112	0	3.64	0	0.178	1.221	-1.042
714.4	57.763	0.098	37.494	0	3.65	0	0.179	1.221	-1.042
714.5	57.819	0.163	38.101	0	3.67	0	0.179	1.221	-1.042
714.6	57.868	0.213	38.433	0	3.65	0	0.179	1.221	-1.042
714.7	57.924	0.213	40.132	0	3.68	0	0.179	1.221	-1.042
714.8	57.98	0.198	43.578	0	3.65	0	0.179	1.221	-1.042
714.9	58.036	0.198	44.373	0	3.68	0	0.179	1.221	-1.042
715	58.092	0.208	44.196	0	3.55	0	0.179	1.221	-1.042
715.1	58.148	0.226	44.426	0	3.34	0	0.179	1.222	-1.042
715.2	58.204	0.243	45.623	0	3.01	0	0.179	1.222	-1.042
715.3	58.266	0.243	45.824	0	2.89	0	0.179	1.222	-1.042
715.4	58.322	0.241	46.124	0	2.92	0	0.18	1.222	-1.042
715.5	58.378	0.223	46.637	0	2.78	0	0.18	1.222	-1.042
715.6	58.44	0.226	46.697	0	2.44	0	0.18	1.222	-1.042
715.7	58.496	0.231	46.513	0	2.45	0	0.18	1.222	-1.042
715.8	58.546	0.223	46.513	0	2.48	0	0.18	1.222	-1.042
715.9	58.608	0.223	47.47	0	2.3	0	0.18	1.222	-1.042
716	58.664	0.236	46.513	0	2.31	0	0.18	1.222	-1.042
716.1	58.72	0.193	46.029	0	0	0	0.18	1.222	-1.042
716.2	58.769	0.203	47.096	0	0	0	0.18	1.222	-1.042
716.3	58.813	0.231	46.248	0	0.58	0	0.18	1.222	-1.042
716.4	58.856	0.231	44.85	0	1.06	0	0.18	1.222	-1.042
716.5	58.9	0.12	46.004	0	0.75	0	0.18	1.222	-1.042
716.6	58.943	0.118	46.411	0	-1.84	0	0.18	1.222	-1.042
716.7	58.981	0.151	43.328	0	-2.82	0	0.18	1.222	-1.042
716.8	59.012	0.151	40.841	0	-3.02	0	0.18	1.222	-1.043
716.9	59.049	0.115	41.565	0	-2.41	0	0.18	1.222	-1.043
717	59.08	0.103	41.322	0	-2.02	0	0.18	1.222	-1.043
717.1	59.105	0.103	40.206	0	-2.52	0	0.18	1.222	-1.043
717.2	59.13	0.05	39.376	0	-2.14	0	0.18	1.222	-1.043
717.3	59.148	0.03	38.447	0	-3.1	0	0.179	1.222	-1.043
717.4	59.167	0.013	36.618	0	-6.45	0	0.179	1.222	-1.043
717.5	59.179	-0.017	35.043	0	-4.49	0	0.179	1.222	-1.043
717.6	59.173	-0.03	34.485	0	-2.12	0	0.179	1.222	-1.043
717.7	59.179	-0.05	33.09	0	0	0	0.179	1.222	-1.043
717.8	59.186	-0.122	31.338	0	0	0	0.179	1.222	-1.043
717.9	59.192	-0.122	29.936	0	-1.75	0	0.179	1.222	-1.043
718	59.186	-0.167	27.524	0	-0.76	0	0.179	1.222	-1.043
718.1	59.186	-0.17	24.268	0	0	0	0.179	1.222	-1.043
718.2	59.179	-0.182	23.636	0	1.42	0	0.179	1.222	-1.043
718.3	59.179	-0.182	23.565	0	1.59	0	0.179	1.222	-1.043
718.4	59.179	-0.207	23.099	0	2.33	0	0.179	1.222	-1.043

718.5	59.173	-0.21	22.566	0	2.63	0	0.179	1.223	-1.043
718.6	59.173	-0.202	21.743	0	2.71	0	0.179	1.223	-1.043
718.7	59.167	-0.195	21.545	0	2.87	0	0.179	1.223	-1.043
718.8	59.167	-0.197	21.327	0	2.5	0	0.179	1.223	-1.043
718.9	59.161	-0.197	20.906	0	0	0	0.179	1.223	-1.043
719	59.148	-0.197	21.81	0	0	0	0.179	1.223	-1.043
719.1	59.142	-0.19	21.454	0	-1.93	0	0.179	1.223	-1.043
719.2	59.123	-0.197	21.309	0	-2.08	0	0.179	1.223	-1.043
719.3	59.105	-0.22	22.555	0	-2.25	0	0.179	1.223	-1.044
719.4	59.08	-0.22	22.178	0	-1.51	0	0.179	1.223	-1.044
719.5	59.055	-0.257	21.528	0	-0.89	0	0.179	1.223	-1.044
719.6	59.036	-0.287	20.105	0	0	0	0.179	1.223	-1.044
719.7	59.005	-0.307	19.254	0	0	0	0.179	1.223	-1.044
719.8	58.981	-0.307	17.65	0	0	0	0.179	1.223	-1.044
719.9	58.949	-0.337	16.079	0	0	0	0.179	1.223	-1.044
720	58.918	-0.352	15.715	0	0	0	0.179	1.223	-1.044
720.1	58.881	-0.357	14.366	0	-1.7	0	0.179	1.223	-1.044
720.2	58.844	-0.352	13.458	0	-2.15	0	0.179	1.223	-1.044
720.3	58.807	-0.355	13.003	0	-1.58	0	0.179	1.223	-1.044
720.4	58.757	-0.355	12.681	0	-0.62	0	0.179	1.223	-1.044
720.5	58.713	-0.355	13.028	0	0	0	0.179	1.223	-1.044
720.6	58.67	-0.43	13.317	0	0.56	0	0.179	1.223	-1.044
720.7	58.62	-0.455	13.773	0	1	0	0.179	1.223	-1.044
720.8	58.57	-0.443	10.273	0	1.27	0	0.179	1.223	-1.044
720.9	58.527	-0.443	7.194	0	1.36	0	0.179	1.223	-1.044
721	58.477	-0.465	7.363	0	1.45	0	0.179	1.223	-1.044
721.1	58.434	-0.483	7.342	0	1.55	0	0.179	1.223	-1.044
721.2	58.39	-0.473	8.091	0	1.58	0	0.179	1.223	-1.044
721.3	58.341	-0.468	7.508	0	1.65	0	0.179	1.223	-1.044
721.4	58.297	-0.468	7.836	0	1.66	0	0.179	1.223	-1.044
721.5	58.254	-0.448	7.858	0	1.7	0	0.179	1.223	-1.044
721.6	58.204	-0.448	8.048	0	1.81	0	0.179	1.223	-1.044
721.7	58.16	-0.43	8.38	0	1.89	0	0.179	1.223	-1.044
721.8	58.117	-0.425	8.136	0	1.91	0	0.18	1.223	-1.044
721.9	58.073	-0.425	8.136	0	1.87	0	0.18	1.223	-1.044
722	58.024	-0.43	8.603	0	1.91	0	0.18	1.223	-1.044
722.1	57.98	-0.458	8.68	0	1.91	0	0.18	1.224	-1.044
722.2	57.93	-0.458	8.85	0	1.92	0	0.18	1.224	-1.044
722.3	57.893	-0.445	9.108	0	1.98	0	0.18	1.224	-1.044
722.4	57.843	-0.445	8.504	0	1.95	0	0.18	1.224	-1.044
722.5	57.8	-0.438	8.43	0	2.11	0	0.18	1.224	-1.044
722.6	57.756	-0.448	8.882	0	3.37	0	0.18	1.224	-1.044
722.7	57.707	-0.438	9.005	0	3.59	0	0.18	1.224	-1.044
722.8	57.663	-0.438	8.719	0	3.57	0	0.18	1.224	-1.044
722.9	57.62	-0.468	8.493	0	3.58	0	0.18	1.224	-1.044
723	57.576	-0.503	8.977	0	3.58	0	0.18	1.224	-1.044
723.1	57.539	-0.488	8.235	0	3.57	0	0.18	1.224	-1.044

723.2	57.508	-0.448	6.812	0	3.58	0	0.181	1.224	-1.044
723.3	57.477	-0.408	6.826	0	3.58	0	0.181	1.225	-1.044
723.4	57.477	-0.408	8.751	0	3.56	0	0.181	1.225	-1.044
723.5	57.427	-0.322	10.57	0	3.24	0	0.181	1.225	-1.044
723.6	57.396	-0.327	13.077	0	2.28	0	0.181	1.225	-1.044
723.7	57.365	-0.327	15.012	0	1.72	0	0.181	1.225	-1.044
723.8	57.334	-0.347	16.008	0	1.56	0	0.181	1.225	-1.044
723.9	57.303	-0.347	15.023	0	1.46	0	0.181	1.225	-1.044
724	57.266	-0.345	14.677	0	1.15	0	0.181	1.225	-1.044
724.1	57.235	-0.352	14.426	0	1.44	0	0.181	1.225	-1.044
724.2	57.203	-0.36	14.076	0	2.01	0	0.181	1.225	-1.044
724.3	57.166	-0.372	13.833	0	2.5	0	0.181	1.225	-1.044
724.4	57.166	-0.372	13.674	0	2.91	0	0.181	1.225	-1.044
724.5	57.104	-0.393	13.024	0	3.13	0	0.181	1.225	-1.044
724.6	57.073	-0.393	13.303	0	3.11	0	0.182	1.225	-1.044
724.7	57.042	-0.405	12.791	0	3.03	0	0.182	1.225	-1.044
724.8	57.005	-0.408	11.601	0	3.13	0	0.182	1.226	-1.044
724.9	56.974	-0.408	11.053	0	3.27	0	0.182	1.226	-1.044
725	56.942	-0.41	11.636	0	3.32	0	0.182	1.226	-1.044
725.1	56.911	-0.395	11.555	0	3.37	0	0.182	1.226	-1.044
725.2	56.874	-0.395	10.753	0	3.36	0	0.182	1.226	-1.044
725.3	56.849	-0.41	11.022	0	3.37	0	0.182	1.226	-1.044
725.4	56.812	-0.403	11.597	0	3.35	0	0.182	1.226	-1.044
725.5	56.775	-0.398	11.347	0	3.38	0	0.182	1.226	-1.044
725.6	56.744	-0.408	10.665	0	3.35	0	0.182	1.226	-1.044
725.7	56.706	-0.408	11.4	0	3.36	0	0.183	1.226	-1.044
725.8	56.675	-0.395	11.46	0	3.37	0	0.183	1.226	-1.044
725.9	56.644	-0.398	11.149	0	3.38	0	0.183	1.227	-1.044
726	56.607	-0.418	11.135	0	3.34	0	0.183	1.227	-1.044
726.1	56.576	-0.423	11.474	0	3.38	0	0.183	1.227	-1.044
726.2	56.545	-0.413	11.686	0	3.34	0	0.183	1.227	-1.044
726.3	56.514	-0.408	10.99	0	3.36	0	0.183	1.227	-1.044
726.4	56.514	-0.413	11.029	0	3.32	0	0.183	1.227	-1.044
726.5	56.445	-0.413	11.184	0	3.29	0	0.183	1.227	-1.044
726.6	56.414	-0.418	11.368	0	3.07	0	0.183	1.227	-1.044
726.7	56.383	-0.413	11.611	0	2.97	0	0.183	1.227	-1.044
726.8	56.346	-0.39	11.495	0	3.33	0	0.184	1.227	-1.044
726.9	56.315	-0.39	10.895	0	3.33	0	0.184	1.227	-1.044
727	56.284	-0.395	11.336	0	3.28	0	0.184	1.228	-1.044
727.1	56.253	-0.42	12.042	0	3.09	0	0.184	1.228	-1.044
727.2	56.215	-0.415	11.435	0	2.72	0	0.184	1.228	-1.044
727.3	56.178	-0.403	11.092	0	2.35	0	0.184	1.228	-1.044
727.4	56.178	-0.42	10.474	0	2.26	0	0.184	1.228	-1.044
727.5	56.11	-0.423	11.304	0	1.74	0	0.184	1.228	-1.044
727.6	56.073	-0.423	11.89	0	0	0	0.184	1.228	-1.044
727.7	56.029	-0.408	11.046	0	-0.71	0	0.184	1.228	-1.044
727.8	55.986	-0.398	11.244	0	0	0	0.184	1.228	-1.044

727.9	55.936	-0.398	10.99	0	0	0	0.184	1.228	-1.044
728	55.892	-0.435	11.159	0	0	0	0.184	1.228	-1.044
728.1	55.843	-0.478	11.94	0	-1.14	0	0.184	1.228	-1.044
728.2	55.787	-0.465	10.965	0	-1.4	0	0.184	1.228	-1.044
728.3	55.737	-0.445	8.673	0	-1.7	0	0.184	1.228	-1.044
728.4	55.681	-0.445	7.345	0	-1.58	0	0.184	1.228	-1.044
728.5	55.631	-0.478	8.514	0	-1.19	0	0.184	1.228	-1.044
728.6	55.582	-0.483	9.334	0	-0.52	0	0.184	1.228	-1.044
728.7	55.526	-0.475	8.712	0	0	0	0.184	1.228	-1.044
728.8	55.476	-0.458	8.359	0	0	0	0.184	1.228	-1.044
728.9	55.426	-0.465	8.207	0	0	0	0.184	1.228	-1.044
729	55.37	-0.49	7.826	0	0	0	0.184	1.228	-1.044
729.1	55.321	-0.5	8.398	0	0	0	0.184	1.228	-1.044
729.2	55.271	-0.495	8.574	0	0	0	0.184	1.228	-1.044
729.3	55.221	-0.493	8.317	0	0.62	0	0.184	1.228	-1.044
729.4	55.165	-0.483	7.932	0	0.6	0	0.184	1.228	-1.044
729.5	55.109	-0.47	8.105	0	0.58	0	0.184	1.228	-1.044
729.6	55.041	-0.528	8.091	0	0.57	0	0.184	1.228	-1.044
729.7	54.979	-0.708	7.836	0	0.57	0	0.184	1.228	-1.044
729.8	54.923	-0.69	8.839	0	0.58	0	0.184	1.228	-1.044
729.9	54.861	-0.69	-1.54	0	0.58	0	0.184	1.228	-1.044
730	54.799	-0.658	-4.022	0	0.56	0	0.184	1.228	-1.044
730.1	54.737	-0.658	0.145	0	0.57	0	0.184	1.228	-1.044
730.2	54.681	-0.633	-0.328	0	0.58	0	0.184	1.228	-1.044
730.3	54.619	-0.62	-1.391	0	0.56	0	0.184	1.228	-1.044
730.4	54.619	-0.628	-1.052	0	0.57	0	0.184	1.228	-1.044
730.5	54.5	-0.628	-0.985	0	0.57	0	0.184	1.228	-1.044
730.6	54.445	-0.628	-0.667	0	0.58	0	0.184	1.228	-1.044
730.7	54.389	-0.653	-1.289	0	0.57	0	0.184	1.228	-1.044
730.8	54.333	-0.65	-0.784	0	0.56	0	0.184	1.228	-1.044
730.9	54.277	-0.65	-1.96	0	0.54	0	0.184	1.228	-1.044
731	54.221	-0.65	-3.136	0	0.54	0	0.184	1.228	-1.044
731.1	54.165	-0.628	-2.857	0	0.54	0	0.184	1.228	-1.044
731.2	54.109	-0.658	-2.624	0	0	0	0.184	1.228	-1.044
731.3	54.059	-0.69	-2.193	0	0	0	0.184	1.228	-1.044
731.4	54.059	-0.69	-0.551	0	0	0	0.184	1.228	-1.044
731.5	53.947	-0.685	-2.815	0	0	0	0.184	1.228	-1.044
731.6	53.885	-0.675	-3.267	0	0	0	0.184	1.228	-1.044
731.7	53.836	-0.66	-2.239	0	0	0	0.184	1.228	-1.044
731.8	53.773	-0.655	-2.627	0	0	0	0.184	1.228	-1.044
731.9	53.718	-0.665	-2.059	0	0	0	0.184	1.228	-1.044
732	53.662	-0.648	-1.579	0	0	0	0.184	1.228	-1.044
732.1	53.612	-0.635	-1.879	0	0	0	0.184	1.228	-1.044
732.2	53.556	-0.65	-2.073	0	0	0	0.184	1.228	-1.044
732.3	53.5	-0.668	-1.105	0	0	0	0.184	1.228	-1.044
732.4	53.5	-0.665	-1.264	0	0	0	0.184	1.228	-1.044
732.5	53.394	-0.67	-1.18	0	0	0	0.184	1.228	-1.044

732.6	53.332	-0.683	-1.706	0	0	0	0.184	1.228	-1.044
732.7	53.283	-0.675	-1.052	0	0	0	0.184	1.228	-1.044
732.8	53.227	-0.663	-1.395	0	0	0	0.184	1.228	-1.044
732.9	53.177	-0.663	-1.843	0	0	0	0.184	1.228	-1.044
733	53.121	-0.655	-0.788	0	0	0	0.184	1.228	-1.044
733.1	53.065	-0.638	-1.201	0	0	0	0.184	1.228	-1.044
733.2	53.009	-0.638	-1.483	0	0	0	0.184	1.228	-1.044
733.3	52.959	-0.633	-0.999	0	0	0	0.184	1.228	-1.044
733.4	52.91	-0.633	-1.218	0	0	0	0.184	1.228	-1.044
733.5	52.848	-0.63	-1.049	0	0	0	0.184	1.228	-1.044
733.6	52.798	-0.63	-0.89	0	0	0	0.184	1.228	-1.044
733.7	52.748	-0.66	-0.95	0	0	0	0.184	1.228	-1.044
733.8	52.692	-0.668	-0.777	0	0	0	0.184	1.228	-1.044
733.9	52.636	-0.668	-0.667	0	0.96	0	0.184	1.228	-1.044
734	52.587	-0.673	-0.752	0	1.1	0	0.184	1.228	-1.044
734.1	52.531	-0.673	-1.25	0	1.1	0	0.184	1.229	-1.044
734.2	52.481	-0.663	-0.964	0	0.91	0	0.184	1.229	-1.044
734.3	52.425	-0.655	-1.367	0	0.53	0	0.184	1.229	-1.044
734.4	52.425	-0.655	-1.052	0	0	0	0.184	1.229	-1.044
734.5	52.319	-0.643	-1.183	0	0.62	0	0.184	1.229	-1.044
734.6	52.264	-0.663	-1.151	0	1.1	0	0.185	1.229	-1.044
734.7	52.214	-0.668	-0.869	0	2.4	0	0.185	1.229	-1.044
734.8	52.164	-0.658	-0.343	0	4.46	0	0.185	1.229	-1.044
734.9	52.121	-0.648	-1.172	0	5.9	0	0.185	1.229	-1.044
735	52.077	-0.655	-1.169	0	6.02	0	0.185	1.229	-1.044
735.1	52.034	-0.678	-1.098	0	5.62	0	0.185	1.229	-1.044
735.2	51.99	-0.68	-0.689	0	5.27	0	0.185	1.229	-1.044
735.3	51.94	-0.668	-1.144	0	5.27	0	0.185	1.23	-1.044
735.4	51.94	-0.643	-1.098	0	5.27	0	0.186	1.23	-1.044
735.5	51.86	-0.643	-1.413	0	5.1	0	0.186	1.23	-1.044
735.6	51.81	-0.653	-1.229	0	5.06	0	0.186	1.23	-1.044
735.7	51.766	-0.673	-0.848	0	4.58	0	0.186	1.23	-1.044
735.8	51.723	-0.675	-0.251	0	3.82	0	0.186	1.23	-1.044
735.9	51.679	-0.675	-0.622	0	2.38	0	0.186	1.23	-1.044
736	51.636	-0.665	-1.275	0	0.9	0	0.186	1.23	-1.044
736.1	51.58	-0.658	-1.176	0	0	0	0.186	1.23	-1.044
736.2	51.53	-0.66	-0.763	0	0	0	0.186	1.23	-1.044
736.3	51.474	-0.665	-0.911	0	0	0	0.186	1.23	-1.044
736.4	51.474	-0.66	-0.738	0	0	0	0.186	1.23	-1.044
736.5	51.375	-0.66	-1.021	0	0	0	0.186	1.23	-1.044
736.6	51.325	-0.665	-1.148	0	0	0	0.186	1.23	-1.044
736.7	51.269	-0.675	-0.653	0	0	0	0.186	1.23	-1.044
736.8	51.22	-0.665	-0.35	0	0	0	0.186	1.23	-1.044
736.9	51.17	-0.665	-0.869	0	0	0	0.186	1.23	-1.044
737	51.114	-0.653	-1.155	0	0	0	0.186	1.23	-1.044
737.1	51.064	-0.66	-0.784	0	0	0	0.186	1.23	-1.044
737.2	51.015	-0.663	-0.537	0	0	0	0.186	1.23	-1.044

737.3	50.959	-0.67	-0.795	0	0	0	0.186	1.23	-1.044
737.4	50.909	-0.67	-0.484	0	0	0	0.186	1.23	-1.044
737.5	50.859	-0.66	-0.212	0	0	0	0.186	1.23	-1.044
737.6	50.803	-0.64	-1.13	0	0	0	0.186	1.23	-1.044
737.7	50.754	-0.653	-1.169	0	0	0	0.186	1.231	-1.044
737.8	50.698	-0.66	-0.699	0	0	0	0.186	1.231	-1.044
737.9	50.636	-0.65	-0.516	0	-2.46	0	0.186	1.231	-1.044
738	50.561	-0.658	-1.028	0	-7.88	0	0.186	1.231	-1.044
738.1	50.474	-0.66	-1.116	0	-13.53	0	0.186	1.231	-1.045
738.2	50.381	-0.655	-0.643	0	-18.55	0	0.185	1.231	-1.045
738.3	50.275	-0.655	-1.045	0	-20.83	0	0.185	1.231	-1.046
738.4	50.275	-0.658	-0.816	0	-23.46	0	0.184	1.231	-1.047
738.5	50.051	-0.638	-0.816	0	-26.44	0	0.183	1.231	-1.047
738.6	49.927	-0.63	-0.985	0	-30.93	0	0.182	1.231	-1.048
738.7	49.79	-0.658	-1.285	0	-35.69	0	0.181	1.231	-1.049
738.8	49.66	-0.66	-0.134	0	-37.05	0	0.18	1.231	-1.05
738.9	49.517	-0.66	0.028	0	-36.98	0	0.179	1.231	-1.051
739	49.387	-0.653	-1.187	0	-36.72	0	0.178	1.231	-1.052
739.1	49.25	-0.66	-0.946	0	-32.4	0	0.177	1.231	-1.053
739.2	49.138	-0.675	-0.632	0	-24	0	0.177	1.231	-1.054
739.3	49.039	-0.675	-0.632	0	-21.6	0	0.176	1.231	-1.054
739.4	49.039	-0.67	-0.3	0	-19.63	0	0.176	1.231	-1.055
739.5	48.84	-0.668	-0.636	0	-16.35	0	0.175	1.231	-1.055
739.6	48.753	-0.683	-0.862	0	-16.06	0	0.175	1.231	-1.056
739.7	48.66	-0.68	-0.258	0	-16.14	0	0.174	1.231	-1.056
739.8	48.573	-0.663	-0.477	0	-16.1	0	0.174	1.231	-1.057
739.9	48.486	-0.663	-1.377	0	-16.04	0	0.173	1.231	-1.057
740	48.399	-0.66	-0.918	0	-16.04	0	0.173	1.231	-1.058
740.1	48.305	-0.67	-0.558	0	-15.97	0	0.172	1.231	-1.058
740.2	48.212	-0.693	-0.749	0	-16.44	0	0.172	1.231	-1.058
740.3	48.125	-0.68	-0.205	0	-16.64	0	0.172	1.231	-1.059
740.4	48.032	-0.68	-0.618	0	-16.6	0	0.171	1.231	-1.059
740.5	47.945	-0.66	-1.501	0	-16.59	0	0.171	1.231	-1.06
740.6	47.852	-0.655	-0.893	0	-16.54	0	0.17	1.231	-1.06
740.7	47.765	-0.668	-0.996	0	-16.51	0	0.17	1.231	-1.061
740.8	47.678	-0.663	-0.724	0	-16.39	0	0.169	1.231	-1.061
740.9	47.585	-0.665	-0.551	0	-15.71	0	0.169	1.231	-1.062
741	47.498	-0.678	-1.218	0	-15.65	0	0.168	1.231	-1.062
741.1	47.411	-0.675	-0.396	0	-15.61	0	0.168	1.231	-1.063
741.2	47.324	-0.668	-0.879	0	-15.6	0	0.168	1.231	-1.063
741.3	47.237	-0.673	-1.067	0	-15.94	0	0.167	1.231	-1.063
741.4	47.143	-0.673	-0.823	0	-16.77	0	0.167	1.231	-1.064
741.5	47.056	-0.658	-0.48	0	-16.74	0	0.166	1.231	-1.064
741.6	46.963	-0.65	-1.19	0	-16.69	0	0.166	1.231	-1.065
741.7	46.87	-0.635	-0.851	0	-16.63	0	0.165	1.231	-1.065
741.8	46.777	-0.648	-0.696	0	-16.62	0	0.165	1.231	-1.066
741.9	46.684	-0.648	-0.643	0	-16.59	0	0.164	1.231	-1.066

742	46.597	-0.653	-0.551	0	-16.56	0	0.164	1.231	-1.067
742.1	46.503	-0.655	-0.879	0	-16.92	0	0.163	1.231	-1.067
742.2	46.41	-0.67	-0.865	0	-18.66	0	0.163	1.231	-1.068
742.3	46.311	-0.675	-0.286	0	-20.24	0	0.162	1.231	-1.068
742.4	46.311	-0.675	-0.696	0	-21.68	0	0.162	1.231	-1.069
742.5	46.1	-0.663	-0.696	0	-22.36	0	0.161	1.231	-1.069
742.6	45.994	-0.663	-0.851	0	-22.97	0	0.16	1.231	-1.07
742.7	45.888	-0.663	-1.19	0	-23.82	0	0.16	1.231	-1.071
742.8	45.776	-0.67	-0.565	0	-24.19	0	0.159	1.231	-1.071
742.9	45.671	-0.67	-0.735	0	-24.55	0	0.158	1.231	-1.072
743	45.559	-0.685	-0.343	0	-27.16	0	0.158	1.231	-1.073
743.1	45.435	-0.658	-0.491	0	-31.21	0	0.157	1.231	-1.074
743.2	45.304	-0.635	-1.165	0	-33.13	0	0.156	1.231	-1.075
743.3	45.174	-0.643	-1.165	0	-33.38	0	0.155	1.231	-1.076
743.4	45.043	-0.643	-0.795	0	-33.27	0	0.154	1.231	-1.076
743.5	44.913	-0.648	0	0	-33.13	0	0.153	1.231	-1.077
743.6	44.782	-0.66	-0.855	0	-33.04	0	0.152	1.231	-1.078
743.7	44.646	-0.673	-0.537	0	-32.88	0	0.151	1.231	-1.079
743.8	44.515	-0.68	-0.512	0	-33.02	0	0.15	1.231	-1.08
743.9	44.378	-0.658	-0.138	0	-34.81	0	0.149	1.231	-1.081
744	44.229	-0.653	-1.123	0	-38.35	0	0.148	1.231	-1.082
744.1	44.074	-0.668	-1.437	0	-42.04	0	0.147	1.231	-1.083
744.2	43.912	-0.663	0.148	0	-43.93	0	0.146	1.231	-1.085
744.3	43.751	-0.653	-0.752	0	-47.24	0	0.145	1.231	-1.086
744.4	43.564	-0.655	-0.964	0	-54.82	0	0.143	1.231	-1.087
744.5	43.341	-0.67	-0.985	0	-62.48	0	0.141	1.231	-1.089
744.6	43.142	-0.67	-0.138	0	-66.11	0	0.14	1.231	-1.091
744.7	42.906	-0.668	-0.671	0	-69.83	0	0.138	1.231	-1.093
744.8	42.657	-0.66	-0.671	0	-71.92	0	0.136	1.231	-1.095
744.9	42.402	-0.66	-0.908	0	-66.12	0	0.134	1.231	-1.097
745	42.148	-0.683	-0.883	0	-59.25	0	0.132	1.231	-1.098
745.1	41.887	-0.675	-0.138	0	-56.03	0	0.131	1.231	-1.1
745.2	41.644	-0.655	-0.597	0	-64.28	0	0.129	1.231	-1.102
745.3	41.377	-0.648	-1.381	0	-65.44	0	0.127	1.231	-1.104
745.4	41.097	-0.648	-0.943	0	-66.36	0	0.125	1.231	-1.105
745.5	40.799	-0.655	-0.798	0	-67.56	0	0.123	1.231	-1.107
745.6	40.489	-0.655	-0.47	0	-74.55	0	0.121	1.231	-1.109
745.7	40.172	-0.668	-0.438	0	-85.92	0	0.119	1.231	-1.112
745.8	39.867	-0.658	-0.371	0	-88.9	0	0.116	1.231	-1.114
745.9	39.544	-0.658	-0.752	0	-87.64	0	0.114	1.231	-1.117
746	39.227	-0.658	-0.724	0	-78.98	0	0.112	1.231	-1.119
746.1	38.898	-0.665	-0.643	0	-71.96	0	0.11	1.231	-1.121
746.2	38.55	-0.66	-0.629	0	-71.85	0	0.108	1.231	-1.123
746.3	38.221	-0.655	-0.629	0	-84.1	0	0.105	1.231	-1.125
746.4	37.897	-0.668	-0.766	0	-84.44	0	0.103	1.231	-1.128
746.5	37.897	-0.685	-0.314	0	-85.6	0	0.101	1.231	-1.13
746.6	37.214	-0.67	-0.124	0	-91.19	0	0.098	1.231	-1.132

746.7	36.847	-0.635	-0.399	0	-99.48	0	0.095	1.231	-1.135
746.8	36.487	-0.633	-1.451	0	-98.53	0	0.093	1.231	-1.138
746.9	36.133	-0.663	-1.123	0	-96.43	0	0.09	1.231	-1.141
747	35.779	-0.675	-0.042	0	-92.56	0	0.087	1.231	-1.143
747.1	35.443	-0.66	-0.318	0	-89.42	0	0.085	1.231	-1.146
747.2	35.107	-0.643	-0.558	0	-88.13	0	0.082	1.231	-1.148
747.3	34.778	-0.65	-1.123	0	-83.74	0	0.08	1.231	-1.15
747.4	34.467	-0.658	-0.583	0	-74.92	0	0.078	1.231	-1.153
747.5	34.151	-0.648	-0.275	0	-73.23	0	0.076	1.231	-1.155
747.6	33.89	-0.64	-0.77	0	-72.7	0	0.074	1.231	-1.157
747.7	33.604	-0.635	-0.445	0	-72.16	0	0.072	1.231	-1.159
747.8	33.299	-0.635	-0.773	0	-71.44	0	0.07	1.231	-1.161
747.9	33.02	-0.635	-0.773	0	-71.31	0	0.068	1.231	-1.163
748	32.728	-0.67	-0.83	0	-74.74	0	0.066	1.231	-1.165
748.1	32.411	-0.67	-0.399	0	-79.43	0	0.064	1.231	-1.167
748.2	32.081	-0.64	-0.113	0	-80.77	0	0.061	1.231	-1.169
748.3	31.746	-0.65	-1.261	0	-80.17	0	0.059	1.231	-1.171
748.4	31.41	-0.683	-1.328	0	-79.38	0	0.057	1.231	-1.173
748.5	31.037	-0.67	0.385	0	-78.25	0	0.055	1.231	-1.176
748.6	30.733	-0.67	-0.445	0	-77.05	0	0.053	1.231	-1.178
748.7	30.397	-0.65	-1.455	0	-74.36	0	0.051	1.231	-1.18
748.8	30.062	-0.658	-0.773	0	-65.51	0	0.049	1.231	-1.182
748.9	29.72	-0.658	-0.29	0	-57.69	0	0.047	1.231	-1.183
749	29.403	-0.673	-0.572	0	-44.56	0	0.046	1.231	-1.185
749.1	29.136	-0.665	-0.604	0	-32.34	0	0.045	1.231	-1.185
749.2	28.906	-0.668	-0.558	0	-21.41	0	0.044	1.231	-1.186
749.3	28.689	-0.673	-0.992	0	-33.92	0	0.044	1.231	-1.187
749.4	28.465	-0.673	-0.516	0	-45.85	0	0.042	1.231	-1.188
749.5	28.229	-0.643	-0.932	0	-46.71	0	0.041	1.231	-1.19
749.6	27.962	-0.658	-1.014	0	-48.38	0	0.04	1.231	-1.191
749.7	27.688	-0.668	-0.773	0	-54.16	0	0.038	1.231	-1.192
749.8	27.396	-0.673	-0.215	0	-59.38	0	0.036	1.231	-1.194
749.9	27.117	-0.663	-0.604	0	-55.88	0	0.035	1.231	-1.196
750	26.856	-0.64	-0.544	0	-54.91	0	0.033	1.231	-1.197
750.1	26.595	-0.633	-1.261	0	-53.85	0	0.032	1.231	-1.199
750.2	26.34	-0.65	-1.098	0	-47.56	0	0.031	1.231	-1.2
750.3	26.11	-0.658	-0.445	0	-45.71	0	0.029	1.231	-1.201
750.4	25.88	-0.668	-0.618	0	-46.99	0	0.028	1.231	-1.203
750.5	25.638	-0.67	-0.59	0	-47.46	0	0.027	1.231	-1.204
750.6	25.395	-0.668	-0.113	0	-48.31	0	0.025	1.231	-1.205
750.7	25.147	-0.675	-0.84	0	-49.31	0	0.024	1.231	-1.207
750.8	24.886	-0.67	-0.275	0	-48.96	0	0.023	1.231	-1.208
750.9	24.619	-0.67	-0.562	0	-48.3	0	0.021	1.231	-1.209
751	24.364	-0.67	-1.056	0	-47.64	0	0.02	1.231	-1.211
751.1	24.103	-0.665	-0.576	0	-47.75	0	0.019	1.231	-1.212
751.2	23.842	-0.66	-0.177	0	-49.08	0	0.017	1.231	-1.213
751.3	23.569	-0.655	-0.918	0	-49.33	0	0.016	1.231	-1.215

751.4	23.295	-0.658	-0.77	0	-48.75	0	0.015	1.231	-1.216
751.5	23.028	-0.665	-0.816	0	-48.15	0	0.013	1.231	-1.217
751.6	22.761	-0.66	-0.562	0	-47.44	0	0.012	1.231	-1.219
751.7	22.487	-0.653	-0.731	0	-46.81	0	0.011	1.231	-1.22
751.8	22.189	-0.653	-1.056	0	-46.14	0	0.009	1.231	-1.221
751.9	21.947	-0.653	-0.576	0	-45.53	0	0.008	1.231	-1.222
752	21.673	-0.655	-0.731	0	-44.84	0	0.007	1.231	-1.224
752.1	21.406	-0.673	-0.66	0	-44.2	0	0.006	1.231	-1.225
752.2	21.139	-0.675	-0.756	0	-43.64	0	0.004	1.231	-1.226
752.3	20.866	-0.655	-0.071	0	-42.93	0	0.003	1.231	-1.227
752.4	20.586	-0.655	-1.014	0	-42.3	0	0.002	1.231	-1.229
752.5	20.313	-0.655	-0.848	0	-41.65	0	0.001	1.231	-1.23
752.6	20.039	-0.653	-0.547	0	-41.07	0	0	1.231	-1.231
752.7	19.772	-0.648	-0.77	0	-40.42	0	-0.001	1.231	-1.232
752.8	19.505	-0.658	-0.961	0	-39.78	0	-0.003	1.231	-1.233
752.9	19.231	-0.655	-0.731	0	-38.14	0	-0.004	1.231	-1.234
753	18.977	-0.643	-0.487	0	-31.69	0	-0.004	1.231	-1.235
753.1	18.765	-0.64	-1.056	0	-26.59	0	-0.005	1.231	-1.236
753.2	18.567	-0.643	-0.731	0	-22.79	0	-0.006	1.231	-1.236
753.3	18.355	-0.655	-0.562	0	-20.73	0	-0.006	1.231	-1.237
753.4	18.138	-0.658	-0.547	0	-18.22	0	-0.007	1.231	-1.237
753.5	17.933	-0.66	-0.862	0	-14.9	0	-0.007	1.231	-1.238
753.6	17.74	-0.67	-0.629	0	-5.44	0	-0.008	1.231	-1.238
753.7	17.579	-0.67	-0.713	0	6.12	0	-0.007	1.231	-1.238
753.8	17.411	-0.665	-0.219	0	-14.82	0	-0.008	1.231	-1.238
753.9	17.218	-0.665	-0.833	0	-19.23	0	-0.008	1.231	-1.239
754	16.976	-0.658	-0.629	0	-26.05	0	-0.009	1.231	-1.24
754.1	16.709	-0.663	-0.731	0	-32.34	0	-0.01	1.231	-1.241
754.2	16.441	-0.663	-1.056	0	-32.3	0	-0.011	1.231	-1.241
754.3	16.187	-0.663	-0.713	0	-31.35	0	-0.012	1.231	-1.242
754.4	15.938	-0.663	-0.703	0	-30.68	0	-0.013	1.231	-1.243
754.5	15.69	-0.673	-0.699	0	-30.11	0	-0.013	1.231	-1.244
754.6	15.441	-0.673	-0.247	0	-29.47	0	-0.014	1.231	-1.245
754.7	15.193	-0.665	-1.208	0	-28.66	0	-0.015	1.231	-1.246
754.8	15.193	-0.675	-0.876	0	-28.2	0	-0.016	1.231	-1.246
754.9	14.695	-0.675	-0.014	0	-27.54	0	-0.017	1.231	-1.247
755	14.695	-0.66	-0.89	0	-26.05	0	-0.017	1.231	-1.248
755.1	14.211	-0.66	-0.851	0	-24.43	0	-0.018	1.231	-1.249
755.2	13.987	-0.66	-0.809	0	-23.7	0	-0.019	1.231	-1.249
755.3	13.757	-0.648	-0.523	0	-23.76	0	-0.019	1.231	-1.25
755.4	13.515	-0.648	-0.809	0	-24.98	0	-0.02	1.231	-1.251
755.5	13.223	-0.685	-0.876	0	-26.6	0	-0.021	1.231	-1.251
755.6	12.962	-0.668	0.081	0	-27.28	0	-0.021	1.231	-1.252
755.7	12.695	-0.66	-0.805	0	-26.86	0	-0.022	1.231	-1.253
755.8	12.695	-0.673	-1.243	0	-26.17	0	-0.023	1.231	-1.254
755.9	12.123	-0.685	-0.378	0	-25.46	0	-0.024	1.231	-1.254
756	11.843	-0.665	-0.187	0	-24.78	0	-0.024	1.231	-1.255

756.1	11.558	-0.65	-0.929	0	-23.96	0	-0.025	1.231	-1.256
756.2	11.278	-0.67	-1.504	0	-22.59	0	-0.026	1.231	-1.256
756.3	11.004	-0.683	-0.36	0	-21.38	0	-0.026	1.231	-1.257
756.4	10.737	-0.665	0.06	0	-20.78	0	-0.027	1.231	-1.257
756.5	10.439	-0.643	-0.671	0	-20.2	0	-0.027	1.231	-1.258
756.6	10.439	-0.65	-1.377	0	-19.65	0	-0.028	1.231	-1.259
756.7	9.923	-0.658	-0.862	0	-19.05	0	-0.028	1.231	-1.259
756.8	9.65	-0.655	-0.233	0	-18.42	0	-0.029	1.231	-1.26
756.9	9.376	-0.655	-0.424	0	-17.2	0	-0.029	1.231	-1.26
757	9.122	-0.635	-0.604	0	-16.45	0	-0.03	1.231	-1.261
757.1	8.861	-0.643	-0.999	0	-15.65	0	-0.03	1.231	-1.261
757.2	8.6	-0.63	-0.265	0	-15.04	0	-0.031	1.231	-1.261
757.3	8.345	-0.628	-0.685	0	-14.44	0	-0.031	1.231	-1.262
757.4	8.345	-0.648	-1.049	0	-13.6	0	-0.031	1.231	-1.262
757.5	7.835	-0.665	-0.304	0	-12.49	0	-0.032	1.231	-1.263
757.6	7.606	-0.655	-0.018	0	-10.97	0	-0.032	1.231	-1.263
757.7	7.394	-0.65	-0.837	0	-10.1	0	-0.032	1.231	-1.263
757.8	7.183	-0.65	-1.165	0	-9.27	0	-0.033	1.231	-1.263
757.9	6.972	-0.65	-0.922	0	-8.39	0	-0.033	1.231	-1.264
758	6.779	-0.66	-0.643	0	-7.56	0	-0.033	1.231	-1.264
758.1	6.568	-0.66	-0.102	0	-6.74	0	-0.033	1.231	-1.264
758.2	6.568	-0.678	-1.201	0	-5.93	0	-0.033	1.231	-1.264
758.3	6.145	-0.69	-0.434	0	-4.96	0	-0.034	1.231	-1.264
758.4	5.928	-0.69	-0.434	0	-4.21	0	-0.034	1.231	-1.264
758.5	5.717	-0.658	-0.675	0	-3.53	0	-0.034	1.231	-1.265
758.6	5.493	-0.663	-0.876	0	-2.88	0	-0.034	1.231	-1.265
758.7	5.269	-0.66	-0.971	0	-2.36	0	-0.034	1.231	-1.265
758.8	5.039	-0.64	-0.314	0	-1.84	0	-0.034	1.231	-1.265
758.9	4.803	-0.653	-0.791	0	-1.32	0	-0.034	1.231	-1.265
759	4.803	-0.663	-1.165	0	-0.86	0	-0.034	1.231	-1.265
759.1	4.381	-0.663	-0.261	0	0	0	-0.034	1.231	-1.265
759.2	4.213	-0.665	-1.003	0	0	0	-0.034	1.231	-1.265
759.3	4.07	-0.655	-0.809	0	0	0	-0.034	1.231	-1.265
759.4	3.933	-0.638	-0.795	0	0	0	-0.034	1.231	-1.265
759.5	3.797	-0.64	-1.176	0	0.61	0	-0.034	1.231	-1.265
759.6	3.647	-0.663	-1.176	0	0.79	0	-0.034	1.231	-1.265
759.7	3.505	-0.665	-0.191	0	0.89	0	-0.034	1.231	-1.265
759.8	3.505	-0.65	-0.424	0	0.94	0	-0.034	1.231	-1.265
759.9	3.206	-0.65	-0.798	0	0.99	0	-0.034	1.231	-1.265
760	3.063	-0.678	-1.165	0	1	0	-0.034	1.231	-1.265
760.1	2.908	-0.665	-0.138	0	1.02	0	-0.034	1.231	-1.265
760.2	2.746	-0.655	-0.364	0	1.05	0	-0.034	1.231	-1.265
760.3	2.554	-0.648	-1.24	0	1.07	0	-0.034	1.231	-1.265
760.4	2.336	-0.655	-0.671	0	1.08	0	-0.034	1.231	-1.265
760.5	2.138	-0.673	-0.833	0	1.08	0	-0.034	1.231	-1.265
760.6	2.138	-0.665	0.328	0	1.1	0	-0.034	1.231	-1.265
760.7	1.721	-0.643	-0.321	0	1.1	0	-0.034	1.231	-1.265

760.8	1.56	-0.643	-1.303	0	1.2	0	-0.034	1.231	-1.265
760.9	1.411	-0.643	-0.833	0	1.3	0	-0.034	1.231	-1.265
761	1.286	-0.643	-0.657	0	1.37	0	-0.034	1.231	-1.265
761.1	1.187	-0.653	-0.837	0	1.47	0	-0.034	1.231	-1.265
761.2	1.106	-0.668	-0.759	0	1.51	0	-0.034	1.231	-1.265
761.3	1.019	-0.663	-0.494	0	1.52	0	-0.033	1.231	-1.265
761.4	1.019	-0.663	-0.509	0	1.56	0	-0.033	1.231	-1.265
761.5	0.857	-0.623	-1.377	0	1.58	0	-0.033	1.231	-1.265
761.6	0.783	-0.638	-0.876	0	1.62	0	-0.033	1.231	-1.265
761.7	0.702	-0.653	-0.657	0	1.61	0	-0.033	1.231	-1.265
761.8	0.628	-0.658	-0.138	0	1.66	0	-0.033	1.232	-1.265
761.9	0.553	-0.665	-0.809	0	1.7	0	-0.033	1.232	-1.265
762	0.466	-0.665	-0.346	0	1.74	0	-0.033	1.232	-1.265
762.1	0.367	-0.655	-0.671	0	1.72	0	-0.033	1.232	-1.265
762.2	0.267	-0.66	-0.819	0	1.7	0	-0.033	1.232	-1.265
762.3	0.205	-0.673	-0.795	0	1.66	0	-0.033	1.232	-1.265
762.4	0.149	-0.67	-0.261	0	1.66	0	-0.033	1.232	-1.265
762.5	0.099	-0.675	-0.614	0	1.65	0	-0.033	1.232	-1.265
762.6	0	-0.693	-1.028	0	1.67	0	-0.033	1.232	-1.265
762.7	0	-0.69	-0.388	0	1.68	0	-0.033	1.232	-1.265
762.8	0	-0.67	-0.59	0	1.7	0	-0.033	1.232	-1.265
762.9	0	-0.67	-1.201	0	1.67	0	-0.033	1.232	-1.265
763	0	-0.663	-0.961	0	1.67	0	-0.033	1.232	-1.265
763.1	0	-0.66	-0.795	0	1.66	0	-0.033	1.232	-1.265
763.2	0	-0.66	-0.752	0	1.62	0	-0.033	1.232	-1.265
763.3	0	-0.663	-1.031	0	1.62	0	-0.033	1.232	-1.265
763.4	0	-0.663	-0.551	0	1.74	0	-0.033	1.232	-1.265
763.5	0	-0.665	-0.837	0	2.03	0	-0.032	1.232	-1.265
763.6	0	-0.665	-0.646	0	2.21	0	-0.032	1.232	-1.265
763.7	0	-0.65	-1.356	0	2.31	0	-0.032	1.232	-1.265
763.8	0	-0.65	-1.151	0	1.75	0	-0.032	1.232	-1.265
763.9	0	-0.65	-0.632	0	1.63	0	-0.032	1.233	-1.265
764	0	-0.67	-0.78	0	1.66	0	-0.032	1.233	-1.265
764.1	0	-0.658	0.025	0	1.65	0	-0.032	1.233	-1.265
764.2	0	-0.648	-0.961	0	1.65	0	-0.032	1.233	-1.265
764.3	0	-0.648	-1.003	0	1.65	0	-0.032	1.233	-1.265
764.4	0	-0.658	-1.123	0	1.67	0	-0.032	1.233	-1.265
764.5	0	-0.668	-0.717	0	1.66	0	-0.032	1.233	-1.265
764.6	0	-0.663	-0.59	0	1.65	0	-0.032	1.233	-1.265
764.7	0	-0.643	-0.42	0	1.65	0	-0.032	1.233	-1.265
764.8	0	-0.64	-1.063	0	1.65	0	-0.032	1.233	-1.265
764.9	0	-0.655	-1.123	0	1.45	0	-0.032	1.233	-1.265
765	0	-0.658	-0.717	0	1.59	0	-0.032	1.233	-1.265
765.05	0	-0.663	-0.551	0	1.67	0	-0.032	1.233	-1.265
765.05	0	-0.66	-0.703	0	1.85	0	-0.032	1.233	-1.265
765.05	0	-0.653	-0.618	0	1.99	0	-0.032	1.233	-1.265
765.05	0	-0.653	-1.006	0	1.83	0	-0.032	1.233	-1.265

765.05	0	-0.618	-0.032	0	1.47	0	-0.031	1.233	-1.265

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Test #	Cycle	ACT-DISTANCE	AMP-HRS	Initial Voltage	Final Voltage	AS-VOLT	START SOC	END SOC
20150359019	***HWY 1 TOTAL***	***10.244***	***6.683***	*385.5*	*360.0*	***372.8***	***0.000***	***6.683***
20150359019	***HWY 2 TOTAL***	***10.241***	***13.400***	*360.3*	*347.0*	***353.6***	***0.000***	***6.717***
	HWY 3 Transition	*1.855*	*14.891*	*NA*	*NA*	*NA*	*0.000*	*1.491*
20150359019	***HWY 3 TOTAL***	***10.248***	***14.925***	*347.8*	*347.0*	***347.4***	***0.000***	***1.525***
20150359020	***HWY 4 TOTAL***	***10.245***	***14.893***	*345.8*	*347.3*	***346.5***	***0.000***	***-0.032***

AER (mi)	Recharge Event Voltage (V)
22.34	**238.5**
	Recharge Event Energy (Wh)
	6215.3

Time (s)	Voltage (VAC rms)	Current (Irms)	Power (W)	AmpHrs (Ah)	Energy (Wh)
0	239.36	0	0	0	0
1	239.48	0	0	0	0
2	239.6	0	0	0	0
3	239.48	0	0	0	0
4	239.62	0	0	0	0
5	239.66	0	0	0	0
6	239.49	0	0	0	0
7	239.52	0	0	0	0
8	239.56	0	0	0	0
9	239.38	0	0	0	0
10	239.35	0	0	0	0
11	239.47	0	0	0	0
12	239.6	0	0	0	0
13	239.51	0	0	0	0
14	239.59	0	0	0	0
15	239.57	0	0	0	0
16	239.61	0	0	0	0
17	239.64	0	0	0	0
18	239.49	0	0	0	0
19	239.51	0	0	0	0
20	239.58	0	0	0	0
21	239.52	0	0	0	0
22	239.4	0	0	0	0
23	239.51	0	0	0	0
24	239.48	0	0	0	0
25	239.5	0	0	0	0
26	239.48	0	0	0	0
27	239.5	0	0	0	0
28	239.58	0	0	0	0
29	239.52	0	0	0	0
30	239.5	0	0	0	0
31	239.48	0	0	0	0
32	239.4	0	0	0	0
33	239.39	0	0	0	0
34	239.4	0	0	0	0
35	239.45	0	0	0	0
36	239.5	0	0	0	0
37	239.35	0	0	0	0
38	239.36	0	0	0	0
39	238.64	0	0	0	0
40	238.75	0	0	0	0
41	239.25	0	0	0	0
42	239.23	0	0	0	0
43	239.2	0	0	0	0
44	239.2	0	0	0	0
45	239.07	0	0	0	0

Recharge Event Volta
238.5

Recharge Event Energ
6215.3

46	239.27	0	0	0	0
47	239.07	0	0	0	0
48	239.17	0	0	0	0
49	239.26	0	0	0	0
50	239.14	0	0	0	0
51	239.14	0	0	0	0
52	239.23	0	0	0	0
53	239.23	0	0	0	0
54	239.2	0	0	0	0
55	239.38	0	0	0	0
56	239.35	0	0	0	0
57	239.39	0	0	0	0
58	239.35	0	0	0	0
59	239.46	0	0	0	0
60	239.34	0	0	0	0
61	239.57	0	0	0	0
62	239.25	0	0	0	0
63	239.39	0	0	0	0
64	239.43	0	0	0	0
65	239.34	0	0	0	0
66	239.38	0	0	0	0
67	239.36	0	0	0	0
68	239.44	0	0	0	0
69	239.34	0	0	0	0
70	239.07	0	0	0	0
71	239.43	0	0	0	0
72	239.34	0	0	0	0
73	239.39	0	0	0	0
74	239.48	0	0	0	0
75	239.55	0.57	0	0	0
76	239.46	0.56	0	0	0
77	239.53	0.56	0	0.001	0
78	239.47	0.56	0	0.001	0
79	239.53	0.56	0	0.001	0
80	239.37	1.9	-397	0.001	-0.1
81	238.94	9.8	-2262	0.003	-0.5
82	238.55	14.92	-3526	0.007	-1.3
83	238.53	14.93	-3528	0.011	-2.3
84	238.42	14.97	-3534	0.015	-3.3
85	238.5	14.96	-3533	0.019	-4.3
86	238.52	14.93	-3528	0.023	-5.2
87	238.47	14.89	-3515	0.027	-6.2
88	238.41	14.98	-3536	0.031	-7.2
89	238.38	14.8	-3492	0.036	-8.2
90	238.5	14.77	-3487	0.04	-9.1
91	238.39	14.78	-3486	0.044	-10.1
92	238.39	14.8	-3490	0.048	-11.1

93	238.39	14.81	-3494	0.052	-12
94	238.54	14.73	-3480	0.056	-13
95	238.41	14.82	-3495	0.06	-14
96	238.49	14.76	-3485	0.064	-15
97	238.45	14.78	-3488	0.068	-15.9
98	238.39	14.76	-3479	0.073	-16.9
99	238.47	14.79	-3488	0.077	-17.9
100	238.52	14.83	-3500	0.081	-18.8
101	238.55	14.79	-3490	0.085	-19.8
102	238.64	14.75	-3481	0.089	-20.8
103	238.52	14.81	-3493	0.093	-21.8
104	238.45	14.83	-3498	0.097	-22.7
105	238.47	14.81	-3492	0.101	-23.7
106	238.46	14.87	-3506	0.105	-24.7
107	238.45	14.87	-3509	0.11	-25.6
108	238.34	14.83	-3496	0.114	-26.6
109	238.41	14.83	-3498	0.118	-27.6
110	238.42	14.84	-3501	0.122	-28.5
111	238.41	14.83	-3500	0.126	-29.5
112	238.48	14.81	-3495	0.13	-30.5
113	238.62	14.88	-3514	0.134	-31.5
114	238.52	14.84	-3503	0.138	-32.4
115	238.57	14.83	-3502	0.142	-33.4
116	238.36	14.83	-3499	0.147	-34.4
117	238.73	14.83	-3505	0.151	-35.3
118	238.55	14.78	-3489	0.155	-36.3
119	238.53	14.81	-3495	0.159	-37.3
120	238.55	14.8	-3495	0.163	-38.3
121	238.31	14.8	-3491	0.167	-39.2
122	238.36	14.8	-3487	0.171	-40.2
123	238.47	14.81	-3493	0.175	-41.2
124	238.47	14.8	-3490	0.18	-42.1
125	238.62	14.79	-3489	0.184	-43.1
126	238.42	14.88	-3506	0.188	-44.1
127	238.38	14.85	-3502	0.192	-45.1
128	238.37	14.82	-3494	0.196	-46
129	238.54	14.8	-3491	0.2	-47
130	238.52	14.83	-3499	0.204	-48
131	238.39	14.8	-3491	0.208	-48.9
132	238.38	14.85	-3502	0.212	-49.9
133	238.36	14.84	-3499	0.217	-50.9
134	238.44	14.84	-3501	0.221	-51.9
135	238.51	14.83	-3498	0.225	-52.8
136	238.53	14.83	-3500	0.229	-53.8
137	238.38	14.89	-3512	0.233	-54.8
138	238.3	14.89	-3509	0.237	-55.7
139	238.69	14.81	-3497	0.241	-56.7

140	238.25	14.9	-3514	0.245	-57.7
141	238.61	14.8	-3495	0.25	-58.7
142	238.27	14.83	-3496	0.254	-59.6
143	238.66	14.84	-3505	0.258	-60.6
144	238.59	14.82	-3502	0.262	-61.6
145	238.43	14.85	-3502	0.266	-62.5
146	238.63	14.88	-3513	0.27	-63.5
147	238.61	14.85	-3506	0.274	-64.5
148	238.58	14.83	-3501	0.278	-65.5
149	238.54	14.84	-3501	0.282	-66.4
150	238.58	14.82	-3498	0.287	-67.4
151	238.65	14.86	-3507	0.291	-68.4
152	238.64	14.77	-3487	0.295	-69.3
153	238.44	14.84	-3500	0.299	-70.3
154	238.47	14.8	-3490	0.303	-71.3
155	238.42	14.86	-3503	0.307	-72.3
156	238.46	14.84	-3501	0.311	-73.2
157	238.43	14.81	-3494	0.315	-74.2
158	238.55	14.82	-3496	0.32	-75.2
159	238.34	14.85	-3500	0.324	-76.2
160	238.55	14.82	-3498	0.328	-77.1
161	238.68	14.77	-3485	0.332	-78.1
162	238.65	14.81	-3494	0.336	-79.1
163	238.55	14.84	-3503	0.34	-80
164	238.49	14.86	-3504	0.344	-81
165	238.62	14.84	-3502	0.348	-82
166	238.56	14.83	-3500	0.353	-83
167	238.55	14.87	-3508	0.357	-83.9
168	238.65	14.8	-3495	0.361	-84.9
169	238.53	14.82	-3499	0.365	-85.9
170	238.55	14.82	-3497	0.369	-86.8
171	238.55	14.85	-3505	0.373	-87.8
172	238.65	14.84	-3505	0.377	-88.8
173	238.51	14.86	-3506	0.381	-89.8
174	238.53	14.83	-3499	0.385	-90.7
175	238.38	14.85	-3502	0.39	-91.7
176	238.47	14.84	-3503	0.394	-92.7
177	238.49	14.84	-3500	0.398	-93.7
178	238.49	14.84	-3502	0.402	-94.6
179	238.36	14.85	-3503	0.406	-95.6
180	238.52	14.86	-3508	0.41	-96.6
181	238.56	14.85	-3508	0.414	-97.5
182	238.65	14.83	-3505	0.418	-98.5
183	238.38	14.83	-3498	0.423	-99.5
184	238.48	14.83	-3502	0.427	-100.5
185	238.62	14.84	-3506	0.431	-101.4
186	238.41	14.83	-3498	0.435	-102.4

187	238.53	14.82	-3500	0.439	-103.4
188	238.38	14.82	-3497	0.443	-104.4
189	238.63	14.83	-3501	0.447	-105.3
190	238.23	14.83	-3497	0.451	-106.3
191	238.56	14.82	-3499	0.456	-107.3
192	238.42	14.84	-3500	0.46	-108.2
193	238.49	14.85	-3505	0.464	-109.2
194	238.37	14.84	-3499	0.468	-110.2
195	238.54	14.82	-3497	0.472	-111.2
196	238.52	14.85	-3508	0.476	-112.1
197	238.54	14.81	-3495	0.48	-113.1
198	238.47	14.85	-3504	0.484	-114.1
199	238.48	14.84	-3502	0.488	-115
200	238.37	14.82	-3494	0.493	-116
201	238.49	14.85	-3504	0.497	-117
202	238.54	14.8	-3494	0.501	-118
203	238.42	14.87	-3505	0.505	-118.9
204	238.74	14.79	-3500	0.509	-119.9
205	238.65	14.76	-3489	0.513	-120.9
206	238.82	14.81	-3503	0.517	-121.9
207	238.79	14.82	-3505	0.521	-122.8
208	238.69	14.81	-3504	0.526	-123.8
209	238.67	14.83	-3506	0.53	-124.8
210	238.88	14.83	-3512	0.534	-125.8
211	238.74	14.82	-3507	0.538	-126.7
212	238.81	14.78	-3495	0.542	-127.7
213	238.7	14.79	-3495	0.546	-128.7
214	238.75	14.83	-3508	0.55	-129.6
215	238.77	14.81	-3502	0.554	-130.6
216	238.4	14.87	-3513	0.558	-131.6
217	238.64	14.8	-3497	0.563	-132.6
218	238.83	14.79	-3496	0.567	-133.5
219	238.69	14.8	-3501	0.571	-134.5
220	238.58	14.85	-3507	0.575	-135.5
221	238.67	14.84	-3505	0.579	-136.5
222	238.65	14.85	-3509	0.583	-137.4
223	238.67	14.87	-3511	0.587	-138.4
224	238.58	14.84	-3506	0.591	-139.4
225	238.55	14.86	-3510	0.596	-140.3
226	238.65	14.85	-3509	0.6	-141.3
227	238.8	14.85	-3509	0.604	-142.3
228	238.49	14.83	-3501	0.608	-143.3
229	238.79	14.77	-3492	0.612	-144.2
230	238.43	14.89	-3514	0.616	-145.2
231	238.48	14.84	-3504	0.62	-146.2
232	238.58	14.84	-3503	0.624	-147.2
233	238.53	14.84	-3506	0.629	-148.1

234	238.5	14.85	-3508	0.633	-149.1
235	238.51	14.88	-3514	0.637	-150.1
236	238.56	14.82	-3503	0.641	-151.1
237	238.66	14.84	-3505	0.645	-152
238	238.42	14.89	-3517	0.649	-153
239	238.41	14.87	-3511	0.653	-154
240	238.43	14.77	-3488	0.657	-154.9
241	238.37	14.83	-3501	0.661	-155.9
242	238.54	14.82	-3499	0.666	-156.9
243	238.5	14.84	-3504	0.67	-157.9
244	238.59	14.84	-3506	0.674	-158.8
245	238.66	14.81	-3501	0.678	-159.8
246	238.56	14.87	-3513	0.682	-160.8
247	238.67	14.84	-3508	0.686	-161.8
248	238.5	14.83	-3501	0.69	-162.7
249	238.54	14.84	-3504	0.694	-163.7
250	238.58	14.84	-3503	0.699	-164.7
251	238.6	14.82	-3503	0.703	-165.7
252	238.47	14.81	-3497	0.707	-166.6
253	238.45	14.83	-3500	0.711	-167.6
254	238.59	14.83	-3503	0.715	-168.6
255	238.47	14.84	-3504	0.719	-169.6
256	238.56	14.79	-3491	0.723	-170.5
257	238.55	14.89	-3517	0.727	-171.5
258	238.56	14.81	-3497	0.732	-172.5
259	238.61	14.84	-3503	0.736	-173.4
260	238.64	14.83	-3504	0.74	-174.4
261	238.68	14.82	-3497	0.744	-175.4
262	238.71	14.79	-3496	0.748	-176.4
263	238.66	14.82	-3500	0.752	-177.3
264	238.62	14.83	-3502	0.756	-178.3
265	238.61	14.89	-3517	0.76	-179.3
266	238.62	14.81	-3498	0.765	-180.3
267	238.56	14.84	-3504	0.769	-181.2
268	238.72	14.85	-3512	0.773	-182.2
269	238.44	14.81	-3493	0.777	-183.2
270	238.43	14.88	-3511	0.781	-184.2
271	238.55	14.83	-3502	0.785	-185.1
272	238.41	14.83	-3498	0.789	-186.1
273	238.6	14.83	-3504	0.793	-187.1
274	238.49	14.84	-3506	0.798	-188.1
275	238.52	14.84	-3504	0.802	-189
276	238.46	14.88	-3515	0.806	-190
277	238.36	14.86	-3506	0.81	-191
278	238.52	14.81	-3497	0.814	-192
279	238.39	14.85	-3508	0.818	-192.9
280	238.25	14.85	-3503	0.822	-193.9

281	238.41	14.83	-3501	0.826	-194.9
282	238.51	14.82	-3503	0.831	-195.9
283	238.53	14.85	-3508	0.835	-196.8
284	238.62	14.83	-3507	0.839	-197.8
285	238.54	14.84	-3505	0.843	-198.8
286	238.54	14.83	-3506	0.847	-199.8
287	238.48	14.82	-3501	0.851	-200.7
288	238.54	14.83	-3504	0.855	-201.7
289	238.41	14.89	-3516	0.859	-202.7
290	238.52	14.82	-3500	0.864	-203.6
291	238.61	14.84	-3506	0.868	-204.6
292	238.49	14.84	-3507	0.872	-205.6
293	238.55	14.84	-3505	0.876	-206.6
294	238.6	14.81	-3503	0.88	-207.5
295	238.63	14.86	-3515	0.884	-208.5
296	238.6	14.87	-3512	0.888	-209.5
297	238.65	14.83	-3506	0.892	-210.5
298	238.59	14.87	-3515	0.897	-211.4
299	238.67	14.85	-3510	0.901	-212.4
300	238.19	14.87	-3511	0.905	-213.4
301	238.37	14.84	-3506	0.909	-214.4
302	238.12	14.89	-3513	0.913	-215.3
303	238.24	14.85	-3505	0.917	-216.3
304	238.22	14.85	-3505	0.921	-217.3
305	238.3	14.86	-3505	0.926	-218.3
306	238.24	14.86	-3507	0.93	-219.2
307	238.23	14.89	-3510	0.934	-220.2
308	238.25	14.88	-3512	0.938	-221.2
309	238.22	14.88	-3510	0.942	-222.2
310	238.13	14.84	-3500	0.946	-223.1
311	238.13	14.86	-3507	0.95	-224.1
312	238.19	14.85	-3503	0.954	-225.1
313	238.16	14.88	-3511	0.959	-226.1
314	238.3	14.85	-3506	0.963	-227
315	238.19	14.88	-3510	0.967	-228
316	238.27	14.88	-3513	0.971	-229
317	238.17	14.86	-3505	0.975	-230
318	238.18	14.86	-3506	0.979	-230.9
319	238.25	14.87	-3506	0.983	-231.9
320	238.14	14.88	-3511	0.988	-232.9
321	238.22	14.85	-3504	0.992	-233.9
322	238.14	14.84	-3500	0.996	-234.8
323	238.1	14.88	-3509	1	-235.8
324	238.25	14.89	-3512	1.004	-236.8
325	238.25	14.88	-3511	1.008	-237.8
326	238.26	14.89	-3511	1.012	-238.7
327	238.23	14.9	-3513	1.016	-239.7

328	238.24	14.87	-3510	1.021	-240.7
329	238.19	14.88	-3511	1.025	-241.7
330	238.13	14.9	-3513	1.029	-242.6
331	238.2	14.9	-3516	1.033	-243.6
332	238.24	14.86	-3508	1.037	-244.6
333	238.18	14.86	-3506	1.041	-245.6
334	238.03	14.87	-3506	1.045	-246.5
335	238.19	14.89	-3515	1.049	-247.5
336	238.19	14.88	-3510	1.054	-248.5
337	238.09	14.85	-3502	1.058	-249.5
338	238.19	14.88	-3512	1.062	-250.4
339	238.12	14.87	-3506	1.066	-251.4
340	238.19	14.86	-3506	1.07	-252.4
341	238.14	14.86	-3502	1.074	-253.4
342	238.28	14.86	-3506	1.078	-254.3
343	238.2	14.87	-3507	1.083	-255.3
344	238.27	14.87	-3508	1.087	-256.3
345	238.16	14.9	-3516	1.091	-257.3
346	238.17	14.84	-3498	1.095	-258.2
347	238.14	14.87	-3507	1.099	-259.2
348	238.15	14.83	-3496	1.103	-260.1
349	238.24	14.89	-3515	1.107	-261.1
350	238.19	14.82	-3494	1.111	-262.1
351	238.19	14.88	-3510	1.115	-263.1
352	238.16	14.88	-3511	1.12	-264.1
353	238.23	14.82	-3496	1.124	-265
354	238.3	14.88	-3513	1.128	-266
355	238.23	14.83	-3496	1.132	-267
356	238.23	14.84	-3500	1.136	-268
357	238.24	14.93	-3518	1.14	-268.9
358	238.26	14.94	-3526	1.144	-269.9
359	238.22	14.91	-3513	1.149	-270.9
360	238.26	14.91	-3517	1.153	-271.9
361	238.25	14.92	-3518	1.157	-272.8
362	238.21	14.94	-3523	1.161	-273.8
363	238.19	14.92	-3519	1.165	-274.8
364	238.35	14.9	-3517	1.169	-275.8
365	238.26	14.88	-3511	1.173	-276.7
366	238.3	14.9	-3515	1.177	-277.7
367	238.19	14.94	-3528	1.182	-278.7
368	238.35	14.9	-3517	1.186	-279.7
369	238.31	14.89	-3515	1.19	-280.6
370	238.18	14.86	-3506	1.194	-281.6
371	238.18	14.9	-3514	1.198	-282.6
372	238.36	14.79	-3492	1.202	-283.6
373	238.24	14.91	-3517	1.206	-284.5
374	238.23	14.85	-3502	1.211	-285.5

375	238.22	14.89	-3515	1.215	-286.5
376	238.31	14.91	-3519	1.219	-287.5
377	238.22	14.89	-3515	1.223	-288.4
378	238.2	14.9	-3515	1.227	-289.4
379	238.16	14.87	-3507	1.231	-290.4
380	238.18	14.9	-3513	1.235	-291.4
381	238.17	14.84	-3500	1.24	-292.3
382	238.17	14.92	-3519	1.244	-293.3
383	238.16	14.83	-3493	1.248	-294.3
384	238.15	14.87	-3503	1.252	-295.3
385	238.19	14.81	-3489	1.256	-296.2
386	238.18	14.9	-3514	1.26	-297.2
387	238.15	14.9	-3512	1.264	-298.2
388	238.12	14.86	-3503	1.268	-299.2
389	238.23	14.88	-3508	1.273	-300.1
390	238.23	14.87	-3507	1.277	-301.1
391	238.21	14.85	-3502	1.281	-302.1
392	238.27	14.89	-3512	1.285	-303.1
393	238.16	14.86	-3504	1.289	-304
394	238.28	14.89	-3513	1.293	-305
395	238.24	14.9	-3514	1.297	-306
396	238.21	14.88	-3508	1.302	-307
397	238.23	14.86	-3505	1.306	-307.9
398	238.21	14.93	-3519	1.31	-308.9
399	238.23	14.89	-3513	1.314	-309.9
400	238.11	14.91	-3513	1.318	-310.9
401	238.15	14.9	-3515	1.322	-311.8
402	238.23	14.89	-3512	1.326	-312.8
403	238.18	14.85	-3502	1.331	-313.8
404	238.24	14.89	-3513	1.335	-314.8
405	238.14	14.93	-3520	1.339	-315.7
406	238.18	14.89	-3513	1.343	-316.7
407	238.19	14.89	-3511	1.347	-317.7
408	238.27	14.9	-3513	1.351	-318.7
409	238.13	14.88	-3507	1.355	-319.7
410	238.21	14.87	-3509	1.36	-320.6
411	238.23	14.87	-3507	1.364	-321.6
412	238.31	14.86	-3508	1.368	-322.6
413	238.2	14.88	-3508	1.372	-323.6
414	238.3	14.86	-3507	1.376	-324.5
415	238.18	14.89	-3509	1.38	-325.5
416	238.37	14.88	-3512	1.384	-326.5
417	238.16	14.87	-3507	1.388	-327.5
418	238.15	14.9	-3512	1.393	-328.4
419	238.23	14.92	-3518	1.397	-329.4
420	238.11	14.88	-3507	1.401	-330.4
421	238.34	14.87	-3508	1.405	-331.4

422	238.28	14.89	-3513	1.409	-332.3
423	238.2	14.91	-3517	1.413	-333.3
424	238.15	14.89	-3511	1.417	-334.3
425	238.21	14.88	-3510	1.422	-335.3
426	238.37	14.88	-3513	1.426	-336.2
427	238.2	14.89	-3513	1.43	-337.2
428	238.19	14.91	-3517	1.434	-338.2
429	238.13	14.92	-3519	1.438	-339.2
430	238.23	14.91	-3516	1.442	-340.1
431	238.3	14.89	-3514	1.446	-341.1
432	238.44	14.87	-3511	1.451	-342.1
433	238.42	14.88	-3513	1.455	-343.1
434	238.45	14.88	-3516	1.459	-344
435	238.38	14.89	-3517	1.463	-345
436	238.43	14.88	-3514	1.467	-346
437	238.41	14.85	-3506	1.471	-347
438	237.78	14.92	-3514	1.475	-347.9
439	238.33	14.87	-3510	1.479	-348.9
440	238.31	14.86	-3508	1.484	-349.9
441	238.27	14.9	-3516	1.488	-350.9
442	238.28	14.87	-3508	1.492	-351.8
443	238.21	14.87	-3508	1.496	-352.8
444	238.39	14.86	-3506	1.5	-353.8
445	238.18	14.92	-3519	1.504	-354.8
446	238.09	14.89	-3509	1.508	-355.8
447	238.12	14.92	-3518	1.513	-356.7
448	238.3	14.9	-3515	1.517	-357.7
449	238.26	14.88	-3512	1.521	-358.7
450	238.18	14.86	-3505	1.525	-359.7
451	238.39	14.86	-3509	1.529	-360.6
452	237.59	14.94	-3516	1.533	-361.6
453	238.24	14.87	-3511	1.537	-362.6
454	238.3	14.89	-3517	1.542	-363.6
455	237.52	14.93	-3512	1.546	-364.5
456	238.25	14.89	-3515	1.55	-365.5
457	238.15	14.87	-3508	1.554	-366.5
458	238.09	14.91	-3515	1.558	-367.5
459	238.16	14.89	-3512	1.562	-368.4
460	238.2	14.85	-3503	1.566	-369.4
461	238.1	14.92	-3519	1.57	-370.4
462	238.21	14.9	-3515	1.575	-371.4
463	238.08	14.89	-3511	1.579	-372.3
464	238.23	14.89	-3513	1.583	-373.3
465	238.18	14.88	-3511	1.587	-374.3
466	238.16	14.9	-3514	1.591	-375.3
467	238.21	14.87	-3511	1.595	-376.3
468	238.18	14.86	-3507	1.599	-377.2

469	238.27	14.93	-3523	1.604	-378.2
470	238.2	14.9	-3516	1.608	-379.2
471	238.16	14.91	-3516	1.612	-380.2
472	238.26	14.9	-3516	1.616	-381.1
473	238.28	14.88	-3509	1.62	-382.1
474	238.28	14.89	-3515	1.624	-383.1
475	238.11	14.88	-3508	1.628	-384.1
476	238.19	14.89	-3513	1.633	-385
477	238.12	14.89	-3511	1.637	-386
478	238.29	14.89	-3513	1.641	-387
479	238.23	14.92	-3519	1.645	-388
480	238.14	14.9	-3512	1.649	-388.9
481	238.13	14.92	-3517	1.653	-389.9
482	238.01	14.9	-3509	1.657	-390.9
483	238.33	14.89	-3511	1.662	-391.9
484	238.45	14.9	-3514	1.666	-392.9
485	238.4	14.89	-3512	1.67	-393.8
486	238.43	14.88	-3508	1.674	-394.8
487	238.35	14.91	-3517	1.678	-395.7
488	238.3	14.86	-3502	1.682	-396.7
489	238.39	14.93	-3523	1.686	-397.7
490	238.4	14.97	-3528	1.69	-398.7
491	238.41	14.91	-3516	1.695	-399.7
492	238.48	14.88	-3507	1.699	-400.6
493	238.47	14.88	-3509	1.703	-401.6
494	238.42	14.88	-3508	1.707	-402.6
495	238.43	14.87	-3505	1.711	-403.6
496	238.4	14.89	-3511	1.715	-404.5
497	238.39	14.89	-3510	1.719	-405.5
498	238.49	14.85	-3501	1.724	-406.5
499	238.3	14.83	-3493	1.728	-407.5
500	238.45	14.94	-3523	1.732	-408.4
501	238.45	14.93	-3520	1.736	-409.4
502	238.47	14.89	-3512	1.74	-410.4
503	238.46	14.91	-3515	1.744	-411.4
504	238.48	14.89	-3514	1.748	-412.3
505	238.44	14.88	-3507	1.753	-413.3
506	238.37	14.92	-3518	1.757	-414.3
507	238.52	14.92	-3519	1.761	-415.3
508	238.55	14.88	-3509	1.765	-416.3
509	238.57	14.9	-3514	1.769	-417.2
510	238.54	14.92	-3518	1.773	-418.2
511	238.53	14.9	-3515	1.777	-419.2
512	238.58	14.81	-3494	1.782	-420.2
513	238.5	14.87	-3510	1.786	-421.1
514	238.59	14.89	-3512	1.79	-422.1
515	238.55	14.95	-3528	1.794	-423.1

516	238.56	14.86	-3504	1.798	-424.1
517	238.55	14.94	-3526	1.802	-425
518	238.57	14.87	-3508	1.806	-426
519	238.54	14.86	-3506	1.81	-427
520	238.49	14.87	-3507	1.815	-428
521	238.5	14.88	-3509	1.819	-429
522	238.56	14.94	-3524	1.823	-429.9
523	238.55	14.88	-3508	1.827	-430.9
524	238.55	14.88	-3511	1.831	-431.9
525	238.56	14.94	-3523	1.835	-432.9
526	238.52	14.84	-3500	1.839	-433.8
527	238.62	14.88	-3509	1.844	-434.8
528	238.53	14.9	-3514	1.848	-435.8
529	238.52	14.91	-3517	1.852	-436.8
530	238.58	14.96	-3528	1.856	-437.7
531	238.7	14.91	-3519	1.86	-438.7
532	238.6	14.86	-3505	1.864	-439.7
533	238.63	14.9	-3516	1.868	-440.7
534	238.62	14.85	-3503	1.873	-441.7
535	238.67	14.9	-3517	1.877	-442.6
536	238.66	14.88	-3510	1.881	-443.6
537	238.71	14.89	-3517	1.885	-444.6
538	238.71	14.84	-3501	1.889	-445.6
539	238.73	14.9	-3519	1.893	-446.5
540	238.73	14.87	-3510	1.897	-447.5
541	238.65	14.88	-3512	1.902	-448.5
542	238.67	14.86	-3506	1.906	-449.5
543	238.61	14.91	-3518	1.91	-450.4
544	238.6	14.95	-3527	1.914	-451.4
545	238.59	14.9	-3515	1.918	-452.4
546	238.64	14.9	-3517	1.922	-453.4
547	238.68	14.86	-3508	1.926	-454.4
548	238.69	14.97	-3536	1.931	-455.3
549	238.65	14.89	-3514	1.935	-456.3
550	238.62	14.87	-3511	1.939	-457.3
551	238.62	14.94	-3525	1.943	-458.3
552	238.6	14.89	-3515	1.947	-459.2
553	238.52	14.88	-3509	1.951	-460.2
554	238.58	14.92	-3519	1.955	-461.2
555	238.6	14.89	-3515	1.96	-462.2
556	238.59	14.91	-3518	1.964	-463.2
557	238.56	14.89	-3517	1.968	-464.1
558	238.54	14.89	-3512	1.972	-465.1
559	238.56	14.89	-3514	1.976	-466.1
560	238.59	14.87	-3509	1.98	-467.1
561	238.54	14.88	-3511	1.984	-468
562	238.55	14.89	-3512	1.989	-469

563	238.55	14.91	-3516	1.993	-470
564	238.49	14.91	-3517	1.997	-471
565	238.53	14.88	-3511	2.001	-471.9
566	238.53	14.86	-3507	2.005	-472.9
567	238.53	14.89	-3513	2.009	-473.9
568	238.55	14.93	-3523	2.013	-474.9
569	238.58	14.92	-3523	2.018	-475.9
570	238.52	14.93	-3519	2.022	-476.8
571	238.5	14.89	-3513	2.026	-477.8
572	238.5	14.89	-3513	2.03	-478.8
573	238.45	14.99	-3534	2.034	-479.8
574	238.48	14.9	-3513	2.038	-480.7
575	238.48	14.89	-3512	2.042	-481.7
576	238.52	14.9	-3518	2.047	-482.7
577	238.53	14.95	-3527	2.051	-483.7
578	238.54	14.95	-3527	2.055	-484.7
579	238.58	14.96	-3528	2.059	-485.6
580	238.51	14.88	-3512	2.063	-486.6
581	238.54	14.88	-3510	2.067	-487.6
582	238.47	14.88	-3509	2.071	-488.6
583	238.46	14.88	-3513	2.076	-489.5
584	238.41	14.92	-3518	2.08	-490.5
585	238.42	14.93	-3523	2.084	-491.5
586	238.48	14.94	-3522	2.088	-492.5
587	238.48	14.91	-3516	2.092	-493.5
588	238.48	14.89	-3513	2.096	-494.4
589	238.54	14.91	-3517	2.1	-495.4
590	238.56	14.91	-3517	2.105	-496.4
591	238.55	14.93	-3524	2.109	-497.4
592	238.48	14.93	-3521	2.113	-498.4
593	238.55	14.94	-3524	2.117	-499.3
594	238.51	14.92	-3521	2.121	-500.3
595	238.56	14.89	-3513	2.125	-501.3
596	238.55	14.92	-3521	2.129	-502.3
597	238.51	14.91	-3518	2.134	-503.2
598	238.56	14.9	-3515	2.138	-504.2
599	238.52	14.9	-3515	2.142	-505.2
600	238.5	14.93	-3521	2.146	-506.2
601	238.53	14.92	-3520	2.15	-507.2
602	238.63	14.9	-3515	2.154	-508.1
603	238.48	14.93	-3522	2.158	-509.1
604	238.57	14.9	-3517	2.163	-510.1
605	238.5	14.91	-3518	2.167	-511.1
606	238.5	14.92	-3523	2.171	-512
607	238.47	14.91	-3516	2.175	-513
608	238.49	14.91	-3517	2.179	-514
609	238.46	14.93	-3520	2.183	-515

610	238.44	14.91	-3518	2.188	-516
611	238.39	14.94	-3523	2.192	-516.9
612	238.39	14.93	-3519	2.196	-517.9
613	238.44	14.94	-3524	2.2	-518.9
614	238.44	14.94	-3521	2.204	-519.9
615	238.47	14.91	-3517	2.208	-520.9
616	238.41	14.95	-3525	2.212	-521.8
617	238.53	14.89	-3513	2.217	-522.8
618	238.52	14.92	-3521	2.221	-523.8
619	238.56	14.9	-3515	2.225	-524.8
620	238.57	14.9	-3518	2.229	-525.7
621	238.55	14.94	-3526	2.233	-526.7
622	238.56	14.92	-3521	2.237	-527.7
623	238.65	14.91	-3521	2.241	-528.7
624	238.58	14.91	-3518	2.246	-529.7
625	238.49	14.88	-3512	2.25	-530.6
626	238.55	14.9	-3516	2.254	-531.6
627	238.46	14.9	-3516	2.258	-532.6
628	238.55	14.94	-3527	2.262	-533.5
629	238.54	14.92	-3522	2.266	-534.5
630	238.55	14.93	-3525	2.27	-535.5
631	238.57	14.92	-3520	2.274	-536.5
632	238.59	14.89	-3514	2.279	-537.5
633	238.46	14.93	-3523	2.283	-538.4
634	238.45	14.91	-3516	2.287	-539.4
635	238.48	14.94	-3524	2.291	-540.4
636	238.43	15	-3537	2.295	-541.4
637	238.4	14.94	-3525	2.299	-542.3
638	238.46	14.95	-3529	2.304	-543.3
639	238.55	14.92	-3520	2.308	-544.3
640	238.5	14.91	-3518	2.312	-545.3
641	238.53	14.99	-3537	2.316	-546.3
642	238.5	14.91	-3518	2.32	-547.2
643	238.49	14.93	-3521	2.324	-548.2
644	238.54	14.99	-3535	2.328	-549.2
645	238.54	14.93	-3525	2.333	-550.2
646	238.52	14.89	-3514	2.337	-551.2
647	238.52	14.94	-3525	2.341	-552.1
648	238.47	14.87	-3511	2.345	-553.1
649	238.46	14.98	-3534	2.349	-554.1
650	238.51	14.92	-3521	2.353	-555.1
651	238.49	14.95	-3529	2.357	-556
652	238.49	14.94	-3524	2.362	-557
653	238.51	14.96	-3531	2.366	-558
654	238.44	14.92	-3522	2.37	-559
655	238.39	14.95	-3525	2.374	-560
656	238.42	14.89	-3511	2.378	-560.9

657	238.5	14.95	-3528	2.382	-561.9
658	238.45	14.97	-3530	2.386	-562.9
659	238.51	14.94	-3526	2.391	-563.9
660	238.49	14.92	-3519	2.395	-564.9
661	238.56	14.97	-3533	2.399	-565.8
662	238.41	14.93	-3522	2.403	-566.8
663	238.49	14.93	-3522	2.407	-567.8
664	238.51	14.94	-3526	2.411	-568.8
665	238.65	14.92	-3523	2.416	-569.8
666	238.63	14.93	-3524	2.42	-570.7
667	238.65	14.91	-3520	2.424	-571.7
668	238.66	14.91	-3521	2.428	-572.7
669	238.36	14.97	-3533	2.432	-573.7
670	238.41	14.96	-3529	2.436	-574.6
671	238.42	14.94	-3523	2.44	-575.6
672	238.39	14.96	-3530	2.445	-576.6
673	238.42	14.94	-3525	2.449	-577.6
674	238.37	14.93	-3521	2.453	-578.6
675	238.26	14.95	-3523	2.457	-579.5
676	238.35	14.94	-3522	2.461	-580.5
677	238.43	14.92	-3521	2.465	-581.5
678	238.38	14.97	-3530	2.47	-582.5
679	238.3	14.92	-3518	2.474	-583.5
680	238.37	14.98	-3533	2.478	-584.4
681	238.35	14.94	-3523	2.482	-585.4
682	238.4	14.92	-3519	2.486	-586.4
683	238.8	14.93	-3528	2.49	-587.4
684	238.82	14.94	-3528	2.494	-588.4
685	238.68	14.94	-3526	2.499	-589.3
686	238.85	14.95	-3533	2.503	-590.3
687	238.81	14.89	-3517	2.507	-591.3
688	238.84	14.93	-3527	2.511	-592.3
689	238.8	14.91	-3522	2.515	-593.3
690	238.79	14.9	-3520	2.519	-594.2
691	238.75	14.9	-3518	2.523	-595.2
692	238.76	14.92	-3523	2.528	-596.2
693	238.73	14.91	-3522	2.532	-597.2
694	238.69	14.9	-3518	2.536	-598.1
695	238.65	14.98	-3538	2.54	-599.1
696	238.73	14.93	-3525	2.544	-600.1
697	238.63	14.94	-3527	2.548	-601.1
698	238.75	14.96	-3535	2.552	-602
699	238.7	14.91	-3518	2.556	-603
700	238.73	14.95	-3534	2.561	-604
701	238.59	14.98	-3536	2.565	-605
702	238.64	14.94	-3528	2.569	-606
703	238.7	14.98	-3540	2.573	-606.9

704	238.71	14.91	-3521	2.577	-607.9
705	238.81	14.93	-3529	2.581	-608.9
706	238.78	14.92	-3526	2.586	-609.9
707	238.85	14.9	-3520	2.59	-610.8
708	238.75	14.95	-3534	2.594	-611.8
709	238.57	14.96	-3531	2.598	-612.8
710	238.54	14.91	-3519	2.602	-613.8
711	238.53	14.93	-3525	2.606	-614.8
712	238.58	14.92	-3522	2.61	-615.7
713	238.45	14.97	-3529	2.615	-616.7
714	238.57	14.88	-3514	2.619	-617.7
715	238.55	14.94	-3525	2.623	-618.7
716	238.53	14.93	-3525	2.627	-619.7
717	238.59	14.96	-3534	2.631	-620.6
718	238.62	14.97	-3532	2.635	-621.6
719	238.65	14.98	-3537	2.639	-622.6
720	238.61	14.95	-3528	2.644	-623.6
721	238.63	14.92	-3522	2.648	-624.6
722	238.61	14.94	-3526	2.652	-625.5
723	238.58	14.93	-3523	2.656	-626.5
724	238.58	14.93	-3522	2.66	-627.5
725	238.61	14.95	-3528	2.664	-628.5
726	238.66	14.96	-3529	2.669	-629.5
727	238.69	14.94	-3527	2.673	-630.4
728	238.69	14.94	-3529	2.677	-631.4
729	238.61	14.93	-3523	2.681	-632.4
730	238.58	14.92	-3522	2.685	-633.4
731	238.55	14.94	-3524	2.689	-634.4
732	238.58	14.92	-3520	2.693	-635.3
733	238.53	14.95	-3529	2.698	-636.3
734	238.56	14.93	-3523	2.702	-637.3
735	238.52	14.93	-3522	2.706	-638.3
736	238.59	14.94	-3527	2.71	-639.3
737	238.51	14.88	-3509	2.714	-640.2
738	238.56	14.91	-3518	2.718	-641.2
739	238.66	14.94	-3527	2.722	-642.2
740	238.52	14.94	-3525	2.727	-643.2
741	238.34	14.96	-3527	2.731	-644.2
742	238.27	14.97	-3527	2.735	-645.1
743	238.33	14.98	-3531	2.739	-646.1
744	238.4	14.94	-3522	2.743	-647.1
745	238.65	14.94	-3527	2.747	-648.1
746	238.63	14.93	-3525	2.752	-649.1
747	238.58	14.96	-3530	2.756	-650
748	238.66	14.93	-3524	2.76	-651
749	238.57	14.93	-3523	2.764	-652
750	238.6	14.96	-3529	2.768	-653

751	238.57	14.91	-3519	2.772	-654
752	238.61	14.9	-3517	2.776	-654.9
753	238.65	14.95	-3529	2.781	-655.9
754	238.68	14.91	-3519	2.785	-656.9
755	238.65	14.95	-3529	2.789	-657.9
756	238.68	14.92	-3522	2.793	-658.8
757	238.59	14.95	-3527	2.797	-659.8
758	238.66	14.78	-3489	2.801	-660.8
759	238.65	14.94	-3526	2.805	-661.8
760	238.48	14.94	-3524	2.81	-662.8
761	238.55	14.93	-3523	2.814	-663.7
762	238.51	14.93	-3521	2.818	-664.7
763	238.42	14.79	-3490	2.822	-665.7
764	238.68	14.78	-3491	2.826	-666.7
765	238.65	14.92	-3521	2.83	-667.6
766	238.55	14.85	-3503	2.834	-668.6
767	238.53	14.94	-3523	2.839	-669.6
768	238.41	14.76	-3482	2.843	-670.6
769	238.54	14.96	-3529	2.847	-671.6
770	238.52	14.97	-3530	2.851	-672.5
771	238.55	14.92	-3520	2.855	-673.5
772	238.52	14.94	-3520	2.859	-674.5
773	238.49	14.94	-3527	2.863	-675.4
774	238.48	14.96	-3531	2.867	-676.4
775	238.42	14.97	-3532	2.872	-677.4
776	238.45	14.89	-3513	2.876	-678.4
777	238.47	14.94	-3523	2.88	-679.3
778	238.36	15.01	-3541	2.884	-680.3
779	238.38	14.78	-3486	2.888	-681.3
780	238.37	14.87	-3504	2.892	-682.3
781	238.34	14.9	-3514	2.896	-683.3
782	238.41	14.93	-3518	2.901	-684.2
783	238.45	14.67	-3459	2.905	-685.2
784	238.29	14.95	-3526	2.909	-686.2
785	238.41	14.97	-3533	2.913	-687.2
786	238.47	14.94	-3522	2.917	-688.1
787	238.47	14.92	-3521	2.921	-689.1
788	238.49	14.9	-3516	2.925	-690.1
789	238.5	14.85	-3502	2.93	-691.1
790	238.46	14.9	-3514	2.934	-692
791	238.46	14.95	-3528	2.938	-693
792	238.42	14.9	-3515	2.942	-694
793	238.6	14.99	-3535	2.946	-695
794	238.66	14.82	-3494	2.95	-695.9
795	238.49	14.84	-3502	2.954	-696.9
796	238.67	14.83	-3503	2.959	-697.9
797	238.39	14.82	-3491	2.963	-698.9

798	238.52	14.93	-3522	2.967	-699.8
799	238.6	15.03	-3549	2.971	-700.8
800	238.55	14.96	-3526	2.975	-701.8
801	238.61	14.92	-3521	2.979	-702.8
802	238.55	14.88	-3511	2.983	-703.7
803	238.54	14.92	-3520	2.987	-704.7
804	238.52	14.94	-3525	2.992	-705.7
805	238.51	14.97	-3534	2.996	-706.7
806	238.55	14.93	-3524	3	-707.7
807	238.6	14.96	-3531	3.004	-708.6
808	238.62	14.74	-3482	3.008	-709.6
809	238.57	14.93	-3527	3.012	-710.6
810	238.47	14.99	-3538	3.016	-711.6
811	238.57	14.96	-3531	3.021	-712.5
812	238.64	14.78	-3490	3.025	-713.5
813	238.57	14.96	-3530	3.029	-714.5
814	238.48	14.7	-3468	3.033	-715.5
815	238.32	14.92	-3514	3.037	-716.4
816	238.34	14.99	-3536	3.041	-717.4
817	238.19	14.77	-3483	3.045	-718.4
818	238.38	14.78	-3486	3.05	-719.4
819	238.38	14.96	-3530	3.054	-720.3
820	238.29	14.71	-3469	3.058	-721.3
821	238.23	15	-3537	3.062	-722.3
822	238.42	14.78	-3490	3.066	-723.3
823	238.4	14.91	-3517	3.07	-724.2
824	238.35	14.77	-3484	3.074	-725.2
825	238.32	14.85	-3502	3.078	-726.2
826	238.3	14.85	-3499	3.083	-727.2
827	238.46	14.82	-3497	3.087	-728.1
828	238.39	14.88	-3507	3.091	-729.1
829	238.22	14.75	-3477	3.095	-730.1
830	238.12	14.89	-3510	3.099	-731.1
831	238.41	14.82	-3495	3.103	-732
832	238.38	14.84	-3496	3.107	-733
833	238.42	14.78	-3484	3.111	-734
834	238.35	14.82	-3493	3.116	-734.9
835	238.43	14.79	-3487	3.12	-735.9
836	238.35	14.81	-3492	3.124	-736.9
837	238.33	14.82	-3495	3.128	-737.9
838	238.33	14.96	-3526	3.132	-738.9
839	238.28	14.82	-3493	3.136	-739.8
840	238.31	14.79	-3487	3.14	-740.8
841	238.25	14.77	-3482	3.145	-741.8
842	238.3	14.81	-3490	3.149	-742.7
843	238.25	14.8	-3489	3.153	-743.7
844	238.35	14.81	-3491	3.157	-744.7

845	238.32	14.78	-3486	3.161	-745.6
846	238.28	14.79	-3486	3.165	-746.6
847	238.33	14.8	-3488	3.169	-747.6
848	238.47	14.77	-3484	3.173	-748.6
849	238.4	14.81	-3492	3.177	-749.5
850	238.39	14.79	-3486	3.182	-750.5
851	238.44	14.79	-3489	3.186	-751.5
852	238.37	14.81	-3492	3.19	-752.4
853	238.39	14.81	-3494	3.194	-753.4
854	238.42	14.81	-3495	3.198	-754.4
855	238.38	14.81	-3494	3.202	-755.3
856	237.58	14.86	-3493	3.206	-756.3
857	237.8	14.84	-3492	3.21	-757.3
858	238.22	14.78	-3484	3.214	-758.2
859	238.3	14.8	-3489	3.219	-759.2
860	238.19	14.81	-3489	3.223	-760.2
861	238.12	14.8	-3485	3.227	-761.2
862	238.2	14.79	-3485	3.231	-762.1
863	238.22	14.79	-3487	3.235	-763.1
864	238.1	14.81	-3489	3.239	-764.1
865	238.15	14.81	-3489	3.243	-765
866	238.17	14.82	-3492	3.247	-766
867	238.12	14.81	-3488	3.251	-767
868	237.99	14.83	-3490	3.256	-767.9
869	238.14	14.83	-3495	3.26	-768.9
870	238.17	14.8	-3489	3.264	-769.9
871	238.13	14.82	-3492	3.268	-770.8
872	238.17	14.81	-3488	3.272	-771.8
873	238.15	14.81	-3491	3.276	-772.8
874	238.2	14.79	-3485	3.28	-773.8
875	238.17	14.81	-3491	3.284	-774.7
876	238.19	14.81	-3489	3.289	-775.7
877	238.16	14.82	-3490	3.293	-776.7
878	238.11	14.82	-3491	3.297	-777.6
879	238.2	14.81	-3490	3.301	-778.6
880	238.2	14.82	-3492	3.305	-779.6
881	238.19	14.8	-3487	3.309	-780.5
882	238.22	14.81	-3491	3.313	-781.5
883	238.15	14.82	-3491	3.317	-782.5
884	238.19	14.82	-3491	3.321	-783.4
885	238.11	14.82	-3491	3.326	-784.4
886	238.08	14.77	-3479	3.33	-785.4
887	238.09	14.82	-3492	3.334	-786.4
888	238.11	14.82	-3490	3.338	-787.3
889	238.11	14.76	-3477	3.342	-788.3
890	238.29	14.78	-3484	3.346	-789.3
891	238.17	14.85	-3498	3.35	-790.2

892	238.17	14.85	-3495	3.354	-791.2
893	238.24	14.81	-3490	3.358	-792.2
894	238.28	14.8	-3490	3.363	-793.1
895	238.38	14.81	-3493	3.367	-794.1
896	238.43	14.86	-3506	3.371	-795.1
897	238.31	14.8	-3487	3.375	-796
898	238.3	14.78	-3481	3.379	-797
899	238.29	14.78	-3484	3.383	-798
900	238.34	14.8	-3489	3.387	-799
901	238.16	14.81	-3489	3.391	-799.9
902	238.26	14.8	-3489	3.395	-800.9
903	238.3	14.83	-3495	3.4	-801.9
904	238.1	14.8	-3483	3.404	-802.8
905	238.13	14.83	-3490	3.408	-803.8
906	238.2	14.79	-3485	3.412	-804.8
907	238.39	14.83	-3495	3.416	-805.7
908	238.31	14.84	-3497	3.42	-806.7
909	238.3	14.86	-3501	3.424	-807.7
910	238.26	14.79	-3486	3.428	-808.7
911	238.31	14.85	-3500	3.433	-809.6
912	238.5	14.8	-3492	3.437	-810.6
913	238.25	14.84	-3498	3.441	-811.6
914	238.33	14.78	-3484	3.445	-812.5
915	238.34	14.81	-3491	3.449	-813.5
916	238.35	14.78	-3484	3.453	-814.5
917	238.39	14.8	-3489	3.457	-815.4
918	238.43	14.83	-3498	3.461	-816.4
919	238.35	14.85	-3503	3.465	-817.4
920	238.34	14.84	-3499	3.47	-818.3
921	238.26	14.82	-3491	3.474	-819.3
922	238.32	14.82	-3491	3.478	-820.3
923	238.33	14.8	-3488	3.482	-821.3
924	238.38	14.75	-3480	3.486	-822.2
925	238.35	14.82	-3494	3.49	-823.2
926	238.35	14.82	-3495	3.494	-824.2
927	238.44	14.82	-3494	3.498	-825.2
928	238.41	14.82	-3496	3.503	-826.1
929	238.27	14.82	-3490	3.507	-827.1
930	238.31	14.8	-3489	3.511	-828.1
931	238.42	14.77	-3484	3.515	-829
932	238.37	14.82	-3496	3.519	-830
933	238.45	14.79	-3489	3.523	-831
934	238.39	14.84	-3499	3.527	-832
935	238.4	14.82	-3494	3.531	-832.9
936	238.33	14.81	-3491	3.535	-833.9
937	238.47	14.82	-3494	3.54	-834.9
938	238.46	14.8	-3491	3.544	-835.8

939	238.52	14.82	-3495	3.548	-836.8
940	238.39	14.8	-3490	3.552	-837.8
941	238.36	14.81	-3491	3.556	-838.7
942	238.41	14.82	-3494	3.56	-839.7
943	238.34	14.8	-3489	3.564	-840.7
944	238.34	14.79	-3487	3.568	-841.7
945	238.39	14.81	-3493	3.572	-842.6
946	236.67	14.91	-3491	3.577	-843.6
947	237.94	14.86	-3497	3.581	-844.6
948	238.01	14.84	-3495	3.585	-845.5
949	237.83	14.85	-3492	3.589	-846.5
950	237.88	14.85	-3496	3.593	-847.5
951	237.92	14.84	-3493	3.597	-848.4
952	237.92	14.86	-3499	3.601	-849.4
953	237.82	14.85	-3491	3.605	-850.4
954	237.84	14.84	-3492	3.61	-851.4
955	237.94	14.86	-3497	3.614	-852.3
956	237.98	14.84	-3493	3.618	-853.3
957	237.88	14.85	-3494	3.622	-854.3
958	237.96	14.86	-3498	3.626	-855.2
959	237.87	14.85	-3494	3.63	-856.2
960	238.02	14.83	-3491	3.634	-857.2
961	238.02	14.84	-3493	3.638	-858.1
962	237.97	14.83	-3492	3.643	-859.1
963	238.02	14.85	-3497	3.647	-860.1
964	237.98	14.83	-3492	3.651	-861.1
965	237.86	14.87	-3497	3.655	-862
966	237.93	14.82	-3489	3.659	-863
967	237.91	14.87	-3499	3.663	-864
968	237.98	14.83	-3491	3.667	-864.9
969	237.96	14.84	-3493	3.671	-865.9
970	237.83	14.84	-3492	3.676	-866.9
971	237.93	14.84	-3495	3.68	-867.8
972	237.82	14.88	-3501	3.684	-868.8
973	237.85	14.85	-3494	3.688	-869.8
974	237.92	14.82	-3488	3.692	-870.8
975	237.94	14.85	-3494	3.696	-871.7
976	237.96	14.84	-3493	3.7	-872.7
977	237.96	14.82	-3488	3.704	-873.7
978	238.39	14.82	-3496	3.709	-874.6
979	238.38	14.8	-3490	3.713	-875.6
980	238.14	14.82	-3493	3.717	-876.6
981	238.26	14.84	-3496	3.721	-877.6
982	238.21	14.83	-3496	3.725	-878.5
983	238.03	14.84	-3494	3.729	-879.5
984	238.2	14.82	-3491	3.733	-880.5
985	238.02	14.84	-3495	3.737	-881.4

986	238.02	14.85	-3498	3.742	-882.4
987	238.11	14.85	-3499	3.746	-883.4
988	238.14	14.84	-3495	3.75	-884.3
989	238.1	14.8	-3486	3.754	-885.3
990	238.14	14.85	-3497	3.758	-886.3
991	238.13	14.81	-3490	3.762	-887.3
992	238.19	14.83	-3493	3.766	-888.2
993	238.14	14.82	-3492	3.77	-889.2
994	238.11	14.81	-3488	3.774	-890.2
995	238.21	14.84	-3497	3.779	-891.1
996	238.17	14.82	-3491	3.783	-892.1
997	238.16	14.81	-3490	3.787	-893.1
998	238.11	14.85	-3497	3.791	-894
999	238.19	14.83	-3493	3.795	-895
1000	238.11	14.83	-3494	3.799	-896
1001	238.1	14.85	-3499	3.803	-897
1002	238.09	14.85	-3500	3.807	-897.9
1003	237.95	14.89	-3506	3.812	-898.9
1004	238.07	14.86	-3500	3.816	-899.9
1005	238.11	14.83	-3493	3.82	-900.8
1006	238.05	14.85	-3498	3.824	-901.8
1007	238.08	14.84	-3494	3.828	-902.8
1008	238.1	14.82	-3490	3.832	-903.8
1009	238.22	14.86	-3500	3.836	-904.7
1010	238.11	14.84	-3496	3.84	-905.7
1011	238.08	14.81	-3488	3.845	-906.7
1012	238.01	14.81	-3487	3.849	-907.6
1013	238.12	14.82	-3493	3.853	-908.6
1014	237.98	14.84	-3496	3.857	-909.6
1015	238.1	14.88	-3505	3.861	-910.6
1016	237.95	14.84	-3494	3.865	-911.5
1017	238.02	14.87	-3500	3.869	-912.5
1018	238.08	14.86	-3500	3.873	-913.5
1019	238.13	14.89	-3507	3.877	-914.4
1020	238.06	14.86	-3498	3.882	-915.4
1021	237.93	14.88	-3503	3.886	-916.4
1022	237.93	14.83	-3490	3.89	-917.3
1023	238.04	14.82	-3490	3.894	-918.3
1024	238.11	14.81	-3488	3.898	-919.3
1025	238.04	14.87	-3501	3.902	-920.3
1026	238.17	14.88	-3506	3.906	-921.2
1027	238.16	14.84	-3496	3.91	-922.2
1028	238.19	14.85	-3498	3.915	-923.2
1029	238.02	14.84	-3493	3.919	-924.1
1030	238.08	14.83	-3493	3.923	-925.1
1031	238.13	14.83	-3493	3.927	-926.1
1032	238.05	14.87	-3502	3.931	-927.1

1033	238.06	14.86	-3500	3.935	-928
1034	238.08	14.89	-3507	3.939	-929
1035	238.12	14.81	-3487	3.943	-930
1036	238.06	14.81	-3486	3.948	-930.9
1037	238.18	14.88	-3503	3.952	-931.9
1038	238.13	14.84	-3494	3.956	-932.9
1039	238.08	14.84	-3492	3.96	-933.9
1040	238.16	14.81	-3487	3.964	-934.8
1041	238.12	14.83	-3494	3.968	-935.8
1042	238.01	14.87	-3502	3.972	-936.8
1043	238.11	14.91	-3513	3.976	-937.7
1044	238.14	14.82	-3495	3.981	-938.7
1045	238.05	14.88	-3502	3.985	-939.7
1046	238.14	14.84	-3496	3.989	-940.6
1047	238.05	14.84	-3495	3.993	-941.6
1048	238	14.89	-3504	3.997	-942.6
1049	238.07	14.81	-3485	4.001	-943.6
1050	237.98	14.83	-3490	4.005	-944.5
1051	238.15	14.81	-3489	4.009	-945.5
1052	238.15	14.83	-3495	4.014	-946.5
1053	238.08	14.84	-3494	4.018	-947.4
1054	238.1	14.89	-3506	4.022	-948.4
1055	238.14	14.82	-3490	4.026	-949.4
1056	238.12	14.94	-3518	4.03	-950.4
1057	238.25	14.84	-3496	4.034	-951.3
1058	238.28	14.88	-3507	4.038	-952.3
1059	238.21	14.84	-3494	4.042	-953.3
1060	238.2	14.83	-3496	4.047	-954.2
1061	238.3	14.84	-3498	4.051	-955.2
1062	238.3	14.85	-3503	4.055	-956.2
1063	238.19	14.86	-3502	4.059	-957.2
1064	238.34	14.85	-3502	4.063	-958.1
1065	238.34	14.89	-3513	4.067	-959.1
1066	238.37	14.79	-3486	4.071	-960.1
1067	238.38	14.79	-3486	4.075	-961
1068	238.4	14.85	-3502	4.08	-962
1069	238.42	14.8	-3491	4.084	-963
1070	238.35	14.87	-3507	4.088	-964
1071	238.41	14.83	-3497	4.092	-964.9
1072	238.3	14.8	-3486	4.096	-965.9
1073	238.43	14.83	-3496	4.1	-966.9
1074	238.36	14.85	-3500	4.104	-967.8
1075	238.38	14.84	-3499	4.108	-968.8
1076	238.47	14.79	-3486	4.112	-969.8
1077	238.42	14.77	-3481	4.117	-970.8
1078	238.33	14.83	-3493	4.121	-971.7
1079	238.45	14.83	-3497	4.125	-972.7

1080	238.38	14.85	-3502	4.129	-973.7
1081	238.28	14.84	-3497	4.133	-974.6
1082	238.26	14.85	-3500	4.137	-975.6
1083	238.3	14.86	-3505	4.141	-976.6
1084	238.39	14.92	-3518	4.145	-977.6
1085	238.35	14.82	-3495	4.15	-978.5
1086	238.18	14.84	-3497	4.154	-979.5
1087	238.26	14.82	-3494	4.158	-980.5
1088	238.28	14.78	-3483	4.162	-981.4
1089	238.3	14.83	-3495	4.166	-982.4
1090	238.3	14.84	-3495	4.17	-983.4
1091	238.18	14.83	-3493	4.174	-984.4
1092	238.1	14.79	-3483	4.178	-985.3
1093	238.37	14.8	-3489	4.183	-986.3
1094	238.34	14.9	-3510	4.187	-987.3
1095	238.4	14.83	-3498	4.191	-988.2
1096	238.28	14.84	-3496	4.195	-989.2
1097	238.22	14.94	-3518	4.199	-990.2
1098	238.28	14.86	-3501	4.203	-991.2
1099	238.21	14.8	-3485	4.207	-992.1
1100	238.23	14.89	-3506	4.211	-993.1
1101	238.26	14.82	-3490	4.215	-994.1
1102	238.31	14.87	-3504	4.22	-995
1103	238.2	14.87	-3503	4.224	-996
1104	238.11	14.79	-3483	4.228	-997
1105	238.11	14.85	-3499	4.232	-998
1106	238.13	14.82	-3493	4.236	-998.9
1107	238.19	14.91	-3514	4.24	-999.9
1108	238.17	14.83	-3495	4.244	-1000.9
1109	238.16	14.86	-3502	4.248	-1001.8
1110	238.2	14.83	-3493	4.253	-1002.8
1111	238.23	14.86	-3500	4.257	-1003.8
1112	238.3	14.84	-3497	4.261	-1004.8
1113	238.24	14.85	-3500	4.265	-1005.7
1114	238.21	14.82	-3489	4.269	-1006.7
1115	238.22	14.85	-3499	4.273	-1007.7
1116	238.25	14.81	-3489	4.277	-1008.6
1117	237.61	14.94	-3512	4.281	-1009.6
1118	237.76	14.88	-3501	4.286	-1010.6
1119	238.09	14.91	-3513	4.29	-1011.6
1120	238.26	14.83	-3497	4.294	-1012.5
1121	238.18	14.84	-3497	4.298	-1013.5
1122	238.21	14.85	-3501	4.302	-1014.5
1123	238.23	14.81	-3493	4.306	-1015.4
1124	238.15	14.83	-3495	4.31	-1016.4
1125	238.16	14.87	-3503	4.314	-1017.4
1126	238.18	14.9	-3512	4.319	-1018.4

1127	238.17	14.8	-3486	4.323	-1019.3
1128	238.17	14.82	-3492	4.327	-1020.3
1129	238.13	14.88	-3507	4.331	-1021.3
1130	238.07	14.95	-3520	4.335	-1022.2
1131	238.06	14.85	-3496	4.339	-1023.2
1132	238.07	14.86	-3501	4.343	-1024.2
1133	238.14	14.87	-3502	4.347	-1025.2
1134	238.09	14.82	-3491	4.352	-1026.1
1135	238.02	14.87	-3501	4.356	-1027.1
1136	238.06	14.85	-3497	4.36	-1028.1
1137	238.11	14.81	-3488	4.364	-1029.1
1138	238.08	14.8	-3486	4.368	-1030
1139	238.09	14.85	-3497	4.372	-1031
1140	238.12	14.83	-3492	4.376	-1032
1141	238.11	14.83	-3493	4.381	-1032.9
1142	238.12	14.86	-3501	4.385	-1033.9
1143	238.09	14.86	-3501	4.389	-1034.9
1144	238.09	14.91	-3512	4.393	-1035.9
1145	238.16	14.96	-3526	4.397	-1036.8
1146	238.12	14.95	-3525	4.401	-1037.8
1147	238.14	14.9	-3511	4.405	-1038.8
1148	238.1	14.95	-3523	4.409	-1039.7
1149	238.05	14.94	-3519	4.414	-1040.7
1150	238.19	14.92	-3515	4.418	-1041.7
1151	238.03	14.87	-3501	4.422	-1042.7
1152	238	14.87	-3502	4.426	-1043.6
1153	237.99	14.82	-3489	4.43	-1044.6
1154	237.98	14.86	-3497	4.434	-1045.6
1155	238	14.8	-3484	4.438	-1046.6
1156	238.07	14.84	-3492	4.442	-1047.5
1157	238.11	14.89	-3507	4.447	-1048.5
1158	237.92	14.84	-3491	4.451	-1049.5
1159	237.99	14.86	-3498	4.455	-1050.4
1160	237.88	14.83	-3490	4.459	-1051.4
1161	238.01	14.84	-3495	4.463	-1052.4
1162	238.07	14.88	-3506	4.467	-1053.4
1163	237.96	14.86	-3499	4.471	-1054.3
1164	238.06	14.85	-3500	4.475	-1055.3
1165	237.99	14.92	-3515	4.48	-1056.3
1166	238.02	14.87	-3506	4.484	-1057.2
1167	237.97	14.86	-3500	4.488	-1058.2
1168	238.06	14.91	-3511	4.492	-1059.2
1169	238.06	14.84	-3495	4.496	-1060.2
1170	238.04	14.86	-3498	4.5	-1061.1
1171	238.13	14.88	-3506	4.504	-1062.1
1172	238.11	14.85	-3499	4.508	-1063.1
1173	238.12	14.86	-3499	4.513	-1064.1

1174	238.07	14.85	-3495	4.517	-1065
1175	238.03	14.9	-3509	4.521	-1066
1176	238.13	14.86	-3500	4.525	-1067
1177	238.13	14.87	-3504	4.529	-1067.9
1178	238.22	14.87	-3500	4.533	-1068.9
1179	238.1	14.94	-3518	4.537	-1069.9
1180	238.18	14.83	-3494	4.542	-1070.9
1181	238.07	14.89	-3508	4.546	-1071.8
1182	238.27	14.84	-3496	4.55	-1072.8
1183	238.3	14.82	-3493	4.554	-1073.8
1184	238.14	14.84	-3497	4.558	-1074.8
1185	238.28	14.79	-3484	4.562	-1075.7
1186	238.4	14.8	-3491	4.566	-1076.7
1187	238.27	14.88	-3508	4.57	-1077.7
1188	238.27	14.82	-3490	4.575	-1078.6
1189	238.35	14.84	-3497	4.579	-1079.6
1190	238.31	14.85	-3499	4.583	-1080.6
1191	238.27	14.85	-3498	4.587	-1081.6
1192	238.27	14.88	-3507	4.591	-1082.5
1193	238.24	14.75	-3475	4.595	-1083.5
1194	238.3	14.87	-3505	4.599	-1084.5
1195	238.44	14.84	-3499	4.603	-1085.5
1196	238.37	14.85	-3501	4.608	-1086.4
1197	238.27	14.86	-3504	4.612	-1087.4
1198	238.39	14.84	-3499	4.616	-1088.4
1199	238.36	14.92	-3517	4.62	-1089.3
1200	238.27	14.91	-3516	4.624	-1090.3
1201	238.31	14.88	-3507	4.628	-1091.3
1202	238.2	14.9	-3512	4.632	-1092.3
1203	238.38	14.88	-3509	4.636	-1093.2
1204	238.43	14.88	-3510	4.641	-1094.2
1205	238.39	14.88	-3509	4.645	-1095.2
1206	238.37	14.92	-3515	4.649	-1096.1
1207	238.36	14.88	-3506	4.653	-1097.1
1208	238.46	14.83	-3494	4.657	-1098.1
1209	238.46	14.82	-3496	4.661	-1099.1
1210	238.54	14.79	-3488	4.665	-1100
1211	238.44	14.83	-3497	4.669	-1101
1212	238.45	14.82	-3495	4.674	-1102
1213	238.29	14.82	-3491	4.678	-1103
1214	238.5	14.86	-3506	4.682	-1103.9
1215	238.4	14.89	-3510	4.686	-1104.9
1216	238.36	14.84	-3499	4.69	-1105.9
1217	238.45	14.85	-3502	4.694	-1106.8
1218	238.39	14.81	-3492	4.698	-1107.8
1219	238.36	14.89	-3512	4.702	-1108.8
1220	238.34	14.84	-3501	4.707	-1109.8

1221	238.39	14.84	-3500	4.711	-1110.7
1222	238.45	14.85	-3505	4.715	-1111.7
1223	238.48	14.88	-3511	4.719	-1112.7
1224	238.43	14.87	-3509	4.723	-1113.7
1225	238.41	14.84	-3504	4.727	-1114.6
1226	238.47	14.86	-3508	4.731	-1115.6
1227	238.39	14.89	-3510	4.735	-1116.6
1228	238.41	14.9	-3515	4.74	-1117.5
1229	238.26	14.89	-3512	4.744	-1118.5
1230	238.38	14.9	-3515	4.748	-1119.5
1231	238.39	14.84	-3499	4.752	-1120.5
1232	238.39	14.85	-3501	4.756	-1121.4
1233	238.37	14.85	-3498	4.76	-1122.4
1234	238.3	14.9	-3510	4.764	-1123.4
1235	238.33	14.83	-3496	4.768	-1124.4
1236	238.26	14.88	-3505	4.773	-1125.3
1237	238.32	14.8	-3490	4.777	-1126.3
1238	238.31	14.84	-3498	4.781	-1127.3
1239	238.31	14.79	-3484	4.785	-1128.2
1240	238.2	14.86	-3501	4.789	-1129.2
1241	238.22	14.85	-3498	4.793	-1130.2
1242	238.31	14.88	-3508	4.797	-1131.2
1243	238.31	14.88	-3507	4.801	-1132.1
1244	238.32	14.83	-3496	4.806	-1133.1
1245	238.29	14.87	-3508	4.81	-1134.1
1246	238.33	14.86	-3503	4.814	-1135.1
1247	238.22	14.88	-3506	4.818	-1136
1248	238.31	14.8	-3487	4.822	-1137
1249	238.39	14.85	-3502	4.826	-1138
1250	238.27	14.82	-3494	4.83	-1138.9
1251	238.23	14.89	-3510	4.834	-1139.9
1252	238.32	14.85	-3501	4.839	-1140.9
1253	238.33	14.82	-3493	4.843	-1141.9
1254	238.25	14.89	-3509	4.847	-1142.8
1255	238.17	14.88	-3503	4.851	-1143.8
1256	238.38	14.86	-3503	4.855	-1144.8
1257	238.19	14.9	-3508	4.859	-1145.8
1258	238.28	14.87	-3504	4.863	-1146.7
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1260	238.24	14.83	-3493	4.872	-1148.7
1261	238.33	14.79	-3484	4.876	-1149.7
1262	238.35	14.83	-3495	4.88	-1150.6
1263	237.53	14.89	-3498	4.884	-1151.6
1264	238.25	14.82	-3492	4.888	-1152.6
1265	238.17	14.86	-3499	4.892	-1153.5
1266	238.18	14.82	-3492	4.896	-1154.5
1267	238.2	14.88	-3505	4.901	-1155.5

1268	238.26	14.83	-3495	4.905	-1156.5
1269	238.33	14.83	-3499	4.909	-1157.4
1270	238.17	14.92	-3516	4.913	-1158.4
1271	238	14.91	-3509	4.917	-1159.4
1272	238.24	14.81	-3490	4.921	-1160.4
1273	238.21	14.87	-3504	4.925	-1161.3
1274	238.19	14.88	-3506	4.929	-1162.3
1275	238.15	14.88	-3503	4.934	-1163.3
1276	238.18	14.87	-3504	4.938	-1164.2
1277	238.14	14.86	-3501	4.942	-1165.2
1278	238.16	14.85	-3500	4.946	-1166.2
1279	238.22	14.87	-3507	4.95	-1167.2
1280	238.17	14.87	-3502	4.954	-1168.1
1281	238.19	14.89	-3510	4.958	-1169.1
1282	238.16	14.92	-3520	4.962	-1170.1
1283	238.04	14.89	-3509	4.967	-1171.1
1284	238.17	14.84	-3496	4.971	-1172
1285	238.12	14.87	-3503	4.975	-1173
1286	238.02	14.87	-3502	4.979	-1174
1287	238.21	14.89	-3509	4.983	-1175
1288	238.04	14.84	-3493	4.987	-1175.9
1289	238.14	14.93	-3517	4.991	-1176.9
1290	238.03	14.91	-3510	4.996	-1177.9
1291	238.1	14.86	-3500	5	-1178.8
1292	238.38	14.94	-3525	5.004	-1179.8
1293	238.34	14.88	-3510	5.008	-1180.8
1294	238.44	14.9	-3515	5.012	-1181.8
1295	238.25	14.85	-3503	5.016	-1182.7
1296	238.34	14.82	-3496	5.02	-1183.7
1297	238.31	14.85	-3501	5.024	-1184.7
1298	238.35	14.8	-3489	5.029	-1185.7
1299	238.47	14.83	-3499	5.033	-1186.6
1300	238.44	14.82	-3492	5.037	-1187.6
1301	238.36	14.89	-3512	5.041	-1188.6
1302	238.39	14.85	-3503	5.045	-1189.6
1303	238.43	14.85	-3502	5.049	-1190.5
1304	238.41	14.86	-3503	5.053	-1191.5
1305	238.39	14.82	-3493	5.057	-1192.5
1306	238.4	14.83	-3498	5.062	-1193.4
1307	238.48	14.88	-3509	5.066	-1194.4
1308	238.42	14.83	-3500	5.07	-1195.4
1309	238.51	14.82	-3498	5.074	-1196.4
1310	238.5	14.9	-3514	5.078	-1197.3
1311	238.47	14.84	-3500	5.082	-1198.3
1312	238.48	14.91	-3520	5.086	-1199.3
1313	238.49	14.88	-3512	5.09	-1200.3
1314	238.35	14.9	-3513	5.095	-1201.2

1315	238.49	14.83	-3498	5.099	-1202.2
1316	238.47	14.79	-3490	5.103	-1203.2
1317	238.39	14.86	-3504	5.107	-1204.1
1318	238.44	14.79	-3486	5.111	-1205.1
1319	238.44	14.89	-3510	5.115	-1206.1
1320	238.45	14.84	-3497	5.119	-1207.1
1321	238.49	14.85	-3502	5.123	-1208
1322	238.51	14.83	-3497	5.128	-1209
1323	238.45	14.88	-3505	5.132	-1210
1324	238.52	14.83	-3495	5.136	-1211
1325	238.41	14.85	-3502	5.14	-1211.9
1326	238.4	14.85	-3502	5.144	-1212.9
1327	238.42	14.85	-3502	5.148	-1213.9
1328	238.4	14.92	-3518	5.152	-1214.9
1329	238.45	14.88	-3510	5.157	-1215.8
1330	238.36	14.84	-3500	5.161	-1216.8
1331	238.33	14.84	-3497	5.165	-1217.8
1332	238.42	14.86	-3504	5.169	-1218.7
1333	238.46	14.9	-3517	5.173	-1219.7
1334	238.34	14.89	-3512	5.177	-1220.7
1335	238.43	14.88	-3508	5.181	-1221.7
1336	238.4	14.9	-3514	5.186	-1222.7
1337	238.37	14.86	-3503	5.19	-1223.6
1338	238.44	14.88	-3510	5.194	-1224.6
1339	238.4	14.84	-3498	5.198	-1225.6
1340	238.33	14.87	-3505	5.202	-1226.6
1341	238.28	14.88	-3506	5.206	-1227.5
1342	238.37	14.88	-3509	5.21	-1228.5
1343	238.39	14.86	-3504	5.214	-1229.5
1344	238.37	14.84	-3499	5.219	-1230.5
1345	238.43	14.85	-3502	5.223	-1231.4
1346	238.37	14.88	-3507	5.227	-1232.4
1347	238.4	14.89	-3509	5.231	-1233.4
1348	238.38	14.83	-3496	5.235	-1234.4
1349	238.44	14.85	-3503	5.239	-1235.3
1350	238.41	14.88	-3508	5.243	-1236.3
1351	238.42	14.86	-3505	5.247	-1237.3
1352	238.39	14.86	-3503	5.252	-1238.3
1353	238.32	14.88	-3506	5.256	-1239.2
1354	238.33	14.88	-3507	5.26	-1240.2
1355	238.32	14.86	-3501	5.264	-1241.2
1356	238.33	14.89	-3510	5.268	-1242.1
1357	238.28	14.86	-3503	5.272	-1243.1
1358	238.3	14.84	-3500	5.276	-1244.1
1359	238.26	14.89	-3510	5.281	-1245.1
1360	238.26	14.86	-3503	5.285	-1246
1361	238.28	14.86	-3503	5.289	-1247

1362	238.25	14.91	-3514	5.293	-1248
1363	238.23	14.89	-3509	5.297	-1249
1364	238.31	14.92	-3517	5.301	-1249.9
1365	238.36	14.84	-3500	5.305	-1250.9
1366	238.4	14.9	-3513	5.309	-1251.9
1367	238.29	14.86	-3503	5.314	-1252.9
1368	238.28	14.89	-3509	5.318	-1253.8
1369	238.31	14.87	-3506	5.322	-1254.8
1370	238.29	14.9	-3512	5.326	-1255.8
1371	238.25	14.84	-3498	5.33	-1256.8
1372	238.3	14.9	-3513	5.334	-1257.7
1373	238.35	14.83	-3496	5.338	-1258.7
1374	238.27	14.9	-3513	5.343	-1259.7
1375	238.33	14.87	-3504	5.347	-1260.7
1376	238.33	14.88	-3508	5.351	-1261.6
1377	238.32	14.89	-3509	5.355	-1262.6
1378	238.24	14.88	-3505	5.359	-1263.6
1379	238.26	14.86	-3502	5.363	-1264.6
1380	238.33	14.88	-3506	5.367	-1265.5
1381	238.38	14.89	-3510	5.371	-1266.5
1382	238.2	14.85	-3498	5.375	-1267.4
1383	238.22	14.82	-3494	5.38	-1268.4
1384	238.31	14.89	-3509	5.384	-1269.4
1385	238.28	14.92	-3516	5.388	-1270.4
1386	238.31	14.87	-3506	5.392	-1271.3
1387	238.3	14.9	-3511	5.396	-1272.3
1388	238.26	14.89	-3508	5.4	-1273.3
1389	238.29	14.83	-3496	5.404	-1274.3
1390	238.33	14.95	-3523	5.409	-1275.2
1391	238.25	14.91	-3512	5.413	-1276.2
1392	238.2	14.91	-3515	5.417	-1277.2
1393	238.33	14.87	-3507	5.421	-1278.2
1394	238.33	14.92	-3518	5.425	-1279.1
1395	238.32	14.9	-3516	5.429	-1280.1
1396	238.35	14.85	-3503	5.433	-1281.1
1397	238.31	14.88	-3510	5.437	-1282.1
1398	238.37	14.82	-3493	5.442	-1283
1399	238.25	14.87	-3505	5.446	-1284
1400	238.31	14.92	-3518	5.45	-1285
1401	238.31	14.86	-3504	5.454	-1286
1402	238.32	14.85	-3499	5.458	-1286.9
1403	238.27	14.87	-3502	5.462	-1287.9
1404	238.22	14.81	-3489	5.466	-1288.9
1405	238.26	14.83	-3493	5.471	-1289.9
1406	238.28	14.86	-3501	5.475	-1290.8
1407	238.28	14.86	-3501	5.479	-1291.8
1408	238.37	14.88	-3508	5.483	-1292.8

1409	238.25	14.87	-3503	5.487	-1293.8
1410	238.27	14.87	-3503	5.491	-1294.7
1411	238.26	14.88	-3507	5.495	-1295.7
1412	238.25	14.92	-3517	5.499	-1296.7
1413	238.31	14.94	-3523	5.504	-1297.7
1414	238.33	14.93	-3524	5.508	-1298.6
1415	238.45	14.81	-3496	5.512	-1299.6
1416	238.44	14.88	-3509	5.516	-1300.6
1417	238.49	14.79	-3490	5.52	-1301.5
1418	238.46	14.86	-3506	5.524	-1302.5
1419	238.45	14.94	-3524	5.528	-1303.5
1420	238.43	14.81	-3492	5.533	-1304.5
1421	238.47	14.85	-3503	5.537	-1305.4
1422	238.45	14.87	-3505	5.541	-1306.4
1423	238.3	14.92	-3512	5.545	-1307.4
1424	238.52	14.85	-3500	5.549	-1308.4
1425	238.52	14.8	-3489	5.553	-1309.3
1426	238.52	14.88	-3508	5.557	-1310.3
1427	238.46	14.86	-3502	5.561	-1311.3
1428	238.47	14.86	-3503	5.566	-1312.3
1429	238.55	14.88	-3509	5.57	-1313.2
1430	238.42	14.84	-3499	5.574	-1314.2
1431	238.48	14.85	-3501	5.578	-1315.2
1432	238.57	14.93	-3523	5.582	-1316.2
1433	238.53	14.89	-3514	5.586	-1317.1
1434	238.55	14.87	-3510	5.59	-1318.1
1435	238.56	14.9	-3515	5.595	-1319.1
1436	238.37	14.91	-3516	5.599	-1320.1
1437	238.43	14.87	-3505	5.603	-1321
1438	238.47	14.87	-3506	5.607	-1322
1439	238.71	14.83	-3503	5.611	-1323
1440	238.69	14.89	-3516	5.615	-1324
1441	238.53	14.82	-3496	5.619	-1324.9
1442	238.64	14.85	-3505	5.623	-1325.9
1443	238.62	14.83	-3499	5.628	-1326.9
1444	238.6	14.83	-3500	5.632	-1327.9
1445	238.42	14.9	-3513	5.636	-1328.8
1446	238.51	14.92	-3520	5.64	-1329.8
1447	238.54	14.84	-3499	5.644	-1330.8
1448	238.48	14.82	-3495	5.648	-1331.8
1449	238.5	14.9	-3515	5.652	-1332.7
1450	238.45	14.95	-3525	5.656	-1333.7
1451	238.6	14.88	-3514	5.661	-1334.7
1452	238.56	14.91	-3518	5.665	-1335.7
1453	238.53	14.9	-3516	5.669	-1336.6
1454	238.59	14.83	-3499	5.673	-1337.6
1455	238.56	14.88	-3511	5.677	-1338.6

1456	238.51	14.84	-3500	5.681	-1339.6
1457	238.46	14.92	-3517	5.685	-1340.5
1458	238.47	14.92	-3517	5.69	-1341.5
1459	238.48	14.87	-3506	5.694	-1342.5
1460	238.59	14.81	-3494	5.698	-1343.5
1461	238.53	14.9	-3513	5.702	-1344.4
1462	238.46	14.82	-3493	5.706	-1345.4
1463	238.42	14.9	-3511	5.71	-1346.4
1464	238.4	14.95	-3525	5.714	-1347.4
1465	238.36	14.86	-3501	5.718	-1348.3
1466	238.3	14.9	-3511	5.723	-1349.3
1467	238.37	14.85	-3499	5.727	-1350.3
1468	238.37	14.9	-3514	5.731	-1351.3
1469	238.21	14.95	-3522	5.735	-1352.2
1470	238.42	14.9	-3516	5.739	-1353.2
1471	238.44	14.89	-3515	5.743	-1354.2
1472	238.39	14.86	-3504	5.747	-1355.2
1473	238.35	14.87	-3506	5.752	-1356.1
1474	238.43	14.83	-3501	5.756	-1357.1
1475	238.47	14.88	-3512	5.76	-1358.1
1476	238.44	14.9	-3514	5.764	-1359.1
1477	238.02	14.88	-3503	5.768	-1360
1478	238.32	14.84	-3497	5.772	-1361
1479	238.3	14.84	-3499	5.776	-1362
1480	238.33	14.86	-3505	5.781	-1363
1481	238.31	14.91	-3516	5.785	-1363.9
1482	238.34	14.92	-3518	5.789	-1364.9
1483	238.32	14.89	-3512	5.793	-1365.9
1484	238.35	14.89	-3511	5.797	-1366.9
1485	238.42	14.88	-3510	5.801	-1367.8
1486	238.24	14.92	-3517	5.805	-1368.8
1487	238.34	14.91	-3515	5.809	-1369.8
1488	238.39	14.88	-3510	5.814	-1370.8
1489	238.29	14.9	-3513	5.818	-1371.7
1490	238.32	14.89	-3510	5.822	-1372.7
1491	238.22	14.91	-3512	5.826	-1373.7
1492	238.3	14.92	-3518	5.83	-1374.7
1493	238.31	14.89	-3510	5.834	-1375.6
1494	238.32	14.87	-3506	5.838	-1376.6
1495	238.4	14.85	-3503	5.843	-1377.6
1496	238.3	14.91	-3515	5.847	-1378.6
1497	238.35	14.89	-3510	5.851	-1379.5
1498	238.36	14.91	-3517	5.855	-1380.5
1499	238.36	14.88	-3510	5.859	-1381.5
1500	238.33	14.91	-3516	5.863	-1382.5
1501	238.3	14.89	-3512	5.867	-1383.4
1502	238.33	14.88	-3510	5.872	-1384.4

1503	238.18	14.91	-3515	5.876	-1385.4
1504	238.13	14.91	-3512	5.88	-1386.4
1505	238.2	14.91	-3512	5.884	-1387.4
1506	238.16	14.89	-3507	5.888	-1388.3
1507	238.17	14.91	-3512	5.892	-1389.3
1508	238.14	14.88	-3504	5.896	-1390.3
1509	238.13	14.9	-3510	5.901	-1391.3
1510	238.18	14.93	-3519	5.905	-1392.2
1511	238.16	14.9	-3510	5.909	-1393.2
1512	238.13	14.89	-3508	5.913	-1394.2
1513	238.14	14.9	-3510	5.917	-1395.2
1514	237.99	14.92	-3514	5.921	-1396.1
1515	238.15	14.92	-3516	5.925	-1397.1
1516	238.18	14.9	-3511	5.93	-1398.1
1517	238.13	14.9	-3512	5.934	-1399.1
1518	237.96	14.92	-3513	5.938	-1400
1519	238.14	14.91	-3513	5.942	-1401
1520	238.24	14.97	-3529	5.946	-1402
1521	238.09	14.88	-3508	5.95	-1402.9
1522	238.12	14.89	-3510	5.954	-1403.9
1523	238.03	14.93	-3516	5.958	-1404.9
1524	237.98	14.93	-3514	5.963	-1405.9
1525	238.01	14.94	-3518	5.967	-1406.8
1526	238.06	14.94	-3519	5.971	-1407.8
1527	238.03	14.89	-3504	5.975	-1408.8
1528	238.07	14.92	-3515	5.979	-1409.8
1529	238.15	14.93	-3518	5.983	-1410.7
1530	237.95	14.95	-3519	5.987	-1411.7
1531	238.12	14.89	-3507	5.992	-1412.7
1532	238.06	14.88	-3504	5.996	-1413.7
1533	238.13	14.88	-3505	6	-1414.6
1534	238.07	14.93	-3516	6.004	-1415.6
1535	238.12	14.95	-3523	6.008	-1416.6
1536	238.08	14.89	-3509	6.012	-1417.6
1537	238.03	14.91	-3514	6.016	-1418.5
1538	238.09	14.86	-3501	6.021	-1419.5
1539	238.12	14.85	-3499	6.025	-1420.5
1540	238.08	14.96	-3524	6.029	-1421.5
1541	238.1	14.9	-3510	6.033	-1422.4
1542	238.1	14.86	-3500	6.037	-1423.4
1543	238.11	14.94	-3520	6.041	-1424.4
1544	238.25	14.88	-3507	6.045	-1425.4
1545	238.2	14.95	-3520	6.05	-1426.4
1546	238.21	14.9	-3510	6.054	-1427.3
1547	238.21	14.89	-3507	6.058	-1428.3
1548	238.13	14.94	-3517	6.062	-1429.3
1549	238.32	14.91	-3513	6.066	-1430.3

1550	238.28	14.95	-3523	6.07	-1431.2
1551	238.23	14.9	-3512	6.074	-1432.2
1552	238.27	14.91	-3516	6.079	-1433.2
1553	238.27	14.92	-3518	6.083	-1434.2
1554	238.26	14.9	-3512	6.087	-1435.1
1555	238.23	14.88	-3504	6.091	-1436.1
1556	238.25	14.82	-3492	6.095	-1437.1
1557	238.38	14.88	-3507	6.099	-1438.1
1558	238.39	14.91	-3515	6.103	-1439
1559	238.36	14.9	-3515	6.108	-1440
1560	238.47	14.91	-3518	6.112	-1441
1561	238.39	14.95	-3525	6.116	-1442
1562	238.22	14.95	-3522	6.12	-1442.9
1563	238.33	14.92	-3513	6.124	-1443.9
1564	238.32	14.88	-3505	6.128	-1444.9
1565	238.32	14.92	-3517	6.132	-1445.9
1566	238.27	14.87	-3505	6.137	-1446.8
1567	238.31	14.95	-3525	6.141	-1447.8
1568	238.38	14.92	-3518	6.145	-1448.8
1569	238.29	14.92	-3519	6.149	-1449.8
1570	238.34	14.87	-3507	6.153	-1450.7
1571	238.29	14.88	-3506	6.157	-1451.7
1572	238.3	14.95	-3524	6.161	-1452.7
1573	238.31	14.91	-3515	6.165	-1453.7
1574	238.21	14.86	-3503	6.17	-1454.7
1575	238.34	14.93	-3519	6.174	-1455.6
1576	238.34	14.88	-3509	6.178	-1456.6
1577	238.32	14.88	-3506	6.182	-1457.6
1578	238.34	14.88	-3508	6.186	-1458.6
1579	238.36	14.87	-3503	6.19	-1459.5
1580	238.29	14.9	-3512	6.194	-1460.5
1581	238.28	14.93	-3517	6.199	-1461.5
1582	238.25	14.94	-3521	6.203	-1462.5
1583	238.21	14.9	-3513	6.207	-1463.4
1584	238.28	14.92	-3517	6.211	-1464.4
1585	238.28	14.93	-3517	6.215	-1465.4
1586	238.27	14.91	-3512	6.219	-1466.4
1587	238.28	14.94	-3520	6.223	-1467.3
1588	238.35	14.9	-3510	6.228	-1468.3
1589	238.2	14.93	-3518	6.232	-1469.3
1590	238.34	14.88	-3509	6.236	-1470.3
1591	238.31	14.94	-3522	6.24	-1471.2
1592	238.27	14.89	-3512	6.244	-1472.2
1593	238.26	14.88	-3508	6.248	-1473.2
1594	238.26	14.96	-3526	6.252	-1474.2
1595	238.23	14.88	-3507	6.257	-1475.2
1596	238.11	14.9	-3510	6.261	-1476.1

1597	238.21	14.87	-3504	6.265	-1477.1
1598	238.21	14.97	-3528	6.269	-1478.1
1599	238.27	14.96	-3525	6.273	-1479.1
1600	238.31	14.85	-3499	6.277	-1480
1601	238.26	14.86	-3501	6.281	-1481
1602	238.29	14.9	-3514	6.286	-1482
1603	238.38	14.88	-3510	6.29	-1483
1604	238.36	14.91	-3514	6.294	-1483.9
1605	238.39	14.89	-3512	6.298	-1484.9
1606	238.37	14.89	-3512	6.302	-1485.9
1607	238.4	14.91	-3515	6.306	-1486.9
1608	238.39	14.89	-3512	6.31	-1487.8
1609	238.4	14.91	-3516	6.315	-1488.8
1610	238.42	14.9	-3513	6.319	-1489.8
1611	238.37	14.9	-3513	6.323	-1490.8
1612	238.39	14.9	-3513	6.327	-1491.7
1613	238.4	14.91	-3517	6.331	-1492.7
1614	238.48	14.92	-3520	6.335	-1493.7
1615	238.45	14.9	-3515	6.339	-1494.7
1616	238.44	14.88	-3511	6.344	-1495.7
1617	238.44	14.9	-3515	6.348	-1496.6
1618	238.46	14.91	-3518	6.352	-1497.6
1619	238.39	14.88	-3509	6.356	-1498.6
1620	238.47	14.88	-3511	6.36	-1499.6
1621	238.45	14.9	-3513	6.364	-1500.5
1622	238.45	14.89	-3513	6.368	-1501.5
1623	238.41	14.9	-3513	6.373	-1502.5
1624	238.37	14.92	-3520	6.377	-1503.5
1625	238.44	14.89	-3511	6.381	-1504.4
1626	238.47	14.88	-3509	6.385	-1505.4
1627	238.42	14.89	-3510	6.389	-1506.4
1628	238.38	14.9	-3514	6.393	-1507.4
1629	238.4	14.89	-3510	6.397	-1508.3
1630	238.37	14.9	-3513	6.402	-1509.3
1631	238.47	14.9	-3514	6.406	-1510.3
1632	238.5	14.9	-3515	6.41	-1511.3
1633	238.48	14.89	-3513	6.414	-1512.3
1634	238.5	14.89	-3513	6.418	-1513.2
1635	238.53	14.91	-3518	6.422	-1514.2
1636	238.57	14.89	-3514	6.426	-1515.2
1637	238.62	14.9	-3517	6.43	-1516.2
1638	238.62	14.89	-3515	6.435	-1517.1
1639	238.57	14.93	-3521	6.439	-1518.1
1640	238.66	14.9	-3515	6.443	-1519.1
1641	238.62	14.9	-3516	6.447	-1520.1
1642	238.59	14.91	-3518	6.451	-1521
1643	238.11	14.91	-3510	6.455	-1522

1644	238.25	14.91	-3512	6.459	-1523
1645	238.62	14.91	-3517	6.464	-1524
1646	238.59	14.87	-3509	6.468	-1524.9
1647	238.61	14.95	-3525	6.472	-1525.9
1648	238.52	14.89	-3511	6.476	-1526.9
1649	238.44	14.93	-3519	6.48	-1527.9
1650	238.53	14.9	-3513	6.484	-1528.8
1651	238.5	14.9	-3513	6.488	-1529.8
1652	238.55	14.91	-3517	6.493	-1530.8
1653	238.59	14.88	-3512	6.497	-1531.8
1654	238.56	14.89	-3511	6.501	-1532.8
1655	238.53	14.93	-3522	6.505	-1533.7
1656	238.59	14.9	-3515	6.509	-1534.7
1657	238.52	14.9	-3513	6.513	-1535.7
1658	238.45	14.89	-3511	6.517	-1536.7
1659	238.42	14.87	-3508	6.522	-1537.6
1660	238.38	14.91	-3514	6.526	-1538.6
1661	238.39	14.87	-3505	6.53	-1539.6
1662	238.58	14.87	-3509	6.534	-1540.6
1663	238.54	14.89	-3515	6.538	-1541.5
1664	238.4	14.89	-3509	6.542	-1542.5
1665	238.48	14.88	-3509	6.546	-1543.5
1666	238.47	14.9	-3512	6.551	-1544.5
1667	238.52	14.91	-3517	6.555	-1545.4
1668	238.59	14.94	-3526	6.559	-1546.4
1669	238.49	14.89	-3513	6.563	-1547.4
1670	238.49	14.96	-3528	6.567	-1548.4
1671	238.41	14.9	-3510	6.571	-1549.4
1672	238.35	14.89	-3508	6.575	-1550.3
1673	238.45	14.91	-3515	6.58	-1551.3
1674	238.42	14.95	-3524	6.584	-1552.3
1675	238.34	14.93	-3523	6.588	-1553.3
1676	238.39	14.88	-3511	6.592	-1554.2
1677	238.38	14.92	-3517	6.596	-1555.2
1678	237.67	14.95	-3514	6.6	-1556.2
1679	237.76	14.96	-3520	6.604	-1557.2
1680	238.32	14.96	-3527	6.609	-1558.1
1681	238.3	14.89	-3510	6.613	-1559.1
1682	238.35	14.87	-3506	6.617	-1560.1
1683	238.3	14.92	-3516	6.621	-1561.1
1684	238.41	14.93	-3518	6.625	-1562
1685	238.39	14.85	-3501	6.629	-1563
1686	238.42	14.96	-3527	6.633	-1564
1687	238.35	14.93	-3519	6.638	-1565
1688	238.28	14.93	-3519	6.642	-1566
1689	238.29	14.94	-3519	6.646	-1566.9
1690	238.38	14.93	-3520	6.65	-1567.9

1691	238.34	14.92	-3518	6.654	-1568.9
1692	238.44	14.92	-3520	6.658	-1569.9
1693	238.34	14.92	-3519	6.662	-1570.8
1694	238.2	14.9	-3510	6.667	-1571.8
1695	238.21	14.95	-3522	6.671	-1572.8
1696	238.22	14.95	-3521	6.675	-1573.8
1697	238.19	14.93	-3515	6.679	-1574.7
1698	238.25	14.92	-3515	6.683	-1575.7
1699	238.26	14.92	-3516	6.687	-1576.7
1700	238.18	14.93	-3516	6.691	-1577.7
1701	238.16	14.97	-3526	6.696	-1578.7
1702	238.14	14.92	-3516	6.7	-1579.6
1703	238.25	14.93	-3520	6.704	-1580.6
1704	238.31	14.94	-3522	6.708	-1581.6
1705	238.2	14.9	-3509	6.712	-1582.6
1706	238.26	14.98	-3530	6.716	-1583.5
1707	238.23	14.93	-3520	6.72	-1584.5
1708	238.24	14.91	-3515	6.725	-1585.5
1709	238.19	14.9	-3510	6.729	-1586.5
1710	238.22	14.91	-3512	6.733	-1587.4
1711	238.34	14.9	-3511	6.737	-1588.4
1712	238.35	14.97	-3528	6.741	-1589.4
1713	238.36	14.86	-3502	6.745	-1590.4
1714	238.29	14.96	-3526	6.749	-1591.4
1715	238.33	14.89	-3509	6.754	-1592.3
1716	238.29	14.92	-3515	6.758	-1593.3
1717	238.24	14.91	-3514	6.762	-1594.3
1718	238.25	14.97	-3529	6.766	-1595.3
1719	238.31	14.9	-3513	6.77	-1596.2
1720	238.34	14.94	-3522	6.774	-1597.2
1721	238.38	14.91	-3516	6.778	-1598.2
1722	238.41	14.92	-3518	6.783	-1599.2
1723	238.35	14.93	-3518	6.787	-1600.2
1724	238.37	14.89	-3511	6.791	-1601.1
1725	238.35	14.94	-3521	6.795	-1602.1
1726	238.35	14.97	-3529	6.799	-1603.1
1727	238.41	14.96	-3526	6.803	-1604.1
1728	238.3	14.93	-3518	6.808	-1605
1729	238.32	14.92	-3516	6.812	-1606
1730	238.32	14.89	-3509	6.816	-1607
1731	238.36	14.92	-3517	6.82	-1608
1732	238.34	14.94	-3522	6.824	-1608.9
1733	238.4	14.93	-3521	6.828	-1609.9
1734	238.42	14.94	-3526	6.832	-1610.9
1735	238.34	14.94	-3523	6.837	-1611.9
1736	238.34	14.93	-3520	6.841	-1612.9
1737	238.35	14.96	-3528	6.845	-1613.8

1738	238.31	14.93	-3519	6.849	-1614.8
1739	238.35	14.89	-3511	6.853	-1615.8
1740	238.36	14.93	-3518	6.857	-1616.8
1741	238.37	14.89	-3509	6.861	-1617.7
1742	238.31	14.92	-3516	6.866	-1618.7
1743	238.32	14.93	-3516	6.87	-1619.7
1744	238.4	14.91	-3515	6.874	-1620.7
1745	238.45	14.91	-3515	6.878	-1621.7
1746	238.33	14.92	-3517	6.882	-1622.6
1747	238.43	14.89	-3511	6.886	-1623.6
1748	238.45	14.95	-3524	6.89	-1624.6
1749	238.47	14.93	-3521	6.895	-1625.6
1750	238.49	14.97	-3531	6.899	-1626.5
1751	238.5	14.94	-3525	6.903	-1627.5
1752	238.53	14.94	-3523	6.907	-1628.5
1753	238.49	14.92	-3519	6.911	-1629.5
1754	238.47	14.96	-3528	6.915	-1630.5
1755	238.41	14.92	-3520	6.919	-1631.4
1756	238.53	14.9	-3517	6.924	-1632.4
1757	238.48	14.91	-3517	6.928	-1633.4
1758	238.37	14.95	-3523	6.932	-1634.4
1759	238.5	14.9	-3516	6.936	-1635.3
1760	238.45	14.89	-3511	6.94	-1636.3
1761	238.47	14.89	-3511	6.944	-1637.3
1762	238.48	14.9	-3513	6.948	-1638.3
1763	238.45	14.96	-3526	6.953	-1639.2
1764	238.46	14.94	-3524	6.957	-1640.2
1765	238.42	14.91	-3515	6.961	-1641.2
1766	238.54	14.95	-3526	6.965	-1642.2
1767	238.53	14.88	-3512	6.969	-1643.2
1768	238.45	14.94	-3522	6.973	-1644.1
1769	238.47	14.94	-3523	6.977	-1645.1
1770	238.37	15	-3537	6.982	-1646.1
1771	238.5	14.9	-3516	6.986	-1647.1
1772	238.54	14.92	-3518	6.99	-1648.1
1773	238.45	14.93	-3522	6.994	-1649.1
1774	238.47	14.92	-3521	6.998	-1650
1775	238.46	14.9	-3516	7.002	-1651
1776	238.34	14.93	-3517	7.007	-1652
1777	238.58	14.91	-3519	7.011	-1653
1778	238.44	14.97	-3529	7.015	-1653.9
1779	238.43	14.92	-3518	7.019	-1654.9
1780	238.44	14.92	-3518	7.023	-1655.9
1781	238.46	14.94	-3522	7.027	-1656.9
1782	238.48	14.92	-3519	7.031	-1657.9
1783	238.45	14.94	-3525	7.036	-1658.8
1784	238.45	14.93	-3522	7.04	-1659.8

1785	238.45	14.92	-3520	7.044	-1660.8
1786	238.45	14.93	-3522	7.048	-1661.8
1787	238.4	14.93	-3521	7.052	-1662.7
1788	238.45	14.94	-3523	7.056	-1663.7
1789	238.49	14.91	-3518	7.061	-1664.7
1790	238.44	14.9	-3515	7.065	-1665.7
1791	238.39	14.9	-3514	7.069	-1666.7
1792	238.41	14.91	-3516	7.073	-1667.6
1793	238.36	14.93	-3520	7.077	-1668.6
1794	238.4	14.95	-3524	7.081	-1669.6
1795	238.43	14.93	-3521	7.085	-1670.6
1796	238.42	14.94	-3523	7.09	-1671.5
1797	238.44	14.94	-3524	7.094	-1672.5
1798	238.43	14.95	-3526	7.098	-1673.5
1799	238.44	14.93	-3522	7.102	-1674.5
1800	238.43	14.97	-3530	7.106	-1675.5
1801	238.45	14.94	-3525	7.11	-1676.4
1802	238.41	14.94	-3522	7.114	-1677.4
1803	238.49	14.9	-3516	7.119	-1678.4
1804	238.39	14.92	-3517	7.123	-1679.4
1805	238.47	14.94	-3525	7.127	-1680.3
1806	238.5	14.92	-3519	7.131	-1681.3
1807	238.44	14.93	-3520	7.135	-1682.3
1808	238.49	14.93	-3520	7.139	-1683.3
1809	238.53	14.91	-3516	7.143	-1684.2
1810	238.51	14.93	-3520	7.148	-1685.2
1811	238.51	14.95	-3525	7.152	-1686.2
1812	238.46	14.94	-3523	7.156	-1687.2
1813	238.47	14.93	-3521	7.16	-1688.2
1814	238.47	14.94	-3522	7.164	-1689.1
1815	238.38	14.96	-3528	7.168	-1690.1
1816	238.42	14.93	-3522	7.172	-1691.1
1817	238.34	14.93	-3521	7.177	-1692.1
1818	238.33	14.95	-3524	7.181	-1693
1819	238.35	15.01	-3538	7.185	-1694
1820	238.36	14.93	-3519	7.189	-1695
1821	238.28	14.96	-3525	7.193	-1696
1822	238.32	14.93	-3517	7.197	-1697
1823	238.36	15	-3536	7.201	-1697.9
1824	238.34	14.92	-3517	7.206	-1698.9
1825	238.38	14.94	-3523	7.21	-1699.9
1826	238.38	14.97	-3529	7.214	-1700.9
1827	238.28	14.96	-3527	7.218	-1701.9
1828	238.35	14.93	-3522	7.222	-1702.8
1829	238.43	14.91	-3514	7.226	-1703.8
1830	238.45	14.89	-3512	7.231	-1704.8
1831	238.36	14.95	-3524	7.235	-1705.8

1832	238.35	14.94	-3522	7.239	-1706.7
1833	238.37	14.93	-3520	7.243	-1707.7
1834	238.47	14.92	-3516	7.247	-1708.7
1835	238.42	14.98	-3529	7.251	-1709.7
1836	238.41	14.96	-3527	7.255	-1710.7
1837	238.41	14.93	-3521	7.26	-1711.6
1838	238.46	14.94	-3522	7.264	-1712.6
1839	238.43	14.94	-3523	7.268	-1713.6
1840	238.37	14.98	-3533	7.272	-1714.6
1841	238.42	14.99	-3533	7.276	-1715.5
1842	238.43	14.94	-3523	7.28	-1716.5
1843	238.42	14.94	-3522	7.284	-1717.5
1844	238.39	14.93	-3520	7.289	-1718.5
1845	238.39	14.99	-3536	7.293	-1719.5
1846	238.44	14.94	-3521	7.297	-1720.4
1847	238.32	14.93	-3518	7.301	-1721.4
1848	238.37	14.94	-3521	7.305	-1722.4
1849	238.41	14.98	-3532	7.309	-1723.4
1850	238.35	14.96	-3527	7.314	-1724.4
1851	238.47	14.92	-3517	7.318	-1725.3
1852	238.45	14.97	-3530	7.322	-1726.3
1853	238.44	14.95	-3525	7.326	-1727.3
1854	238.44	14.91	-3517	7.33	-1728.3
1855	238.36	14.94	-3520	7.334	-1729.2
1856	238.36	14.96	-3528	7.338	-1730.2
1857	238.37	14.97	-3531	7.343	-1731.2
1858	238.35	14.97	-3531	7.347	-1732.2
1859	238.43	14.94	-3521	7.351	-1733.2
1860	238.38	14.94	-3523	7.355	-1734.1
1861	238.43	14.93	-3523	7.359	-1735.1
1862	238.38	15	-3536	7.363	-1736.1
1863	238.39	14.93	-3519	7.367	-1737.1
1864	238.42	14.97	-3527	7.372	-1738
1865	238.44	14.99	-3533	7.376	-1739
1866	238.42	14.95	-3525	7.38	-1740
1867	238.4	14.95	-3523	7.384	-1741
1868	238.38	14.94	-3522	7.388	-1742
1869	238.4	14.94	-3522	7.392	-1742.9
1870	238.39	14.96	-3528	7.397	-1743.9
1871	238.35	14.95	-3526	7.401	-1744.9
1872	238.38	14.92	-3517	7.405	-1745.9
1873	238.36	14.95	-3524	7.409	-1746.9
1874	238.26	14.96	-3525	7.413	-1747.8
1875	238.36	14.96	-3526	7.417	-1748.8
1876	238.41	14.96	-3527	7.421	-1749.8
1877	238.28	14.94	-3519	7.426	-1750.8
1878	238.26	14.97	-3530	7.43	-1751.8

1879	238.3	14.96	-3525	7.434	-1752.7
1880	238.21	14.96	-3521	7.438	-1753.7
1881	238.24	14.98	-3529	7.442	-1754.7
1882	238.19	14.95	-3522	7.446	-1755.7
1883	238.19	14.96	-3523	7.451	-1756.6
1884	238.19	14.97	-3528	7.455	-1757.6
1885	238.22	14.97	-3527	7.459	-1758.6
1886	238.2	14.93	-3518	7.463	-1759.6
1887	238.22	14.94	-3521	7.467	-1760.6
1888	238.17	14.98	-3528	7.471	-1761.5
1889	238.14	14.98	-3529	7.475	-1762.5
1890	238.18	14.96	-3524	7.48	-1763.5
1891	238.18	14.93	-3516	7.484	-1764.5
1892	238.22	14.96	-3524	7.488	-1765.5
1893	238.27	14.93	-3519	7.492	-1766.4
1894	238.15	14.96	-3524	7.496	-1767.4
1895	238.16	14.94	-3518	7.5	-1768.4
1896	238.2	14.94	-3521	7.505	-1769.4
1897	238.15	14.97	-3527	7.509	-1770.3
1898	238.1	14.99	-3530	7.513	-1771.3
1899	238.19	14.95	-3521	7.517	-1772.3
1900	238.16	14.96	-3524	7.521	-1773.3
1901	238.15	14.94	-3521	7.525	-1774.3
1902	238.16	14.95	-3522	7.53	-1775.3
1903	238.18	14.95	-3522	7.534	-1776.3
1904	238.17	14.98	-3528	7.538	-1777.2
1905	238.24	14.96	-3526	7.542	-1778.2
1906	238.16	14.97	-3526	7.546	-1779.2
1907	238.02	14.98	-3527	7.55	-1780.2
1908	238.09	14.98	-3528	7.555	-1781.2
1909	238.13	14.97	-3524	7.559	-1782.1
1910	238.2	14.96	-3524	7.563	-1783.1
1911	238.2	14.95	-3524	7.567	-1784.1
1912	238.16	14.98	-3527	7.571	-1785.1
1913	238.22	14.96	-3524	7.575	-1786
1914	238.25	14.97	-3528	7.579	-1787
1915	238.16	14.95	-3522	7.584	-1788
1916	238.24	14.96	-3525	7.588	-1789
1917	238.29	14.96	-3526	7.592	-1790
1918	238.18	14.97	-3527	7.596	-1790.9
1919	238.21	14.98	-3530	7.6	-1791.9
1920	238.25	14.97	-3527	7.604	-1792.9
1921	238.26	14.96	-3525	7.609	-1793.9
1922	238.23	14.96	-3525	7.613	-1794.9
1923	238.21	14.96	-3522	7.617	-1795.8
1924	238.24	14.96	-3525	7.621	-1796.8
1925	238.18	14.97	-3526	7.625	-1797.8

1926	238.21	14.96	-3525	7.629	-1798.8
1927	238.23	14.96	-3524	7.634	-1799.8
1928	238.22	14.96	-3526	7.638	-1800.7
1929	238.23	14.96	-3526	7.642	-1801.7
1930	238.25	14.96	-3524	7.646	-1802.7
1931	238.31	14.96	-3527	7.65	-1803.7
1932	238.22	14.97	-3528	7.654	-1804.7
1933	238.36	14.93	-3520	7.658	-1805.6
1934	238.36	14.97	-3528	7.663	-1806.6
1935	238.28	14.95	-3523	7.667	-1807.6
1936	238.33	14.94	-3522	7.671	-1808.6
1937	238.27	14.96	-3524	7.675	-1809.5
1938	238.21	15.01	-3535	7.679	-1810.5
1939	238.26	14.96	-3524	7.683	-1811.5
1940	238.31	14.96	-3525	7.688	-1812.5
1941	238.29	14.95	-3523	7.692	-1813.5
1942	238.18	14.98	-3531	7.696	-1814.4
1943	238.23	14.98	-3530	7.7	-1815.4
1944	238.23	14.97	-3527	7.704	-1816.4
1945	238.23	14.97	-3526	7.708	-1817.4
1946	238.26	14.96	-3527	7.712	-1818.4
1947	238.28	14.99	-3533	7.717	-1819.3
1948	238.33	14.95	-3523	7.721	-1820.3
1949	238.32	14.97	-3528	7.725	-1821.3
1950	238.29	14.95	-3524	7.729	-1822.3
1951	238.32	14.96	-3526	7.733	-1823.3
1952	238.3	14.97	-3528	7.737	-1824.2
1953	238.33	14.97	-3528	7.742	-1825.2
1954	238.31	14.97	-3529	7.746	-1826.2
1955	238.3	14.97	-3528	7.75	-1827.2
1956	238.34	14.96	-3528	7.754	-1828.2
1957	238.31	14.97	-3528	7.758	-1829.1
1958	238.28	14.96	-3527	7.762	-1830.1
1959	238.31	14.96	-3526	7.766	-1831.1
1960	238.16	14.98	-3530	7.771	-1832.1
1961	238.25	14.96	-3527	7.775	-1833.1
1962	238.21	14.96	-3525	7.779	-1834
1963	238.12	14.98	-3527	7.783	-1835
1964	238.18	14.97	-3527	7.787	-1836
1965	238.14	14.98	-3529	7.791	-1837
1966	238.29	14.97	-3527	7.796	-1838
1967	238.17	14.98	-3528	7.8	-1838.9
1968	238.14	14.97	-3526	7.804	-1839.9
1969	238.07	14.99	-3529	7.808	-1840.9
1970	238.25	14.92	-3515	7.812	-1841.9
1971	238.1	14.97	-3527	7.816	-1842.8
1972	238.09	14.97	-3528	7.821	-1843.8

1973	238.1	14.97	-3526	7.825	-1844.8
1974	238.15	14.97	-3526	7.829	-1845.8
1975	238.12	14.98	-3528	7.833	-1846.8
1976	238.25	14.95	-3522	7.837	-1847.7
1977	238.15	14.95	-3520	7.841	-1848.7
1978	238	14.99	-3527	7.845	-1849.7
1979	238.11	14.96	-3521	7.85	-1850.7
1980	238.17	14.96	-3525	7.854	-1851.6
1981	238.18	14.99	-3531	7.858	-1852.6
1982	238.14	14.99	-3530	7.862	-1853.6
1983	238.14	15	-3534	7.866	-1854.6
1984	238.19	14.95	-3522	7.87	-1855.6
1985	238.1	14.79	-3486	7.874	-1856.5
1986	238.14	14.8	-3486	7.879	-1857.5
1987	238.04	14.96	-3521	7.883	-1858.5
1988	238.12	14.78	-3481	7.887	-1859.5
1989	238.2	14.97	-3527	7.891	-1860.4
1990	238.07	14.98	-3527	7.895	-1861.4
1991	238.21	14.84	-3495	7.899	-1862.4
1992	238.17	14.95	-3521	7.903	-1863.4
1993	238.18	14.83	-3492	7.908	-1864.3
1994	238.25	14.78	-3483	7.912	-1865.3
1995	238.19	14.84	-3494	7.916	-1866.3
1996	238.26	14.93	-3519	7.92	-1867.3
1997	238.21	14.98	-3529	7.924	-1868.2
1998	238.17	14.96	-3525	7.928	-1869.2
1999	238.23	14.86	-3502	7.932	-1870.2
2000	238.26	14.8	-3486	7.937	-1871.2
2001	238.19	14.8	-3487	7.941	-1872.1
2002	238.25	14.94	-3520	7.945	-1873.1
2003	238.22	14.84	-3496	7.949	-1874.1
2004	238.17	14.83	-3494	7.953	-1875
2005	238.13	14.82	-3488	7.957	-1876
2006	238.13	14.81	-3489	7.961	-1877
2007	238.07	14.85	-3497	7.965	-1878
2008	238.22	14.83	-3495	7.97	-1878.9
2009	238.12	14.83	-3492	7.974	-1879.9
2010	238.16	14.81	-3489	7.978	-1880.9
2011	238.21	14.98	-3529	7.982	-1881.8
2012	238.25	14.81	-3490	7.986	-1882.8
2013	238.2	14.83	-3491	7.99	-1883.8
2014	238.15	14.83	-3491	7.994	-1884.8
2015	238.18	14.82	-3489	7.998	-1885.7
2016	238.15	14.84	-3493	8.003	-1886.7
2017	238.26	14.84	-3495	8.007	-1887.7
2018	238.22	14.83	-3493	8.011	-1888.6
2019	238.23	14.83	-3493	8.015	-1889.6

2020	238.19	14.85	-3495	8.019	-1890.6
2021	238.22	14.82	-3491	8.023	-1891.5
2022	238.03	14.84	-3492	8.027	-1892.5
2023	238.19	14.84	-3495	8.031	-1893.5
2024	238.14	14.82	-3490	8.035	-1894.5
2025	238.15	14.82	-3491	8.04	-1895.4
2026	238.1	14.83	-3493	8.044	-1896.4
2027	238.07	14.81	-3487	8.048	-1897.4
2028	237.96	14.85	-3494	8.052	-1898.3
2029	238.23	14.81	-3489	8.056	-1899.3
2030	238.08	14.83	-3491	8.06	-1900.2
2031	238.23	14.82	-3489	8.064	-1901.2
2032	238.16	14.86	-3498	8.068	-1902.2
2033	238.22	14.8	-3487	8.072	-1903.2
2034	238.15	14.79	-3483	8.077	-1904.1
2035	238.21	14.84	-3496	8.081	-1905.1
2036	238.21	14.87	-3504	8.085	-1906.1
2037	238.21	14.84	-3496	8.089	-1907
2038	238.28	14.86	-3500	8.093	-1908
2039	238.26	14.83	-3495	8.097	-1909
2040	238.17	14.77	-3480	8.101	-1909.9
2041	238.22	14.79	-3484	8.105	-1910.9
2042	238.2	14.81	-3487	8.109	-1911.9
2043	238.22	14.82	-3489	8.114	-1912.9
2044	238.25	14.86	-3500	8.118	-1913.8
2045	238.26	14.84	-3497	8.122	-1914.8
2046	238.26	14.83	-3494	8.126	-1915.8
2047	238.2	14.83	-3492	8.13	-1916.7
2048	238.2	14.85	-3500	8.134	-1917.7
2049	238.17	14.83	-3493	8.138	-1918.7
2050	238.12	14.84	-3495	8.143	-1919.7
2051	238.26	14.83	-3493	8.147	-1920.7
2052	238.2	14.83	-3493	8.151	-1921.6
2053	238.23	14.82	-3490	8.155	-1922.6
2054	238.21	14.81	-3490	8.159	-1923.6
2055	238.05	14.84	-3493	8.163	-1924.5
2056	238.1	14.85	-3495	8.167	-1925.5
2057	238.14	14.82	-3489	8.171	-1926.5
2058	238.14	14.83	-3493	8.176	-1927.4
2059	238.16	14.84	-3494	8.18	-1928.4
2060	238.15	14.83	-3494	8.184	-1929.4
2061	237.95	14.86	-3497	8.188	-1930.4
2062	238.06	14.84	-3493	8.192	-1931.3
2063	238.09	14.83	-3492	8.196	-1932.3
2064	238.09	14.84	-3492	8.2	-1933.3
2065	237.99	14.85	-3495	8.204	-1934.2
2066	238.07	14.82	-3490	8.209	-1935.2

2067	238	14.85	-3494	8.213	-1936.2
2068	238.02	14.85	-3495	8.217	-1937.1
2069	237.94	14.84	-3492	8.221	-1938.1
2070	238.01	14.84	-3493	8.225	-1939.1
2071	237.99	14.87	-3501	8.229	-1940.1
2072	238.06	14.84	-3495	8.233	-1941
2073	238.04	14.83	-3490	8.237	-1942
2074	238.08	14.86	-3498	8.241	-1943
2075	238.07	14.86	-3498	8.246	-1943.9
2076	238.03	14.86	-3498	8.25	-1944.9
2077	238.1	14.85	-3496	8.254	-1945.9
2078	238.17	14.83	-3493	8.258	-1946.8
2079	238.25	14.83	-3493	8.262	-1947.8
2080	238.2	14.85	-3499	8.266	-1948.8
2081	238.16	14.84	-3496	8.27	-1949.8
2082	238.16	14.83	-3494	8.274	-1950.7
2083	238.12	14.84	-3496	8.279	-1951.7
2084	238.24	14.83	-3494	8.283	-1952.7
2085	238.23	14.86	-3501	8.287	-1953.6
2086	238.24	14.82	-3493	8.291	-1954.6
2087	238.1	14.84	-3494	8.295	-1955.6
2088	238.12	14.84	-3494	8.299	-1956.6
2089	238.17	14.83	-3494	8.303	-1957.5
2090	238.17	14.83	-3494	8.307	-1958.5
2091	238.19	14.84	-3494	8.312	-1959.5
2092	238.15	14.83	-3493	8.316	-1960.4
2093	238.16	14.84	-3495	8.32	-1961.4
2094	237.47	14.88	-3495	8.324	-1962.4
2095	237.51	14.88	-3495	8.328	-1963.3
2096	238.03	14.85	-3494	8.332	-1964.3
2097	237.99	14.87	-3501	8.336	-1965.3
2098	238.16	14.82	-3490	8.34	-1966.3
2099	238.17	14.85	-3497	8.345	-1967.2
2100	238.2	14.85	-3498	8.349	-1968.2
2101	238.08	14.83	-3491	8.353	-1969.2
2102	237.93	14.85	-3493	8.357	-1970.1
2103	237.89	14.87	-3498	8.361	-1971.1
2104	238.24	14.83	-3495	8.365	-1972.1
2105	238.23	14.85	-3497	8.369	-1973.1
2106	238.12	14.87	-3503	8.373	-1974
2107	237.85	14.91	-3508	8.378	-1975
2108	238.02	14.86	-3499	8.382	-1976
2109	238.07	14.83	-3491	8.386	-1976.9
2110	237.94	14.84	-3491	8.39	-1977.9
2111	238.1	14.89	-3505	8.394	-1978.9
2112	238.06	14.83	-3492	8.398	-1979.9
2113	238.14	14.86	-3500	8.402	-1980.8

2114	238.1	14.83	-3494	8.406	-1981.8
2115	238.13	14.92	-3515	8.411	-1982.8
2116	238.1	14.89	-3508	8.415	-1983.7
2117	238.05	14.83	-3491	8.419	-1984.7
2118	238.09	14.81	-3486	8.423	-1985.7
2119	238.05	14.86	-3499	8.427	-1986.7
2120	238.18	14.87	-3502	8.431	-1987.6
2121	238.04	14.88	-3500	8.435	-1988.6
2122	238.02	14.87	-3502	8.439	-1989.6
2123	238.11	14.84	-3495	8.444	-1990.5
2124	238.13	14.91	-3512	8.448	-1991.5
2125	238.04	14.86	-3502	8.452	-1992.5
2126	238.13	14.8	-3486	8.456	-1993.4
2127	238.14	14.85	-3498	8.46	-1994.4
2128	238.13	14.81	-3491	8.464	-1995.4
2129	238.07	14.85	-3495	8.468	-1996.4
2130	238.12	14.87	-3503	8.472	-1997.3
2131	238.07	14.87	-3500	8.477	-1998.3
2132	238.06	14.84	-3494	8.481	-1999.3
2133	238.15	14.88	-3507	8.485	-2000.2
2134	238.06	14.84	-3496	8.489	-2001.2
2135	238.03	14.86	-3498	8.493	-2002.2
2136	238.09	14.85	-3497	8.497	-2003.2
2137	238.04	14.83	-3491	8.501	-2004.1
2138	238.12	14.86	-3500	8.505	-2005.1
2139	238.15	14.84	-3494	8.51	-2006.1
2140	238.17	14.83	-3492	8.514	-2007
2141	238.05	14.88	-3503	8.518	-2008
2142	238.16	14.82	-3490	8.522	-2009
2143	238.18	14.89	-3507	8.526	-2010
2144	238.22	14.86	-3501	8.53	-2010.9
2145	238.22	14.81	-3492	8.534	-2011.9
2146	238.22	14.88	-3505	8.538	-2012.9
2147	238.24	14.86	-3503	8.543	-2013.8
2148	238.06	14.82	-3490	8.547	-2014.8
2149	238.1	14.87	-3502	8.551	-2015.8
2150	238.17	14.85	-3499	8.555	-2016.8
2151	238.16	14.85	-3497	8.559	-2017.7
2152	238.16	14.87	-3502	8.563	-2018.7
2153	238.12	14.82	-3490	8.567	-2019.7
2154	238.2	14.81	-3489	8.571	-2020.6
2155	238.23	14.89	-3508	8.576	-2021.6
2156	238.22	14.82	-3492	8.58	-2022.6
2157	238.14	14.88	-3504	8.584	-2023.6
2158	238.17	14.86	-3498	8.588	-2024.5
2159	238.19	14.78	-3482	8.592	-2025.5
2160	238.22	14.88	-3504	8.596	-2026.5

2161	238.17	14.89	-3507	8.6	-2027.4
2162	238.17	14.8	-3486	8.604	-2028.4
2163	238.13	14.89	-3505	8.608	-2029.4
2164	238.14	14.87	-3504	8.613	-2030.4
2165	237.99	14.89	-3502	8.617	-2031.3
2166	238.11	14.84	-3497	8.621	-2032.3
2167	238.04	14.84	-3495	8.625	-2033.3
2168	238.08	14.86	-3498	8.629	-2034.2
2169	237.97	14.85	-3497	8.633	-2035.2
2170	238.06	14.81	-3488	8.637	-2036.2
2171	238.15	14.86	-3500	8.642	-2037.2
2172	238.06	14.89	-3507	8.646	-2038.1
2173	238.07	14.86	-3497	8.65	-2039.1
2174	238.04	14.85	-3498	8.654	-2040.1
2175	238.03	14.86	-3497	8.658	-2041.1
2176	238.06	14.87	-3500	8.662	-2042.1
2177	238.07	14.85	-3496	8.666	-2043
2178	238.05	14.86	-3498	8.671	-2044
2179	237.98	14.87	-3499	8.675	-2045
2180	237.8	14.87	-3498	8.679	-2045.9
2181	237.84	14.88	-3500	8.683	-2046.9
2182	237.93	14.87	-3500	8.687	-2047.9
2183	237.94	14.87	-3499	8.691	-2048.9
2184	237.95	14.87	-3500	8.695	-2049.8
2185	238	14.87	-3499	8.699	-2050.8
2186	238	14.86	-3497	8.704	-2051.8
2187	237.93	14.86	-3497	8.708	-2052.7
2188	238.06	14.86	-3499	8.712	-2053.7
2189	238.07	14.88	-3504	8.716	-2054.7
2190	237.98	14.85	-3496	8.72	-2055.7
2191	237.99	14.87	-3500	8.724	-2056.6
2192	238.02	14.89	-3504	8.728	-2057.6
2193	237.96	14.89	-3503	8.732	-2058.6
2194	237.97	14.87	-3498	8.737	-2059.5
2195	237.99	14.87	-3499	8.741	-2060.5
2196	237.91	14.85	-3494	8.745	-2061.5
2197	237.99	14.89	-3504	8.749	-2062.5
2198	237.89	14.87	-3500	8.753	-2063.4
2199	237.87	14.87	-3498	8.757	-2064.4
2200	237.81	14.84	-3489	8.761	-2065.4
2201	237.88	14.89	-3502	8.765	-2066.3
2202	237.8	14.86	-3495	8.77	-2067.3
2203	237.75	14.88	-3499	8.774	-2068.3
2204	237.93	14.88	-3502	8.778	-2069.3
2205	237.86	14.89	-3503	8.782	-2070.2
2206	237.88	14.88	-3501	8.786	-2071.2
2207	237.81	14.86	-3494	8.79	-2072.2

2208	237.74	14.88	-3499	8.794	-2073.1
2209	237.84	14.88	-3501	8.799	-2074.1
2210	238.03	14.88	-3501	8.803	-2075.1
2211	237.8	14.86	-3496	8.807	-2076.1
2212	237.91	14.86	-3497	8.811	-2077
2213	237.84	14.88	-3499	8.815	-2078
2214	237.96	14.86	-3495	8.819	-2079
2215	237.87	14.86	-3497	8.823	-2079.9
2216	237.88	14.93	-3512	8.827	-2080.9
2217	237.87	14.88	-3502	8.832	-2081.9
2218	237.91	14.88	-3504	8.836	-2082.9
2219	237.92	14.89	-3504	8.84	-2083.8
2220	237.96	14.86	-3500	8.844	-2084.8
2221	238	14.85	-3494	8.848	-2085.8
2222	237.53	14.88	-3493	8.852	-2086.8
2223	237.81	14.87	-3498	8.856	-2087.7
2224	237.94	14.84	-3490	8.861	-2088.7
2225	237.93	14.86	-3499	8.865	-2089.7
2226	237.99	14.84	-3494	8.869	-2090.6
2227	238.05	14.87	-3503	8.873	-2091.6
2228	237.96	14.88	-3501	8.877	-2092.6
2229	238.01	14.85	-3496	8.881	-2093.6
2230	238.04	14.85	-3495	8.885	-2094.5
2231	237.97	14.85	-3496	8.889	-2095.5
2232	237.9	14.87	-3500	8.894	-2096.5
2233	237.85	14.86	-3495	8.898	-2097.4
2234	238.02	14.89	-3508	8.902	-2098.4
2235	238.04	14.85	-3498	8.906	-2099.4
2236	238.04	14.85	-3497	8.91	-2100.4
2237	237.88	14.84	-3492	8.914	-2101.3
2238	237.83	14.86	-3495	8.918	-2102.3
2239	237.9	14.87	-3500	8.922	-2103.3
2240	237.87	14.85	-3493	8.927	-2104.2
2241	237.88	14.9	-3505	8.931	-2105.2
2242	237.92	14.89	-3503	8.935	-2106.2
2243	237.8	14.88	-3501	8.939	-2107.2
2244	237.94	14.89	-3503	8.943	-2108.2
2245	237.92	14.88	-3501	8.947	-2109.1
2246	237.95	14.86	-3497	8.952	-2110.1
2247	237.96	14.88	-3503	8.956	-2111.1
2248	237.9	14.89	-3506	8.96	-2112.1
2249	237.93	14.89	-3503	8.964	-2113
2250	237.99	14.86	-3499	8.968	-2114
2251	237.95	14.83	-3491	8.972	-2115
2252	237.85	14.88	-3500	8.976	-2115.9
2253	237.93	14.89	-3503	8.98	-2116.9
2254	238.06	14.89	-3505	8.985	-2117.9

2255	237.99	14.86	-3499	8.989	-2118.9
2256	237.91	14.87	-3500	8.993	-2119.8
2257	237.95	14.89	-3504	8.997	-2120.8
2258	237.91	14.88	-3502	9.001	-2121.8
2259	238.06	14.86	-3497	9.005	-2122.8
2260	237.96	14.86	-3497	9.009	-2123.7
2261	237.98	14.9	-3507	9.013	-2124.7
2262	237.92	14.87	-3499	9.018	-2125.7
2263	237.89	14.88	-3501	9.022	-2126.6
2264	237.96	14.87	-3499	9.026	-2127.6
2265	237.84	14.9	-3505	9.03	-2128.6
2266	237.93	14.89	-3504	9.034	-2129.6
2267	237.93	14.89	-3505	9.038	-2130.5
2268	237.92	14.88	-3503	9.042	-2131.5
2269	238	14.85	-3498	9.047	-2132.5
2270	237.97	14.87	-3500	9.051	-2133.5
2271	238.08	14.86	-3497	9.055	-2134.4
2272	238.08	14.89	-3504	9.059	-2135.4
2273	238.04	14.91	-3510	9.063	-2136.4
2274	238.19	14.89	-3508	9.067	-2137.3
2275	238.01	14.87	-3501	9.071	-2138.3
2276	237.99	14.91	-3509	9.075	-2139.3
2277	237.97	14.89	-3505	9.08	-2140.3
2278	238.07	14.89	-3506	9.084	-2141.2
2279	238.07	14.87	-3500	9.088	-2142.2
2280	238.07	14.87	-3501	9.092	-2143.2
2281	238.09	14.89	-3505	9.096	-2144.2
2282	238.07	14.87	-3502	9.1	-2145.1
2283	237.97	14.9	-3506	9.104	-2146.1
2284	238.04	14.87	-3501	9.109	-2147.1
2285	237.97	14.88	-3504	9.113	-2148
2286	238.03	14.87	-3501	9.117	-2149
2287	238.09	14.86	-3500	9.121	-2150
2288	238.03	14.86	-3499	9.125	-2151
2289	238.01	14.89	-3503	9.129	-2151.9
2290	237.93	14.89	-3505	9.133	-2152.9
2291	238.01	14.87	-3502	9.137	-2153.9
2292	237.99	14.88	-3504	9.142	-2154.8
2293	237.92	14.84	-3494	9.146	-2155.8
2294	238.12	14.89	-3507	9.15	-2156.8
2295	237.98	14.93	-3515	9.154	-2157.8
2296	237.99	14.94	-3513	9.158	-2158.7
2297	238	14.89	-3506	9.162	-2159.7
2298	238.04	14.84	-3493	9.166	-2160.7
2299	237.94	14.88	-3502	9.171	-2161.7
2300	237.98	14.95	-3519	9.175	-2162.6
2301	237.94	14.9	-3505	9.179	-2163.6

2302	237.98	14.88	-3505	9.183	-2164.6
2303	237.97	14.85	-3495	9.187	-2165.6
2304	237.93	14.9	-3509	9.191	-2166.5
2305	238	14.9	-3506	9.195	-2167.5
2306	237.95	14.92	-3509	9.199	-2168.5
2307	238	14.84	-3492	9.204	-2169.4
2308	237.95	14.85	-3494	9.208	-2170.4
2309	237.96	14.92	-3511	9.212	-2171.4
2310	237.89	14.88	-3501	9.216	-2172.4
2311	237.99	14.91	-3510	9.22	-2173.3
2312	237.97	14.86	-3498	9.224	-2174.3
2313	237.9	14.89	-3503	9.228	-2175.3
2314	237.96	14.9	-3506	9.233	-2176.3
2315	237.59	14.95	-3514	9.237	-2177.2
2316	237.8	14.92	-3509	9.241	-2178.2
2317	237.78	14.96	-3518	9.245	-2179.2
2318	237.85	14.92	-3512	9.249	-2180.2
2319	237.83	14.9	-3505	9.253	-2181.1
2320	237.8	14.87	-3500	9.257	-2182.1
2321	237.83	14.87	-3498	9.261	-2183.1
2322	237.82	14.92	-3507	9.266	-2184
2323	237.82	14.9	-3504	9.27	-2185
2324	237.83	14.87	-3497	9.274	-2186
2325	237.81	14.91	-3507	9.278	-2187
2326	237.83	14.86	-3495	9.282	-2187.9
2327	237.85	14.97	-3524	9.286	-2188.9
2328	237.86	14.86	-3496	9.29	-2189.9
2329	237.87	14.89	-3503	9.295	-2190.9
2330	237.87	14.96	-3519	9.299	-2191.8
2331	237.88	14.91	-3506	9.303	-2192.8
2332	237.81	14.89	-3504	9.307	-2193.8
2333	237.93	14.91	-3508	9.311	-2194.8
2334	237.88	14.87	-3502	9.315	-2195.7
2335	237.8	14.89	-3500	9.319	-2196.7
2336	237.89	14.88	-3502	9.324	-2197.7
2337	237.85	14.93	-3510	9.328	-2198.6
2338	237.81	14.9	-3506	9.332	-2199.6
2339	237.81	14.92	-3508	9.336	-2200.6
2340	237.84	14.91	-3508	9.34	-2201.6
2341	237.84	14.89	-3504	9.344	-2202.6
2342	237.78	14.93	-3511	9.349	-2203.5
2343	237.79	14.91	-3506	9.353	-2204.5
2344	237.83	14.89	-3504	9.357	-2205.5
2345	237.86	14.92	-3509	9.361	-2206.5
2346	237.9	14.89	-3504	9.365	-2207.4
2347	237.85	14.92	-3510	9.369	-2208.4
2348	237.86	14.89	-3505	9.373	-2209.4

2349	237.84	14.88	-3502	9.378	-2210.4
2350	237.87	14.89	-3503	9.382	-2211.3
2351	237.88	14.87	-3500	9.386	-2212.3
2352	237.91	14.89	-3503	9.39	-2213.3
2353	237.86	14.94	-3514	9.394	-2214.3
2354	237.88	14.91	-3507	9.398	-2215.2
2355	237.78	14.89	-3503	9.402	-2216.2
2356	237.73	14.92	-3509	9.406	-2217.2
2357	237.73	14.91	-3507	9.411	-2218.2
2358	237.67	14.95	-3515	9.415	-2219.1
2359	237.67	14.91	-3504	9.419	-2220.1
2360	237.66	14.91	-3508	9.423	-2221.1
2361	237.65	14.91	-3504	9.427	-2222
2362	237.68	14.93	-3510	9.431	-2223
2363	237.68	14.91	-3507	9.435	-2224
2364	237.73	14.92	-3510	9.44	-2225
2365	237.67	14.89	-3500	9.444	-2225.9
2366	237.78	14.93	-3512	9.448	-2226.9
2367	237.76	14.9	-3503	9.452	-2227.9
2368	237.82	14.91	-3510	9.456	-2228.9
2369	237.85	14.93	-3514	9.46	-2229.8
2370	237.83	14.87	-3499	9.464	-2230.8
2371	237.8	14.93	-3512	9.469	-2231.8
2372	237.87	14.87	-3502	9.473	-2232.8
2373	237.86	14.9	-3506	9.477	-2233.7
2374	237.86	14.89	-3504	9.481	-2234.7
2375	237.79	14.92	-3510	9.485	-2235.7
2376	237.85	14.91	-3510	9.489	-2236.7
2377	237.78	14.93	-3512	9.493	-2237.6
2378	237.76	14.9	-3505	9.498	-2238.6
2379	237.78	14.93	-3515	9.502	-2239.6
2380	237.86	14.92	-3512	9.506	-2240.6
2381	237.78	14.9	-3508	9.51	-2241.5
2382	237.76	14.92	-3510	9.514	-2242.5
2383	237.68	14.9	-3504	9.518	-2243.5
2384	237.7	14.9	-3505	9.522	-2244.5
2385	237.78	14.9	-3507	9.527	-2245.4
2386	237.76	14.92	-3512	9.531	-2246.4
2387	237.72	14.92	-3510	9.535	-2247.4
2388	237.74	14.92	-3511	9.539	-2248.4
2389	237.73	14.94	-3515	9.543	-2249.3
2390	237.74	14.87	-3498	9.547	-2250.3
2391	237.76	14.86	-3496	9.551	-2251.3
2392	237.67	14.93	-3511	9.556	-2252.3
2393	237.83	14.92	-3511	9.56	-2253.2
2394	237.8	14.92	-3511	9.564	-2254.2
2395	237.81	14.89	-3504	9.568	-2255.2

2396	237.85	14.9	-3508	9.572	-2256.2
2397	237.9	14.91	-3512	9.576	-2257.1
2398	237.88	14.92	-3510	9.58	-2258.1
2399	237.85	14.88	-3502	9.585	-2259.1
2400	237.81	14.9	-3505	9.589	-2260
2401	237.86	14.89	-3505	9.593	-2261
2402	237.84	14.89	-3503	9.597	-2262
2403	237.84	14.9	-3507	9.601	-2263
2404	237.83	14.9	-3504	9.605	-2263.9
2405	237.79	14.9	-3507	9.609	-2264.9
2406	237.77	14.92	-3510	9.614	-2265.9
2407	237.8	14.91	-3508	9.618	-2266.9
2408	237.77	14.95	-3515	9.622	-2267.8
2409	237.73	14.92	-3510	9.626	-2268.8
2410	237.73	14.94	-3514	9.63	-2269.8
2411	237.79	14.91	-3509	9.634	-2270.8
2412	237.69	14.93	-3512	9.638	-2271.7
2413	237.87	14.91	-3509	9.643	-2272.7
2414	237.87	14.91	-3510	9.647	-2273.7
2415	237.78	14.91	-3508	9.651	-2274.7
2416	237.82	14.91	-3509	9.655	-2275.6
2417	237.82	14.91	-3510	9.659	-2276.6
2418	237.73	14.93	-3513	9.663	-2277.6
2419	237.76	14.9	-3505	9.667	-2278.6
2420	237.79	14.92	-3510	9.672	-2279.5
2421	237.75	14.92	-3510	9.676	-2280.5
2422	237.82	14.91	-3510	9.68	-2281.5
2423	237.74	14.9	-3505	9.684	-2282.5
2424	237.74	14.91	-3508	9.688	-2283.4
2425	237.67	14.91	-3505	9.692	-2284.4
2426	237.83	14.9	-3505	9.696	-2285.4
2427	237.77	14.9	-3506	9.701	-2286.4
2428	237.78	14.91	-3508	9.705	-2287.3
2429	237.72	14.89	-3503	9.709	-2288.3
2430	237.77	14.93	-3514	9.713	-2289.3
2431	237.76	14.94	-3515	9.717	-2290.3
2432	237.81	14.93	-3513	9.721	-2291.2
2433	237.87	14.92	-3511	9.725	-2292.2
2434	237.96	14.86	-3500	9.73	-2293.2
2435	237.91	14.9	-3509	9.734	-2294.2
2436	237.87	14.93	-3514	9.738	-2295.1
2437	237.79	14.92	-3510	9.742	-2296.1
2438	237.87	14.9	-3507	9.746	-2297.1
2439	237.88	14.92	-3511	9.75	-2298.1
2440	237.91	14.89	-3507	9.754	-2299
2441	237.88	14.89	-3504	9.759	-2300
2442	237.91	14.9	-3507	9.763	-2301

2443	237.93	14.93	-3515	9.767	-2302
2444	237.82	14.94	-3516	9.771	-2302.9
2445	237.89	14.86	-3499	9.775	-2303.9
2446	237.87	14.91	-3511	9.779	-2304.9
2447	237.82	14.93	-3514	9.783	-2305.9
2448	237.79	14.94	-3514	9.788	-2306.9
2449	237.75	14.91	-3506	9.792	-2307.8
2450	237.83	14.91	-3508	9.796	-2308.8
2451	237.76	14.92	-3510	9.8	-2309.8
2452	237.74	14.91	-3507	9.804	-2310.8
2453	237.63	14.95	-3515	9.808	-2311.7
2454	237.74	14.92	-3509	9.812	-2312.7
2455	237.75	14.92	-3512	9.817	-2313.7
2456	237.79	14.89	-3503	9.821	-2314.7
2457	237.67	14.92	-3509	9.825	-2315.6
2458	237.78	14.95	-3517	9.829	-2316.6
2459	237.75	14.91	-3506	9.833	-2317.6
2460	237.8	14.92	-3510	9.837	-2318.6
2461	237.7	14.94	-3515	9.841	-2319.5
2462	237.64	14.93	-3511	9.846	-2320.5
2463	237.92	14.97	-3523	9.85	-2321.5
2464	237.92	14.94	-3519	9.854	-2322.4
2465	237.82	15.05	-3539	9.858	-2323.4
2466	237.83	14.88	-3503	9.862	-2324.4
2467	237.78	14.91	-3507	9.866	-2325.4
2468	237.81	14.97	-3522	9.87	-2326.3
2469	237.84	14.86	-3494	9.875	-2327.3
2470	237.73	15.05	-3538	9.879	-2328.3
2471	237.79	14.9	-3502	9.883	-2329.3
2472	237.71	14.96	-3517	9.887	-2330.2
2473	237.66	14.92	-3506	9.891	-2331.2
2474	237.75	14.95	-3515	9.895	-2332.2
2475	237.78	14.92	-3513	9.899	-2333.2
2476	237.84	14.93	-3512	9.904	-2334.1
2477	237.79	14.88	-3501	9.908	-2335.1
2478	237.84	14.96	-3518	9.912	-2336.1
2479	237.9	14.91	-3508	9.916	-2337.1
2480	237.89	14.85	-3493	9.92	-2338
2481	237.83	14.97	-3520	9.924	-2339
2482	237.84	14.98	-3523	9.928	-2340
2483	237.79	14.95	-3518	9.933	-2341
2484	237.74	14.98	-3525	9.937	-2341.9
2485	237.73	14.93	-3510	9.941	-2342.9
2486	237.72	14.92	-3509	9.945	-2343.9
2487	237.74	14.97	-3522	9.949	-2344.9
2488	237.71	14.99	-3526	9.953	-2345.8
2489	237.84	14.91	-3506	9.958	-2346.8

2490	237.75	14.98	-3524	9.962	-2347.8
2491	237.8	14.97	-3521	9.966	-2348.8
2492	237.71	14.92	-3509	9.97	-2349.8
2493	237.65	15	-3527	9.974	-2350.7
2494	237.75	14.94	-3514	9.978	-2351.7
2495	237.74	14.86	-3494	9.982	-2352.7
2496	237.73	14.96	-3519	9.987	-2353.7
2497	238.19	14.9	-3509	9.991	-2354.6
2498	237.51	14.92	-3505	9.995	-2355.6
2499	237.6	14.95	-3512	9.999	-2356.6
2500	238.08	14.99	-3529	10.003	-2357.6
2501	238.07	14.92	-3511	10.007	-2358.5
2502	238.12	14.88	-3505	10.011	-2359.5
2503	238.11	14.96	-3524	10.016	-2360.5
2504	238.11	14.92	-3512	10.02	-2361.5
2505	238.06	14.97	-3527	10.024	-2362.4
2506	238.1	14.86	-3498	10.028	-2363.4
2507	238.14	14.96	-3525	10.032	-2364.4
2508	238.09	14.96	-3520	10.036	-2365.4
2509	238.11	14.94	-3517	10.04	-2366.3
2510	238.06	14.9	-3507	10.045	-2367.3
2511	238.03	14.97	-3523	10.049	-2368.3
2512	238.06	14.94	-3518	10.053	-2369.3
2513	238.04	14.91	-3509	10.057	-2370.2
2514	238.09	14.94	-3521	10.061	-2371.2
2515	238.12	14.92	-3514	10.065	-2372.2
2516	238.09	14.95	-3521	10.069	-2373.2
2517	238.15	14.89	-3508	10.074	-2374.2
2518	238.22	14.9	-3511	10.078	-2375.1
2519	238.23	14.89	-3508	10.082	-2376.1
2520	238.26	14.91	-3513	10.086	-2377.1
2521	238.19	14.93	-3517	10.09	-2378.1
2522	238.19	14.87	-3502	10.094	-2379
2523	238.19	14.92	-3515	10.098	-2380
2524	238.22	14.94	-3519	10.103	-2381
2525	238.17	14.94	-3520	10.107	-2382
2526	238.23	14.91	-3512	10.111	-2382.9
2527	238.16	14.9	-3509	10.115	-2383.9
2528	238.14	14.91	-3512	10.119	-2384.9
2529	238.18	14.93	-3519	10.123	-2385.9
2530	238.2	14.93	-3519	10.128	-2386.8
2531	238.2	14.92	-3515	10.132	-2387.8
2532	238.19	14.9	-3509	10.136	-2388.8
2533	238.22	14.92	-3516	10.14	-2389.8
2534	238.15	14.93	-3516	10.144	-2390.8
2535	238.2	14.92	-3515	10.148	-2391.7
2536	238.22	14.92	-3514	10.152	-2392.7

2537	238.21	14.87	-3503	10.157	-2393.7
2538	238.34	14.91	-3513	10.161	-2394.7
2539	238.19	14.89	-3508	10.165	-2395.6
2540	238.27	14.91	-3512	10.169	-2396.6
2541	238.33	14.91	-3515	10.173	-2397.6
2542	238.26	14.91	-3513	10.177	-2398.6
2543	238.3	14.89	-3510	10.181	-2399.5
2544	238.25	14.9	-3512	10.186	-2400.5
2545	238.21	14.91	-3514	10.19	-2401.5
2546	238.12	14.93	-3517	10.194	-2402.5
2547	238.23	14.9	-3511	10.198	-2403.4
2548	238.17	14.93	-3517	10.202	-2404.4
2549	238.13	14.95	-3520	10.206	-2405.4
2550	238.22	14.9	-3511	10.21	-2406.4
2551	238.02	14.94	-3516	10.215	-2407.4
2552	237.99	14.93	-3514	10.219	-2408.3
2553	238.07	14.93	-3514	10.223	-2409.3
2554	238.1	14.94	-3518	10.227	-2410.3
2555	238.06	14.93	-3515	10.231	-2411.3
2556	238	14.92	-3512	10.235	-2412.2
2557	237.98	14.94	-3517	10.239	-2413.2
2558	238	14.93	-3514	10.244	-2414.2
2559	237.98	14.94	-3518	10.248	-2415.2
2560	238.07	14.92	-3514	10.252	-2416.1
2561	238.07	14.95	-3522	10.256	-2417.1
2562	238.1	14.91	-3513	10.26	-2418.1
2563	238.11	14.94	-3519	10.264	-2419.1
2564	238.16	14.9	-3510	10.268	-2420.1
2565	238.21	14.9	-3510	10.273	-2421
2566	238.07	14.95	-3521	10.277	-2422
2567	238.06	14.93	-3514	10.281	-2423
2568	238	14.93	-3516	10.285	-2424
2569	237.93	14.94	-3516	10.289	-2424.9
2570	238	14.89	-3505	10.293	-2425.9
2571	238.08	14.95	-3522	10.297	-2426.9
2572	238.08	14.95	-3520	10.302	-2427.8
2573	238.06	14.96	-3523	10.306	-2428.8
2574	238.03	14.92	-3513	10.31	-2429.8
2575	238.03	14.95	-3521	10.314	-2430.8
2576	237.97	14.95	-3520	10.318	-2431.7
2577	237.98	14.95	-3519	10.322	-2432.7
2578	237.95	14.93	-3512	10.326	-2433.7
2579	237.93	14.94	-3515	10.331	-2434.7
2580	238	14.93	-3517	10.335	-2435.7
2581	237.98	14.91	-3508	10.339	-2436.6
2582	237.95	14.93	-3516	10.343	-2437.6
2583	238.03	14.91	-3511	10.347	-2438.6

2584	237.98	14.94	-3519	10.351	-2439.6
2585	237.95	14.95	-3519	10.355	-2440.5
2586	238	14.88	-3506	10.36	-2441.5
2587	237.97	14.99	-3531	10.364	-2442.5
2588	237.95	14.94	-3517	10.368	-2443.5
2589	238.05	14.93	-3516	10.372	-2444.5
2590	237.96	14.94	-3518	10.376	-2445.4
2591	237.97	14.95	-3519	10.38	-2446.4
2592	238.01	14.97	-3524	10.385	-2447.4
2593	237.95	14.97	-3523	10.389	-2448.4
2594	238.01	14.94	-3514	10.393	-2449.3
2595	237.99	14.89	-3508	10.397	-2450.3
2596	238.01	14.89	-3507	10.401	-2451.3
2597	237.97	14.95	-3523	10.405	-2452.3
2598	237.98	14.92	-3513	10.409	-2453.3
2599	237.97	14.9	-3508	10.414	-2454.2
2600	237.98	14.89	-3504	10.418	-2455.2
2601	238.03	14.93	-3516	10.422	-2456.2
2602	237.96	14.95	-3519	10.426	-2457.2
2603	237.98	14.95	-3522	10.43	-2458.1
2604	238.04	14.98	-3525	10.434	-2459.1
2605	238.06	14.95	-3518	10.439	-2460.1
2606	238.04	14.92	-3512	10.443	-2461.1
2607	238.1	14.94	-3516	10.447	-2462
2608	238.07	14.94	-3518	10.451	-2463
2609	238.11	14.95	-3520	10.455	-2464
2610	238.05	14.95	-3521	10.459	-2465
2611	238.04	14.96	-3522	10.463	-2466
2612	238.18	14.94	-3520	10.468	-2466.9
2613	238.15	14.91	-3512	10.472	-2467.9
2614	238.08	14.92	-3514	10.476	-2468.9
2615	238.08	14.93	-3514	10.48	-2469.9
2616	238.13	14.92	-3515	10.484	-2470.8
2617	238.08	14.93	-3516	10.488	-2471.8
2618	238.18	14.93	-3517	10.493	-2472.8
2619	238.11	14.92	-3513	10.497	-2473.8
2620	238.06	14.92	-3513	10.501	-2474.8
2621	238.11	14.92	-3514	10.505	-2475.7
2622	238.1	14.92	-3512	10.509	-2476.7
2623	238.07	14.95	-3520	10.513	-2477.7
2624	238.05	14.98	-3525	10.517	-2478.7
2625	238.12	14.97	-3526	10.522	-2479.7
2626	238.11	14.96	-3523	10.526	-2480.6
2627	238.09	14.94	-3520	10.53	-2481.6
2628	238.16	14.94	-3519	10.534	-2482.6
2629	238.11	14.94	-3518	10.538	-2483.6
2630	238.16	14.93	-3517	10.542	-2484.5

2631	238	14.97	-3523	10.546	-2485.5
2632	238.1	14.94	-3518	10.551	-2486.5
2633	238.1	14.93	-3516	10.555	-2487.5
2634	238.13	14.98	-3529	10.559	-2488.4
2635	238.09	14.91	-3509	10.563	-2489.4
2636	238.04	15	-3531	10.567	-2490.4
2637	237.95	15	-3531	10.571	-2491.4
2638	237.97	14.99	-3527	10.575	-2492.3
2639	237.96	14.95	-3518	10.58	-2493.3
2640	237.96	15	-3530	10.584	-2494.3
2641	237.95	14.96	-3522	10.588	-2495.3
2642	237.99	14.95	-3521	10.592	-2496.2
2643	238.04	14.92	-3515	10.596	-2497.2
2644	238.05	14.92	-3514	10.6	-2498.2
2645	238.06	14.95	-3522	10.605	-2499.2
2646	238.26	14.91	-3511	10.609	-2500.2
2647	238.25	14.95	-3521	10.613	-2501.1
2648	238.26	14.95	-3523	10.617	-2502.1
2649	238.19	14.96	-3522	10.621	-2503.1
2650	238.26	14.95	-3524	10.625	-2504.1
2651	238.28	14.97	-3528	10.629	-2505
2652	238.26	14.97	-3530	10.634	-2506
2653	238.24	14.94	-3520	10.638	-2507
2654	238.21	14.94	-3522	10.642	-2508
2655	238.18	14.94	-3518	10.646	-2509
2656	238.17	14.91	-3513	10.65	-2509.9
2657	238.18	14.94	-3519	10.654	-2510.9
2658	238.22	14.96	-3524	10.658	-2511.9
2659	238.26	14.94	-3520	10.663	-2512.9
2660	238.21	14.95	-3522	10.667	-2513.8
2661	238.13	14.99	-3532	10.671	-2514.8
2662	238.24	14.92	-3515	10.675	-2515.8
2663	237.84	14.93	-3513	10.679	-2516.8
2664	237.9	14.9	-3504	10.683	-2517.8
2665	238.16	14.93	-3515	10.688	-2518.7
2666	238.23	14.95	-3519	10.692	-2519.7
2667	238.16	15	-3533	10.696	-2520.7
2668	238.06	14.93	-3515	10.7	-2521.7
2669	238.12	14.95	-3521	10.704	-2522.7
2670	238.16	14.94	-3518	10.708	-2523.6
2671	238.11	14.96	-3523	10.712	-2524.6
2672	238.08	14.97	-3525	10.717	-2525.6
2673	237.97	14.97	-3524	10.721	-2526.6
2674	238.05	14.93	-3516	10.725	-2527.5
2675	238	14.96	-3523	10.729	-2528.5
2676	238.08	14.93	-3517	10.733	-2529.5
2677	238.03	14.95	-3520	10.737	-2530.5

2678	237.95	14.93	-3515	10.742	-2531.5
2679	238.05	14.98	-3527	10.746	-2532.4
2680	238.09	14.97	-3526	10.75	-2533.4
2681	238.05	14.96	-3521	10.754	-2534.4
2682	238.02	14.94	-3518	10.758	-2535.4
2683	238.08	14.96	-3522	10.762	-2536.4
2684	238	14.94	-3517	10.766	-2537.3
2685	238.08	14.95	-3522	10.771	-2538.3
2686	238.11	14.95	-3523	10.775	-2539.3
2687	238.1	14.95	-3522	10.779	-2540.3
2688	238.05	14.96	-3524	10.783	-2541.2
2689	237.79	14.98	-3524	10.787	-2542.2
2690	238.03	14.91	-3512	10.791	-2543.2
2691	238.13	14.94	-3519	10.796	-2544.2
2692	238.14	14.94	-3521	10.8	-2545.2
2693	238.16	14.96	-3525	10.804	-2546.1
2694	238.16	14.96	-3523	10.808	-2547.1
2695	238.14	14.95	-3523	10.812	-2548.1
2696	238.15	14.95	-3523	10.816	-2549.1
2697	238.12	14.98	-3528	10.821	-2550.1
2698	238.2	14.95	-3522	10.825	-2551
2699	238.13	14.97	-3526	10.829	-2552
2700	238.17	14.93	-3518	10.833	-2553
2701	238.11	14.97	-3526	10.837	-2554
2702	238.06	14.95	-3520	10.841	-2554.9
2703	238.11	14.98	-3529	10.845	-2555.9
2704	238.18	14.95	-3522	10.85	-2556.9
2705	238.05	14.98	-3527	10.854	-2557.9
2706	238.18	14.94	-3521	10.858	-2558.9
2707	238.16	14.95	-3523	10.862	-2559.8
2708	238.12	15.01	-3536	10.866	-2560.8
2709	238.19	14.98	-3530	10.87	-2561.8
2710	238.16	14.86	-3502	10.874	-2562.7
2711	238.14	14.99	-3531	10.879	-2563.7
2712	238.09	14.9	-3508	10.883	-2564.7
2713	238.08	14.94	-3518	10.887	-2565.7
2714	238.17	15	-3534	10.891	-2566.7
2715	238.21	14.94	-3522	10.895	-2567.6
2716	238.13	14.96	-3526	10.899	-2568.6
2717	238.15	14.98	-3532	10.903	-2569.6
2718	238.05	14.91	-3511	10.908	-2570.6
2719	238.09	14.89	-3509	10.912	-2571.6
2720	238.08	14.92	-3517	10.916	-2572.5
2721	238.18	14.97	-3528	10.92	-2573.5
2722	238.08	14.96	-3524	10.924	-2574.5
2723	238.17	14.91	-3512	10.928	-2575.5
2724	238.1	14.91	-3511	10.932	-2576.4

2725	238.04	14.96	-3522	10.937	-2577.4
2726	238.22	14.95	-3525	10.941	-2578.4
2727	238.15	14.9	-3511	10.945	-2579.4
2728	238.19	14.96	-3527	10.949	-2580.4
2729	238.19	14.95	-3524	10.953	-2581.3
2730	238.11	14.78	-3486	10.957	-2582.3
2731	238.19	14.82	-3491	10.962	-2583.3
2732	238.19	14.76	-3475	10.966	-2584.3
2733	238.25	14.94	-3520	10.97	-2585.2
2734	238.26	14.73	-3474	10.974	-2586.2
2735	238.2	14.92	-3513	10.978	-2587.2
2736	238.14	14.77	-3479	10.982	-2588.2
2737	238.09	14.95	-3520	10.986	-2589.1
2738	238.15	14.79	-3486	10.99	-2590.1
2739	238.02	14.81	-3488	10.995	-2591.1
2740	238.08	14.8	-3488	10.999	-2592
2741	238	15.01	-3533	11.003	-2593
2742	237.99	14.94	-3518	11.007	-2594
2743	237.97	14.81	-3484	11.011	-2595
2744	238.03	14.72	-3465	11.015	-2595.9
2745	238.03	14.78	-3476	11.019	-2596.9
2746	237.94	14.79	-3480	11.023	-2597.9
2747	237.91	14.76	-3473	11.028	-2598.8
2748	237.98	14.79	-3480	11.032	-2599.8
2749	237.96	14.86	-3497	11.036	-2600.8
2750	238.05	14.8	-3485	11.04	-2601.7
2751	238.04	14.81	-3488	11.044	-2602.7
2752	237.99	14.83	-3491	11.048	-2603.7
2753	237.94	14.81	-3487	11.052	-2604.6
2754	238.04	14.78	-3479	11.056	-2605.6
2755	238.01	14.79	-3482	11.06	-2606.6
2756	237.97	14.95	-3514	11.065	-2607.6
2757	237.96	14.84	-3492	11.069	-2608.5
2758	237.98	14.87	-3499	11.073	-2609.5
2759	237.91	14.82	-3486	11.077	-2610.5
2760	238.01	14.8	-3483	11.081	-2611.4
2761	238.02	14.86	-3499	11.085	-2612.4
2762	238.04	14.75	-3472	11.089	-2613.4
2763	237.99	14.8	-3484	11.093	-2614.3
2764	238.05	14.8	-3487	11.098	-2615.3
2765	237.92	14.84	-3492	11.102	-2616.3
2766	238.02	14.85	-3494	11.106	-2617.2
2767	238.02	14.74	-3467	11.11	-2618.2
2768	238.04	14.83	-3489	11.114	-2619.2
2769	238.07	14.85	-3496	11.118	-2620.1
2770	238.01	14.74	-3470	11.122	-2621.1
2771	238	14.84	-3494	11.126	-2622.1

2772	238.02	14.78	-3481	11.13	-2623.1
2773	238.01	14.81	-3487	11.135	-2624
2774	237.95	14.76	-3474	11.139	-2625
2775	237.96	14.82	-3487	11.143	-2626
2776	237.92	14.83	-3488	11.147	-2626.9
2777	237.87	14.82	-3485	11.151	-2627.9
2778	237.94	14.81	-3484	11.155	-2628.9
2779	237.97	14.79	-3483	11.159	-2629.8
2780	237.94	14.83	-3487	11.163	-2630.8
2781	237.95	14.82	-3486	11.168	-2631.8
2782	237.9	14.79	-3479	11.172	-2632.7
2783	238.03	14.83	-3490	11.176	-2633.7
2784	237.97	14.83	-3488	11.18	-2634.7
2785	237.99	14.8	-3482	11.184	-2635.6
2786	237.93	14.8	-3482	11.188	-2636.6
2787	238.09	14.81	-3487	11.192	-2637.6
2788	237.98	14.8	-3481	11.196	-2638.6
2789	238.02	14.79	-3480	11.2	-2639.5
2790	238.18	14.79	-3483	11.205	-2640.5
2791	238.01	14.85	-3493	11.209	-2641.5
2792	238	14.84	-3493	11.213	-2642.4
2793	238.11	14.8	-3484	11.217	-2643.4
2794	237.85	14.83	-3488	11.221	-2644.4
2795	237.96	14.79	-3480	11.225	-2645.3
2796	237.94	14.83	-3490	11.229	-2646.3
2797	237.99	14.84	-3492	11.233	-2647.3
2798	237.94	14.82	-3487	11.238	-2648.2
2799	237.93	14.85	-3493	11.242	-2649.2
2800	237.87	14.81	-3484	11.246	-2650.2
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2802	237.94	14.81	-3484	11.254	-2652.1
2803	237.98	14.8	-3482	11.258	-2653.1
2804	237.95	14.84	-3492	11.262	-2654.1
2805	238.03	14.83	-3491	11.266	-2655
2806	237.98	14.84	-3491	11.27	-2656
2807	237.97	14.81	-3487	11.275	-2657
2808	237.96	14.84	-3493	11.279	-2657.9
2809	238.06	14.84	-3493	11.283	-2658.9
2810	238.12	14.8	-3485	11.287	-2659.9
2811	238.18	14.81	-3487	11.291	-2660.8
2812	238.12	14.79	-3482	11.295	-2661.8
2813	238.09	14.81	-3486	11.299	-2662.8
2814	238	14.82	-3487	11.303	-2663.8
2815	238.11	14.8	-3483	11.308	-2664.7
2816	238.06	14.81	-3486	11.312	-2665.7
2817	237.98	14.84	-3493	11.316	-2666.7
2818	237.96	14.84	-3492	11.32	-2667.6

2819	237.99	14.85	-3494	11.324	-2668.6
2820	237.92	14.81	-3485	11.328	-2669.6
2821	238.08	14.85	-3495	11.332	-2670.5
2822	238.04	14.82	-3489	11.336	-2671.5
2823	237.97	14.85	-3495	11.34	-2672.5
2824	237.99	14.85	-3496	11.345	-2673.4
2825	238.04	14.85	-3497	11.349	-2674.4
2826	237.99	14.83	-3492	11.353	-2675.4
2827	238.04	14.82	-3491	11.357	-2676.4
2828	238.01	14.82	-3489	11.361	-2677.3
2829	238.08	14.82	-3491	11.365	-2678.3
2830	237.93	14.82	-3487	11.369	-2679.3
2831	238.02	14.8	-3486	11.373	-2680.2
2832	237.97	14.8	-3485	11.378	-2681.2
2833	237.94	14.82	-3487	11.382	-2682.2
2834	237.94	14.81	-3485	11.386	-2683.1
2835	237.91	14.82	-3487	11.39	-2684.1
2836	237.86	14.92	-3509	11.394	-2685
2837	237.94	14.77	-3476	11.398	-2686
2838	237.85	14.86	-3498	11.402	-2687
2839	237.71	14.88	-3499	11.406	-2688
2840	237.8	14.86	-3496	11.41	-2688.9
2841	237.92	14.82	-3487	11.414	-2689.9
2842	237.85	14.83	-3489	11.419	-2690.9
2843	237.83	14.84	-3490	11.423	-2691.8
2844	237.85	14.79	-3480	11.427	-2692.8
2845	237.9	14.92	-3514	11.431	-2693.8
2846	237.88	14.82	-3488	11.435	-2694.7
2847	237.91	14.86	-3500	11.439	-2695.7
2848	237.9	14.88	-3499	11.443	-2696.7
2849	237.92	14.78	-3481	11.447	-2697.6
2850	237.81	14.85	-3493	11.452	-2698.6
2851	237.96	14.83	-3489	11.456	-2699.6
2852	237.9	14.8	-3482	11.46	-2700.6
2853	237.9	14.84	-3493	11.464	-2701.5
2854	237.86	14.82	-3487	11.468	-2702.5
2855	237.91	14.84	-3491	11.472	-2703.5
2856	237.88	14.83	-3491	11.476	-2704.4
2857	237.84	14.83	-3488	11.48	-2705.4
2858	237.9	14.77	-3477	11.485	-2706.4
2859	237.84	14.86	-3495	11.489	-2707.3
2860	237.9	14.77	-3476	11.493	-2708.3
2861	237.87	14.83	-3490	11.497	-2709.3
2862	237.93	14.89	-3502	11.501	-2710.3
2863	237.79	14.86	-3495	11.505	-2711.2
2864	237.9	14.81	-3486	11.509	-2712.2
2865	237.94	14.77	-3477	11.513	-2713.2

2866	237.87	14.91	-3507	11.517	-2714.1
2867	237.8	14.8	-3480	11.522	-2715.1
2868	237.66	14.88	-3497	11.526	-2716.1
2869	237.73	14.85	-3493	11.53	-2717
2870	237.78	14.87	-3499	11.534	-2718
2871	237.79	14.85	-3492	11.538	-2719
2872	237.81	14.88	-3500	11.542	-2720
2873	237.8	14.79	-3480	11.546	-2720.9
2874	237.64	14.91	-3506	11.55	-2721.9
2875	237.8	14.81	-3484	11.555	-2722.9
2876	237.87	14.85	-3494	11.559	-2723.8
2877	237.85	14.81	-3485	11.563	-2724.8
2878	237.84	14.79	-3479	11.567	-2725.8
2879	237.82	14.9	-3507	11.571	-2726.7
2880	237.67	14.84	-3488	11.575	-2727.7
2881	237.82	14.85	-3496	11.579	-2728.7
2882	237.8	14.83	-3490	11.583	-2729.7
2883	237.83	14.79	-3481	11.588	-2730.6
2884	237.81	14.86	-3493	11.592	-2731.6
2885	237.84	14.85	-3492	11.596	-2732.6
2886	237.83	14.82	-3485	11.6	-2733.5
2887	237.83	14.86	-3495	11.604	-2734.5
2888	237.84	14.91	-3508	11.608	-2735.5
2889	237.9	14.86	-3498	11.612	-2736.4
2890	237.98	14.84	-3494	11.616	-2737.4
2891	237.88	14.86	-3496	11.621	-2738.4
2892	238.09	14.81	-3488	11.625	-2739.4
2893	238.14	14.74	-3471	11.629	-2740.3
2894	238.01	14.81	-3486	11.633	-2741.3
2895	238.07	14.84	-3494	11.637	-2742.3
2896	238.08	14.82	-3487	11.641	-2743.2
2897	238.02	14.93	-3516	11.645	-2744.2
2898	237.97	14.91	-3508	11.649	-2745.2
2899	237.99	14.82	-3489	11.654	-2746.1
2900	237.87	14.89	-3504	11.658	-2747.1
2901	237.98	14.87	-3499	11.662	-2748.1
2902	237.86	14.85	-3493	11.666	-2749.1
2903	237.89	14.95	-3515	11.67	-2750
2904	237.93	14.92	-3512	11.674	-2751
2905	236.88	14.92	-3496	11.678	-2752
2906	237.8	14.94	-3517	11.682	-2752.9
2907	237.83	14.9	-3504	11.687	-2753.9
2908	237.87	14.77	-3474	11.691	-2754.9
2909	237.89	14.86	-3496	11.695	-2755.8
2910	237.76	14.87	-3495	11.699	-2756.8
2911	237.7	14.86	-3495	11.703	-2757.8
2912	237.83	14.88	-3499	11.707	-2758.8

2913	237.74	14.9	-3503	11.711	-2759.7
2914	237.81	14.92	-3510	11.715	-2760.7
2915	237.79	14.77	-3474	11.72	-2761.7
2916	237.72	14.9	-3502	11.724	-2762.6
2917	237.73	14.84	-3487	11.728	-2763.6
2918	237.69	14.81	-3480	11.732	-2764.6
2919	237.8	14.86	-3497	11.736	-2765.5
2920	237.87	14.82	-3487	11.74	-2766.5
2921	237.76	14.88	-3500	11.744	-2767.5
2922	237.81	14.87	-3497	11.748	-2768.5
2923	237.81	14.83	-3488	11.753	-2769.4
2924	237.79	14.89	-3501	11.757	-2770.4
2925	237.76	14.88	-3496	11.761	-2771.4
2926	237.85	14.81	-3487	11.765	-2772.3
2927	237.8	14.87	-3497	11.769	-2773.3
2928	237.77	14.82	-3486	11.773	-2774.3
2929	237.78	14.92	-3508	11.777	-2775.3
2930	237.86	14.76	-3471	11.781	-2776.2
2931	237.82	14.91	-3507	11.786	-2777.2
2932	237.85	14.86	-3494	11.79	-2778.2
2933	237.66	14.93	-3509	11.794	-2779.1
2934	237.79	14.81	-3484	11.798	-2780.1
2935	237.82	14.91	-3508	11.802	-2781.1
2936	237.83	14.85	-3494	11.806	-2782
2937	237.88	14.87	-3497	11.81	-2783
2938	237.91	14.74	-3470	11.814	-2784
2939	237.9	14.89	-3502	11.819	-2785
2940	238.05	14.88	-3505	11.823	-2785.9
2941	238.01	14.88	-3502	11.827	-2786.9
2942	237.86	14.87	-3498	11.831	-2787.9
2943	237.81	14.86	-3499	11.835	-2788.8
2944	237.9	14.9	-3506	11.839	-2789.8
2945	237.83	14.84	-3491	11.843	-2790.8
2946	237.87	14.85	-3493	11.848	-2791.8
2947	237.93	14.84	-3493	11.852	-2792.8
2948	237.85	14.87	-3498	11.856	-2793.7
2949	237.89	14.87	-3498	11.86	-2794.7
2950	237.88	14.87	-3498	11.864	-2795.7
2951	237.91	14.86	-3496	11.868	-2796.6
2952	237.92	14.87	-3497	11.872	-2797.6
2953	237.9	14.87	-3498	11.876	-2798.6
2954	237.87	14.83	-3489	11.881	-2799.6
2955	237.8	14.86	-3495	11.885	-2800.5
2956	237.81	14.84	-3491	11.889	-2801.5
2957	237.88	14.88	-3500	11.893	-2802.5
2958	237.88	14.82	-3488	11.897	-2803.4
2959	237.83	14.85	-3494	11.901	-2804.4

2960	237.85	14.87	-3498	11.905	-2805.4
2961	237.73	14.86	-3495	11.91	-2806.4
2962	237.91	14.86	-3496	11.914	-2807.4
2963	237.85	14.85	-3493	11.918	-2808.3
2964	237.91	14.85	-3493	11.922	-2809.3
2965	237.89	14.85	-3494	11.926	-2810.2
2966	237.87	14.88	-3500	11.93	-2811.2
2967	237.91	14.83	-3488	11.934	-2812.2
2968	237.82	14.86	-3494	11.938	-2813.1
2969	237.82	14.88	-3499	11.943	-2814.1
2970	237.89	14.88	-3499	11.947	-2815.1
2971	237.98	14.87	-3499	11.951	-2816.1
2972	237.97	14.85	-3493	11.955	-2817
2973	238.07	14.84	-3495	11.959	-2818
2974	238.04	14.86	-3496	11.963	-2819
2975	238.12	14.86	-3501	11.967	-2819.9
2976	238.03	14.83	-3490	11.971	-2820.9
2977	238.02	14.86	-3497	11.976	-2821.9
2978	238.02	14.84	-3493	11.98	-2822.9
2979	237.97	14.88	-3501	11.984	-2823.8
2980	238.09	14.88	-3504	11.988	-2824.8
2981	237.97	14.88	-3503	11.992	-2825.8
2982	237.95	14.84	-3491	11.996	-2826.7
2983	238.04	14.87	-3500	12	-2827.7
2984	238.08	14.85	-3495	12.004	-2828.7
2985	238.03	14.86	-3499	12.009	-2829.7
2986	237.96	14.88	-3502	12.013	-2830.6
2987	238.06	14.88	-3502	12.017	-2831.6
2988	238.13	14.85	-3496	12.021	-2832.6
2989	237.95	14.86	-3498	12.025	-2833.5
2990	238.16	14.83	-3493	12.029	-2834.5
2991	238.03	14.85	-3496	12.033	-2835.5
2992	238.1	14.85	-3498	12.037	-2836.5
2993	238.09	14.87	-3501	12.042	-2837.4
2994	237.98	14.84	-3493	12.046	-2838.4
2995	238.06	14.86	-3498	12.05	-2839.4
2996	238.06	14.85	-3495	12.054	-2840.4
2997	238.05	14.85	-3496	12.058	-2841.3
2998	238.08	14.88	-3503	12.062	-2842.3
2999	238.01	14.88	-3503	12.066	-2843.3
3000	238.14	14.85	-3497	12.07	-2844.2
3001	238.12	14.85	-3497	12.075	-2845.2
3002	238.14	14.86	-3498	12.079	-2846.2
3003	238.07	14.83	-3492	12.083	-2847.2
3004	238.04	14.86	-3497	12.087	-2848.1
3005	238.09	14.87	-3499	12.091	-2849.1
3006	238.09	14.87	-3500	12.095	-2850.1

3007	237.97	14.88	-3503	12.099	-2851
3008	238	14.85	-3495	12.103	-2852
3009	237.98	14.9	-3506	12.108	-2853
3010	237.89	14.87	-3499	12.112	-2854
3011	237.87	14.86	-3496	12.116	-2854.9
3012	237.97	14.85	-3495	12.12	-2855.9
3013	237.87	14.89	-3503	12.124	-2856.9
3014	237.74	14.88	-3500	12.128	-2857.8
3015	237.88	14.87	-3500	12.132	-2858.8
3016	237.9	14.85	-3496	12.137	-2859.8
3017	237.84	14.89	-3504	12.141	-2860.8
3018	237.83	14.87	-3497	12.145	-2861.7
3019	237.89	14.86	-3497	12.149	-2862.7
3020	237.88	14.88	-3501	12.153	-2863.7
3021	237.95	14.86	-3498	12.157	-2864.6
3022	237.91	14.89	-3503	12.161	-2865.6
3023	237.94	14.9	-3507	12.165	-2866.6
3024	237.85	14.89	-3504	12.17	-2867.6
3025	237.92	14.84	-3495	12.174	-2868.5
3026	237.85	14.89	-3504	12.178	-2869.5
3027	237.86	14.85	-3496	12.182	-2870.5
3028	237.9	14.88	-3501	12.186	-2871.5
3029	237.79	14.88	-3501	12.19	-2872.4
3030	237.85	14.89	-3503	12.194	-2873.4
3031	237.79	14.86	-3497	12.198	-2874.4
3032	237.68	14.89	-3501	12.203	-2875.3
3033	237.76	14.8	-3483	12.207	-2876.3
3034	237.76	14.86	-3496	12.211	-2877.3
3035	237.6	14.94	-3509	12.215	-2878.3
3036	237.63	14.97	-3520	12.219	-2879.2
3037	237.66	14.89	-3502	12.223	-2880.2
3038	237.69	14.9	-3503	12.227	-2881.2
3039	237.68	14.88	-3499	12.232	-2882.1
3040	237.62	14.9	-3503	12.236	-2883.1
3041	237.71	14.9	-3506	12.24	-2884.1
3042	237.64	14.88	-3499	12.244	-2885.1
3043	237.68	14.86	-3496	12.248	-2886
3044	237.75	14.9	-3504	12.252	-2887
3045	237.66	14.89	-3500	12.256	-2888
3046	237.65	14.91	-3504	12.261	-2889
3047	237.71	14.87	-3497	12.265	-2889.9
3048	237.64	14.88	-3497	12.269	-2890.9
3049	237.64	14.89	-3501	12.273	-2891.9
3050	237.71	14.88	-3498	12.277	-2892.8
3051	237.7	14.91	-3506	12.281	-2893.8
3052	237.76	14.93	-3510	12.285	-2894.8
3053	237.76	14.9	-3504	12.289	-2895.8

3054	237.79	14.89	-3504	12.294	-2896.7
3055	237.77	14.85	-3494	12.298	-2897.7
3056	237.7	14.89	-3503	12.302	-2898.7
3057	237.76	14.89	-3502	12.306	-2899.7
3058	237.75	14.9	-3504	12.31	-2900.6
3059	237.87	14.87	-3498	12.314	-2901.6
3060	237.87	14.87	-3498	12.318	-2902.6
3061	237.82	14.88	-3501	12.323	-2903.5
3062	237.9	14.87	-3499	12.327	-2904.5
3063	237.9	14.87	-3499	12.331	-2905.5
3064	237.9	14.87	-3499	12.335	-2906.5
3065	237.82	14.91	-3507	12.339	-2907.4
3066	237.78	14.9	-3503	12.343	-2908.4
3067	237.86	14.9	-3506	12.347	-2909.4
3068	237.88	14.89	-3502	12.352	-2910.4
3069	237.78	14.88	-3500	12.356	-2911.3
3070	237.87	14.92	-3511	12.36	-2912.3
3071	237.83	14.86	-3497	12.364	-2913.3
3072	237.77	14.88	-3500	12.368	-2914.3
3073	237.9	14.87	-3498	12.372	-2915.2
3074	237.87	14.88	-3501	12.376	-2916.2
3075	237.85	14.9	-3505	12.381	-2917.2
3076	237.84	14.89	-3502	12.385	-2918.1
3077	237.87	14.9	-3505	12.389	-2919.1
3078	237.85	14.9	-3503	12.393	-2920.1
3079	237.81	14.87	-3496	12.397	-2921.1
3080	237.88	14.92	-3510	12.401	-2922
3081	237.91	14.89	-3502	12.405	-2923
3082	237.81	14.88	-3500	12.409	-2924
3083	237.88	14.89	-3502	12.414	-2925
3084	237.87	14.88	-3500	12.418	-2925.9
3085	237.89	14.93	-3512	12.422	-2926.9
3086	237.95	14.9	-3507	12.426	-2927.9
3087	237.88	14.91	-3508	12.43	-2928.9
3088	237.88	14.9	-3504	12.434	-2929.8
3089	237.91	14.88	-3500	12.438	-2930.8
3090	237.93	14.87	-3499	12.443	-2931.8
3091	237.95	14.88	-3501	12.447	-2932.7
3092	238.05	14.88	-3504	12.451	-2933.7
3093	237.84	14.91	-3508	12.455	-2934.7
3094	237.89	14.9	-3505	12.459	-2935.7
3095	237.87	14.91	-3510	12.463	-2936.6
3096	237.89	14.9	-3505	12.467	-2937.6
3097	237.92	14.89	-3504	12.472	-2938.6
3098	237.91	14.9	-3504	12.476	-2939.6
3099	237.92	14.88	-3501	12.48	-2940.5
3100	237.84	14.91	-3506	12.484	-2941.5

3101	237.85	14.91	-3508	12.488	-2942.5
3102	237.89	14.91	-3507	12.492	-2943.5
3103	237.93	14.91	-3509	12.496	-2944.4
3104	237.93	14.92	-3512	12.5	-2945.4
3105	237.93	14.92	-3511	12.505	-2946.4
3106	237.85	14.91	-3508	12.509	-2947.4
3107	237.92	14.9	-3508	12.513	-2948.3
3108	237.93	14.88	-3501	12.517	-2949.3
3109	237.87	14.89	-3503	12.521	-2950.3
3110	237.8	14.92	-3508	12.525	-2951.2
3111	237.81	14.9	-3505	12.529	-2952.2
3112	237.9	14.9	-3504	12.534	-2953.2
3113	237.91	14.91	-3509	12.538	-2954.2
3114	237.88	14.88	-3502	12.542	-2955.1
3115	237.92	14.91	-3508	12.546	-2956.1
3116	237.94	14.89	-3506	12.55	-2957.1
3117	237.89	14.88	-3501	12.554	-2958.1
3118	237.85	14.92	-3511	12.558	-2959
3119	237.82	14.91	-3507	12.563	-2960
3120	237.87	14.89	-3504	12.567	-2961
3121	237.83	14.95	-3516	12.571	-2962
3122	237.8	14.89	-3503	12.575	-2962.9
3123	237.81	14.91	-3508	12.579	-2963.9
3124	237.93	14.88	-3503	12.583	-2964.9
3125	237.85	14.89	-3502	12.587	-2965.9
3126	238.01	14.9	-3507	12.592	-2966.8
3127	237.97	14.89	-3504	12.596	-2967.8
3128	237.96	14.89	-3504	12.6	-2968.8
3129	237.95	14.91	-3507	12.604	-2969.8
3130	237.98	14.91	-3509	12.608	-2970.7
3131	237.93	14.89	-3505	12.612	-2971.7
3132	237.96	14.88	-3504	12.616	-2972.7
3133	237.82	14.93	-3510	12.621	-2973.6
3134	237.78	14.9	-3506	12.625	-2974.6
3135	237.8	14.89	-3504	12.629	-2975.6
3136	237.81	14.9	-3506	12.633	-2976.6
3137	237.78	14.93	-3511	12.637	-2977.5
3138	237.77	14.88	-3501	12.641	-2978.6
3139	237.78	14.93	-3512	12.645	-2979.5
3140	237.77	14.9	-3504	12.65	-2980.5
3141	237.68	14.92	-3508	12.654	-2981.4
3142	237.64	14.92	-3507	12.658	-2982.4
3143	237.6	14.91	-3505	12.662	-2983.4
3144	237.75	14.94	-3514	12.666	-2984.4
3145	237.68	14.96	-3517	12.67	-2985.3
3146	237.72	14.95	-3515	12.674	-2986.3
3147	237.7	14.93	-3511	12.679	-2987.3

3148	237.74	14.93	-3511	12.683	-2988.3
3149	237.71	14.93	-3511	12.687	-2989.2
3150	237.78	14.92	-3511	12.691	-2990.2
3151	237.76	14.9	-3505	12.695	-2991.2
3152	237.72	14.9	-3505	12.699	-2992.2
3153	237.8	14.9	-3505	12.703	-2993.1
3154	237.83	14.89	-3505	12.708	-2994.1
3155	237.79	14.91	-3508	12.712	-2995.1
3156	237.83	14.91	-3508	12.716	-2996.1
3157	237.95	14.93	-3515	12.72	-2997
3158	237.88	14.93	-3516	12.724	-2998
3159	237.88	14.94	-3517	12.728	-2999
3160	237.88	14.92	-3511	12.732	-3000
3161	237.84	14.91	-3507	12.737	-3000.9
3162	237.82	14.93	-3511	12.741	-3001.9
3163	237.77	14.91	-3507	12.745	-3002.9
3164	237.81	14.92	-3510	12.749	-3003.9
3165	237.79	14.95	-3517	12.753	-3004.8
3166	237.84	14.94	-3515	12.757	-3005.8
3167	237.79	14.94	-3513	12.761	-3006.8
3168	237.91	14.9	-3507	12.766	-3007.8
3169	237.74	14.91	-3508	12.77	-3008.7
3170	237.84	14.91	-3508	12.774	-3009.7
3171	237.87	14.92	-3512	12.778	-3010.7
3172	237.9	14.89	-3504	12.782	-3011.7
3173	237.94	14.88	-3504	12.786	-3012.6
3174	237.89	14.9	-3509	12.79	-3013.6
3175	237.83	14.89	-3503	12.795	-3014.6
3176	237.87	14.93	-3513	12.799	-3015.6
3177	237.88	14.91	-3509	12.803	-3016.5
3178	237.87	14.91	-3509	12.807	-3017.5
3179	237.82	14.89	-3502	12.811	-3018.5
3180	237.87	14.92	-3510	12.815	-3019.5
3181	237.82	14.91	-3508	12.819	-3020.4
3182	237.85	14.94	-3516	12.824	-3021.4
3183	237.9	14.94	-3518	12.828	-3022.4
3184	237.86	14.93	-3513	12.832	-3023.4
3185	237.82	14.92	-3510	12.836	-3024.3
3186	237.94	14.9	-3509	12.84	-3025.3
3187	237.91	14.9	-3507	12.844	-3026.3
3188	237.92	14.91	-3509	12.848	-3027.3
3189	237.91	14.94	-3517	12.853	-3028.2
3190	238.07	14.9	-3510	12.857	-3029.2
3191	238.09	14.89	-3506	12.861	-3030.2
3192	238	14.93	-3515	12.865	-3031.2
3193	237.98	14.92	-3510	12.869	-3032.1
3194	237.95	14.92	-3511	12.873	-3033.1

3195	238	14.9	-3508	12.877	-3034.1
3196	238.06	14.9	-3506	12.882	-3035.1
3197	238.11	14.91	-3511	12.886	-3036
3198	238.07	14.91	-3511	12.89	-3037
3199	238.06	14.93	-3514	12.894	-3038
3200	238.13	14.92	-3514	12.898	-3039
3201	238.1	14.91	-3511	12.902	-3039.9
3202	238.16	14.9	-3508	12.906	-3040.9
3203	238.13	14.91	-3511	12.911	-3041.9
3204	238.02	14.92	-3513	12.915	-3042.9
3205	238.07	14.91	-3512	12.919	-3043.8
3206	238.12	14.91	-3510	12.923	-3044.8
3207	238.12	14.94	-3517	12.927	-3045.8
3208	238.19	14.89	-3507	12.931	-3046.8
3209	238.15	14.91	-3512	12.935	-3047.7
3210	238.2	14.9	-3510	12.939	-3048.7
3211	238.2	14.91	-3512	12.944	-3049.7
3212	238.18	14.95	-3521	12.948	-3050.7
3213	238.15	14.9	-3509	12.952	-3051.6
3214	238.15	14.91	-3511	12.956	-3052.6
3215	238.18	14.88	-3505	12.96	-3053.6
3216	238.11	14.92	-3513	12.964	-3054.6
3217	238.15	14.91	-3512	12.968	-3055.5
3218	238.05	14.93	-3515	12.973	-3056.5
3219	238.23	14.88	-3505	12.977	-3057.5
3220	238.18	14.89	-3510	12.981	-3058.5
3221	238.05	14.94	-3517	12.985	-3059.4
3222	238.13	14.93	-3517	12.989	-3060.4
3223	238.04	14.94	-3516	12.993	-3061.4
3224	238.1	14.89	-3505	12.997	-3062.4
3225	238.07	14.91	-3510	13.002	-3063.3
3226	238.09	14.92	-3513	13.006	-3064.3
3227	238.15	14.88	-3504	13.01	-3065.3
3228	238.02	14.94	-3518	13.014	-3066.3
3229	238.04	14.9	-3508	13.018	-3067.2
3230	238.23	14.91	-3513	13.022	-3068.2
3231	238.12	14.92	-3513	13.026	-3069.2
3232	238.19	14.9	-3512	13.031	-3070.2
3233	238.19	14.94	-3519	13.035	-3071.2
3234	238.14	14.89	-3507	13.039	-3072.1
3235	238.12	14.9	-3510	13.043	-3073.1
3236	238.08	14.92	-3514	13.047	-3074.1
3237	238.15	14.91	-3511	13.051	-3075.1
3238	238.19	14.88	-3506	13.055	-3076
3239	238.14	14.9	-3510	13.06	-3077
3240	238.18	14.96	-3523	13.064	-3077.9
3241	238.12	14.94	-3518	13.068	-3078.9

3242	238.09	14.92	-3514	13.072	-3079.9
3243	238.17	14.93	-3518	13.076	-3080.9
3244	238.09	14.88	-3504	13.08	-3081.9
3245	238.08	14.93	-3514	13.084	-3082.8
3246	238.06	14.94	-3517	13.088	-3083.8
3247	238.15	14.9	-3511	13.093	-3084.8
3248	238.14	14.87	-3501	13.097	-3085.8
3249	238.15	14.93	-3516	13.101	-3086.7
3250	238.19	14.99	-3532	13.105	-3087.7
3251	238.11	14.89	-3507	13.109	-3088.7
3252	238.21	14.81	-3490	13.113	-3089.7
3253	238.18	14.93	-3517	13.118	-3090.6
3254	238.08	14.96	-3522	13.122	-3091.6
3255	238.02	14.93	-3516	13.126	-3092.6
3256	238.14	14.88	-3504	13.13	-3093.6
3257	238.15	14.92	-3518	13.134	-3094.5
3258	238.15	14.96	-3523	13.138	-3095.5
3259	238.16	14.91	-3511	13.142	-3096.5
3260	238.06	14.95	-3519	13.147	-3097.5
3261	238.1	14.94	-3516	13.151	-3098.4
3262	238.04	14.92	-3513	13.155	-3099.4
3263	237.98	14.97	-3522	13.159	-3100.4
3264	237.98	15	-3531	13.163	-3101.4
3265	237.91	15.02	-3535	13.167	-3102.4
3266	238.03	14.93	-3516	13.171	-3103.3
3267	237.95	14.93	-3515	13.176	-3104.3
3268	237.87	14.92	-3512	13.18	-3105.3
3269	237.92	14.93	-3512	13.184	-3106.3
3270	237.85	14.92	-3508	13.188	-3107.2
3271	237.84	14.9	-3504	13.192	-3108.2
3272	237.92	14.92	-3509	13.196	-3109.2
3273	237.83	14.92	-3509	13.2	-3110.2
3274	237.95	14.99	-3528	13.205	-3111.1
3275	237.98	14.96	-3520	13.209	-3112.1
3276	237.97	14.93	-3518	13.213	-3113.1
3277	237.89	14.93	-3511	13.217	-3114.1
3278	237.78	14.89	-3504	13.221	-3115.1
3279	237.86	14.98	-3524	13.225	-3116
3280	237.84	14.95	-3513	13.23	-3117
3281	237.83	14.96	-3520	13.234	-3118
3282	237.72	14.99	-3525	13.238	-3119
3283	237.71	14.97	-3520	13.242	-3119.9
3284	237.85	14.94	-3516	13.246	-3120.9
3285	237.77	15.01	-3530	13.25	-3121.9
3286	237.8	14.95	-3519	13.254	-3122.9
3287	237.9	14.92	-3511	13.259	-3123.8
3288	237.77	14.89	-3500	13.263	-3124.8

3289	237.73	14.98	-3522	13.267	-3125.8
3290	237.84	14.97	-3521	13.271	-3126.8
3291	237.88	14.94	-3516	13.275	-3127.8
3292	237.89	14.95	-3518	13.279	-3128.7
3293	237.98	15.05	-3542	13.284	-3129.7
3294	237.72	14.97	-3521	13.288	-3130.7
3295	237.71	14.98	-3521	13.292	-3131.7
3296	237.84	14.87	-3497	13.296	-3132.6
3297	237.81	14.98	-3524	13.3	-3133.6
3298	237.83	14.98	-3525	13.304	-3134.6
3299	237.8	14.97	-3520	13.308	-3135.6
3300	237.9	14.88	-3501	13.313	-3136.6
3301	237.81	14.98	-3522	13.317	-3137.5
3302	237.96	14.96	-3523	13.321	-3138.5
3303	237.75	14.95	-3519	13.325	-3139.5
3304	237.86	14.9	-3506	13.329	-3140.5
3305	237.78	14.95	-3517	13.333	-3141.4
3306	237.83	14.95	-3516	13.338	-3142.4
3307	237.79	14.96	-3519	13.342	-3143.4
3308	237.84	14.94	-3516	13.346	-3144.4
3309	237.83	14.96	-3519	13.35	-3145.4
3310	237.83	14.96	-3519	13.354	-3146.3
3311	237.88	14.91	-3508	13.358	-3147.3
3312	237.86	14.96	-3520	13.362	-3148.3
3313	237.83	14.97	-3523	13.367	-3149.3
3314	237.94	14.94	-3517	13.371	-3150.2
3315	237.89	14.92	-3512	13.375	-3151.2
3316	237.94	14.95	-3519	13.379	-3152.2
3317	238.03	14.92	-3514	13.383	-3153.2
3318	237.92	14.94	-3516	13.387	-3154.2
3319	237.85	14.97	-3522	13.392	-3155.1
3320	237.92	14.96	-3521	13.396	-3156.1
3321	237.87	14.98	-3524	13.4	-3157.1
3322	237.98	14.98	-3526	13.404	-3158.1
3323	237.15	15.01	-3522	13.408	-3159
3324	237.65	14.95	-3515	13.412	-3160
3325	237.9	14.97	-3522	13.417	-3161
3326	237.88	14.98	-3525	13.421	-3162
3327	238.05	14.92	-3513	13.425	-3163
3328	238.05	14.93	-3515	13.429	-3163.9
3329	237.91	14.95	-3518	13.433	-3164.9
3330	237.99	14.94	-3519	13.437	-3165.9
3331	237.93	14.96	-3521	13.441	-3166.9
3332	238.03	14.96	-3524	13.446	-3167.9
3333	238.02	14.93	-3516	13.45	-3168.8
3334	238.11	14.93	-3518	13.454	-3169.8
3335	237.96	14.98	-3528	13.458	-3170.8

3336	238.12	14.97	-3524	13.462	-3171.8
3337	238.02	14.97	-3524	13.466	-3172.7
3338	237.92	14.97	-3521	13.471	-3173.7
3339	238.07	14.94	-3519	13.475	-3174.7
3340	237.97	14.97	-3524	13.479	-3175.7
3341	237.95	14.97	-3523	13.483	-3176.7
3342	237.97	14.96	-3522	13.487	-3177.6
3343	238.09	14.96	-3524	13.491	-3178.6
3344	238.04	14.95	-3520	13.495	-3179.6
3345	238.05	14.96	-3523	13.5	-3180.6
3346	238.14	14.94	-3520	13.504	-3181.5
3347	237.98	14.96	-3520	13.508	-3182.5
3348	238.01	14.94	-3517	13.512	-3183.5
3349	238.01	14.98	-3529	13.516	-3184.5
3350	237.95	14.95	-3520	13.52	-3185.5
3351	237.91	14.94	-3517	13.525	-3186.4
3352	238.07	14.96	-3522	13.529	-3187.4
3353	237.99	14.96	-3522	13.533	-3188.4
3354	237.97	14.96	-3522	13.537	-3189.4
3355	238.05	14.96	-3524	13.541	-3190.4
3356	237.97	14.95	-3519	13.545	-3191.3
3357	238.01	14.78	-3480	13.549	-3192.3
3358	237.95	14.98	-3525	13.554	-3193.3
3359	238.01	14.77	-3478	13.558	-3194.2
3360	238.05	14.78	-3480	13.562	-3195.2
3361	238.05	14.8	-3485	13.566	-3196.2
3362	238.08	14.77	-3477	13.57	-3197.2
3363	238.12	14.78	-3481	13.574	-3198.1
3364	238.15	14.8	-3485	13.578	-3199.1
3365	238.05	14.75	-3474	13.582	-3200.1
3366	238.04	14.81	-3485	13.587	-3201
3367	238.02	14.75	-3472	13.591	-3202
3368	238	14.79	-3481	13.595	-3203
3369	238.02	14.78	-3479	13.599	-3203.9
3370	238.12	14.77	-3479	13.603	-3204.9
3371	238.03	14.81	-3487	13.607	-3205.9
3372	237.96	14.8	-3484	13.611	-3206.8
3373	237.99	14.81	-3488	13.615	-3207.8
3374	238.05	14.8	-3485	13.619	-3208.8
3375	237.98	14.81	-3486	13.624	-3209.7
3376	238.05	14.79	-3484	13.628	-3210.7
3377	238.01	14.8	-3485	13.632	-3211.7
3378	238.01	14.79	-3483	13.636	-3212.6
3379	238.13	14.79	-3484	13.64	-3213.6
3380	238.07	14.81	-3486	13.644	-3214.6
3381	238.06	14.81	-3487	13.648	-3215.5
3382	238.05	14.81	-3488	13.652	-3216.5

3383	238.1	14.8	-3486	13.656	-3217.5
3384	238.04	14.79	-3483	13.66	-3218.4
3385	238.02	14.78	-3481	13.665	-3219.4
3386	238.02	14.82	-3489	13.669	-3220.4
3387	237.99	14.8	-3483	13.673	-3221.3
3388	238.1	14.8	-3486	13.677	-3222.3
3389	238.02	14.77	-3477	13.681	-3223.3
3390	237.86	14.83	-3489	13.685	-3224.3
3391	237.92	14.81	-3486	13.689	-3225.2
3392	237.8	14.83	-3489	13.693	-3226.2
3393	237.83	14.81	-3486	13.697	-3227.2
3394	237.95	14.77	-3478	13.702	-3228.1
3395	237.8	14.83	-3489	13.706	-3229.1
3396	237.79	14.79	-3480	13.71	-3230.1
3397	237.82	14.83	-3489	13.714	-3231
3398	237.87	14.77	-3477	13.718	-3232
3399	237.79	14.82	-3486	13.722	-3233
3400	237.85	14.82	-3487	13.726	-3233.9
3401	237.5	14.82	-3480	13.73	-3234.9
3402	237.71	14.81	-3484	13.734	-3235.8
3403	237.83	14.83	-3488	13.739	-3236.8
3404	237.68	14.79	-3475	13.743	-3237.8
3405	237.79	14.89	-3501	13.747	-3238.7
3406	237.82	14.77	-3473	13.751	-3239.7
3407	237.82	14.85	-3492	13.755	-3240.7
3408	237.82	14.84	-3491	13.759	-3241.6
3409	237.88	14.77	-3476	13.763	-3242.6
3410	237.77	14.89	-3505	13.767	-3243.6
3411	237.8	14.82	-3488	13.771	-3244.6
3412	237.73	14.73	-3462	13.776	-3245.5
3413	237.71	14.8	-3479	13.78	-3246.5
3414	237.85	14.84	-3490	13.784	-3247.5
3415	237.74	14.8	-3479	13.788	-3248.4
3416	237.88	14.82	-3488	13.792	-3249.4
3417	237.8	14.83	-3491	13.796	-3250.4
3418	237.81	14.83	-3486	13.8	-3251.3
3419	237.75	14.83	-3489	13.804	-3252.3
3420	237.77	14.83	-3487	13.808	-3253.3
3421	237.76	14.83	-3487	13.813	-3254.2
3422	237.85	14.78	-3476	13.817	-3255.2
3423	237.84	14.81	-3483	13.821	-3256.2
3424	237.83	14.84	-3491	13.825	-3257.1
3425	237.86	14.84	-3493	13.829	-3258.1
3426	237.83	14.87	-3501	13.833	-3259.1
3427	237.79	14.86	-3495	13.837	-3260
3428	237.77	14.82	-3484	13.841	-3261
3429	237.82	14.82	-3487	13.846	-3262

3430	237.86	14.79	-3479	13.85	-3263
3431	237.88	14.81	-3485	13.854	-3264
3432	237.87	14.8	-3481	13.858	-3264.9
3433	237.89	14.84	-3491	13.862	-3265.9
3434	237.85	14.8	-3482	13.866	-3266.9
3435	237.89	14.83	-3487	13.87	-3267.8
3436	237.88	14.86	-3496	13.875	-3268.8
3437	237.79	14.85	-3493	13.879	-3269.8
3438	237.81	14.86	-3494	13.883	-3270.7
3439	237.83	14.86	-3496	13.887	-3271.7
3440	237.87	14.82	-3488	13.891	-3272.7
3441	237.86	14.85	-3493	13.895	-3273.6
3442	237.83	14.85	-3492	13.899	-3274.6
3443	237.89	14.8	-3482	13.903	-3275.6
3444	237.91	14.81	-3485	13.907	-3276.6
3445	237.81	14.82	-3487	13.912	-3277.5
3446	237.83	14.82	-3486	13.916	-3278.5
3447	237.75	14.85	-3490	13.92	-3279.5
3448	237.72	14.86	-3493	13.924	-3280.4
3449	237.86	14.85	-3494	13.928	-3281.4
3450	237.9	14.8	-3483	13.932	-3282.4
3451	237.75	14.81	-3482	13.936	-3283.3
3452	237.83	14.83	-3489	13.94	-3284.3
3453	237.79	14.86	-3495	13.945	-3285.3
3454	237.83	14.85	-3494	13.949	-3286.2
3455	237.92	14.88	-3501	13.953	-3287.2
3456	238.04	14.8	-3484	13.957	-3288.2
3457	237.96	14.82	-3490	13.961	-3289.2
3458	237.86	14.82	-3487	13.965	-3290.1
3459	238	14.83	-3490	13.969	-3291.1
3460	238	14.87	-3503	13.973	-3292
3461	237.95	14.83	-3489	13.977	-3293
3462	237.98	14.79	-3481	13.982	-3294
3463	237.93	14.78	-3477	13.986	-3294.9
3464	238	14.81	-3486	13.99	-3295.9
3465	238	14.88	-3504	13.994	-3296.9
3466	238.01	14.84	-3495	13.998	-3297.9
3467	238.01	14.76	-3473	14.002	-3298.8
3468	238.01	14.8	-3483	14.006	-3299.8
3469	237.95	14.85	-3494	14.01	-3300.8
3470	237.99	14.82	-3487	14.014	-3301.7
3471	237.99	14.81	-3487	14.019	-3302.7
3472	237.92	14.78	-3477	14.023	-3303.7
3473	237.93	14.79	-3480	14.027	-3304.6
3474	237.93	14.9	-3509	14.031	-3305.6
3475	237.96	14.92	-3512	14.035	-3306.6
3476	237.94	14.79	-3482	14.039	-3307.6

3477	238.04	14.85	-3497	14.043	-3308.5
3478	238	14.85	-3495	14.047	-3309.5
3479	238.01	14.82	-3486	14.052	-3310.5
3480	238.02	14.79	-3481	14.056	-3311.4
3481	238.04	14.86	-3495	14.06	-3312.4
3482	238.02	14.84	-3494	14.064	-3313.4
3483	238.09	14.83	-3494	14.068	-3314.4
3484	238.02	14.83	-3492	14.072	-3315.3
3485	238.04	14.83	-3492	14.076	-3316.3
3486	238.03	14.77	-3478	14.08	-3317.3
3487	237.97	14.84	-3492	14.085	-3318.2
3488	238.04	14.83	-3492	14.089	-3319.2
3489	237.97	14.82	-3488	14.093	-3320.2
3490	238.04	14.89	-3505	14.097	-3321.1
3491	237.93	14.9	-3508	14.101	-3322.1
3492	237.99	14.87	-3502	14.105	-3323.1
3493	237.96	14.81	-3484	14.109	-3324.1
3494	237.89	14.88	-3503	14.113	-3325
3495	237.94	14.81	-3490	14.118	-3326
3496	237.91	14.81	-3484	14.122	-3327
3497	237.96	14.81	-3484	14.126	-3327.9
3498	237.85	14.89	-3504	14.13	-3328.9
3499	237.89	14.9	-3506	14.134	-3329.9
3500	237.84	14.86	-3494	14.138	-3330.9
3501	237.91	14.88	-3503	14.142	-3331.8
3502	237.91	14.87	-3500	14.146	-3332.8
3503	237.88	14.83	-3490	14.151	-3333.8
3504	237.89	14.86	-3497	14.155	-3334.7
3505	237.89	14.78	-3478	14.159	-3335.7
3506	237.95	14.84	-3490	14.163	-3336.7
3507	238.04	14.88	-3505	14.167	-3337.7
3508	237.91	14.88	-3501	14.171	-3338.6
3509	238.02	14.86	-3498	14.175	-3339.6
3510	238	14.86	-3500	14.179	-3340.6
3511	237.98	14.82	-3489	14.184	-3341.5
3512	238	14.84	-3494	14.188	-3342.5
3513	237.89	14.84	-3490	14.192	-3343.5
3514	237.85	14.92	-3509	14.196	-3344.5
3515	237.97	14.85	-3495	14.2	-3345.4
3516	237.86	14.87	-3499	14.204	-3346.4
3517	237.84	14.92	-3509	14.208	-3347.4
3518	237.8	14.86	-3495	14.213	-3348.3
3519	237.85	14.87	-3498	14.217	-3349.3
3520	237.87	14.88	-3502	14.221	-3350.3
3521	237.91	14.85	-3495	14.225	-3351.3
3522	237.83	14.89	-3503	14.229	-3352.2
3523	237.77	14.86	-3495	14.233	-3353.2

3524	237.72	14.85	-3491	14.237	-3354.2
3525	237.77	14.89	-3501	14.241	-3355.1
3526	237.71	14.85	-3492	14.246	-3356.1
3527	237.74	14.88	-3500	14.25	-3357.1
3528	237.67	14.9	-3504	14.254	-3358.1
3529	237.78	14.87	-3498	14.258	-3359
3530	237.79	14.9	-3504	14.262	-3360
3531	237.77	14.9	-3505	14.266	-3361
3532	237.7	14.9	-3503	14.27	-3362
3533	237.74	14.9	-3503	14.275	-3362.9
3534	237.72	14.91	-3506	14.279	-3363.9
3535	237.68	14.9	-3503	14.283	-3364.9
3536	237.65	14.91	-3504	14.287	-3365.8
3537	237.68	14.9	-3505	14.291	-3366.8
3538	237.7	14.87	-3498	14.295	-3367.8
3539	237.65	14.91	-3507	14.299	-3368.8
3540	237.74	14.87	-3498	14.303	-3369.7
3541	237.74	14.87	-3498	14.308	-3370.7
3542	237.77	14.87	-3497	14.312	-3371.7
3543	237.79	14.88	-3498	14.316	-3372.7
3544	237.7	14.88	-3497	14.32	-3373.6
3545	237.77	14.88	-3498	14.324	-3374.6
3546	237.73	14.89	-3502	14.328	-3375.6
3547	237.75	14.9	-3506	14.332	-3376.5
3548	237.76	14.92	-3509	14.337	-3377.5
3549	237.73	14.88	-3500	14.341	-3378.5
3550	237.72	14.9	-3504	14.345	-3379.5
3551	237.74	14.87	-3497	14.349	-3380.4
3552	237.7	14.87	-3496	14.353	-3381.4
3553	237.69	14.91	-3507	14.357	-3382.4
3554	237.73	14.9	-3504	14.361	-3383.4
3555	237.75	14.86	-3495	14.366	-3384.3
3556	237.78	14.88	-3500	14.37	-3385.3
3557	237.79	14.88	-3498	14.374	-3386.3
3558	237.71	14.86	-3494	14.378	-3387.3
3559	237.73	14.91	-3507	14.382	-3388.2
3560	237.7	14.91	-3506	14.386	-3389.2
3561	237.86	14.9	-3505	14.39	-3390.2
3562	237.7	14.92	-3507	14.395	-3391.1
3563	237.76	14.9	-3505	14.399	-3392.1
3564	237.77	14.89	-3503	14.403	-3393.1
3565	237.75	14.88	-3499	14.407	-3394.1
3566	237.78	14.9	-3504	14.411	-3395
3567	237.74	14.91	-3507	14.415	-3396
3568	237.72	14.9	-3504	14.419	-3397
3569	237.8	14.95	-3517	14.424	-3398
3570	237.79	14.89	-3504	14.428	-3398.9

3571	237.81	14.87	-3498	14.432	-3399.9
3572	237.84	14.89	-3504	14.436	-3400.9
3573	237.69	14.94	-3513	14.44	-3401.8
3574	237.76	14.92	-3508	14.444	-3402.8
3575	237.79	14.85	-3491	14.448	-3403.8
3576	237.71	14.89	-3504	14.452	-3404.7
3577	237.73	14.88	-3500	14.456	-3405.7
3578	237.75	14.93	-3513	14.461	-3406.7
3579	237.78	14.87	-3497	14.465	-3407.7
3580	237.72	14.95	-3516	14.469	-3408.6
3581	237.82	14.88	-3499	14.473	-3409.6
3582	237.93	14.89	-3503	14.477	-3410.6
3583	237.81	14.92	-3509	14.481	-3411.6
3584	237.82	14.92	-3510	14.485	-3412.5
3585	237.86	14.88	-3502	14.49	-3413.5
3586	237.83	14.98	-3524	14.494	-3414.5
3587	237.83	14.88	-3499	14.498	-3415.5
3588	238.07	14.87	-3503	14.502	-3416.4
3589	238.01	14.91	-3514	14.506	-3417.4
3590	238.13	14.87	-3501	14.51	-3418.4
3591	238.08	14.82	-3490	14.514	-3419.4
3592	237.93	14.9	-3509	14.519	-3420.3
3593	237.94	14.94	-3515	14.523	-3421.3
3594	238.03	14.86	-3497	14.527	-3422.3
3595	238.05	14.89	-3508	14.531	-3423.3
3596	237.93	14.92	-3512	14.535	-3424.2
3597	237.81	14.9	-3506	14.539	-3425.2
3598	237.83	14.91	-3509	14.543	-3426.2
3599	238.02	14.95	-3520	14.548	-3427.2
3600	237.94	14.79	-3481	14.552	-3428.1
3601	237.96	14.87	-3503	14.556	-3429.1
3602	237.98	14.94	-3517	14.56	-3430.1
3603	238.12	14.85	-3496	14.564	-3431
3604	238.1	14.94	-3521	14.568	-3432
3605	238.14	14.89	-3510	14.572	-3433
3606	238.18	14.86	-3502	14.576	-3434
3607	238.21	14.88	-3508	14.581	-3434.9
3608	238.17	14.87	-3500	14.585	-3435.9
3609	238.18	14.91	-3510	14.589	-3436.9
3610	238.13	14.88	-3503	14.593	-3437.9
3611	238.1	14.9	-3509	14.597	-3438.8
3612	238.07	14.94	-3518	14.601	-3439.8
3613	238.07	14.87	-3501	14.605	-3440.8
3614	238.03	14.95	-3521	14.61	-3441.8
3615	238.17	14.89	-3507	14.614	-3442.7
3616	238.13	14.85	-3498	14.618	-3443.7
3617	238.08	14.9	-3511	14.622	-3444.7

3618	238.09	14.88	-3504	14.626	-3445.7
3619	238.09	14.86	-3499	14.63	-3446.6
3620	238.13	14.87	-3503	14.634	-3447.6
3621	238.11	14.96	-3523	14.639	-3448.6
3622	238.11	14.87	-3502	14.643	-3449.6
3623	238.41	14.86	-3505	14.647	-3450.5
3624	238.42	14.91	-3517	14.651	-3451.5
3625	238.42	14.84	-3502	14.655	-3452.5
3626	238.45	14.9	-3516	14.659	-3453.5
3627	238.42	14.93	-3519	14.663	-3454.4
3628	238.39	14.88	-3511	14.668	-3455.4
3629	238.34	14.87	-3504	14.672	-3456.4
3630	238.34	14.93	-3518	14.676	-3457.4
3631	238.39	14.92	-3516	14.68	-3458.3
3632	238.33	14.9	-3510	14.684	-3459.3
3633	238.34	14.89	-3510	14.688	-3460.4
3634	238.39	14.87	-3508	14.692	-3461.3
3635	238.43	14.89	-3512	14.697	-3462.3
3636	238.38	14.89	-3512	14.701	-3463.3
3637	238.41	14.9	-3514	14.705	-3464.2
3638	238.42	14.87	-3507	14.709	-3465.2
3639	238.39	14.91	-3516	14.713	-3466.2
3640	238.4	14.88	-3508	14.717	-3467.2
3641	238.41	14.9	-3513	14.721	-3468.1
3642	238.39	14.89	-3512	14.726	-3469.1
3643	238.4	14.9	-3513	14.73	-3470.1
3644	238.24	14.89	-3509	14.734	-3471.1
3645	238.33	14.9	-3510	14.738	-3472
3646	238.45	14.91	-3516	14.742	-3473
3647	238.4	14.91	-3517	14.746	-3474
3648	238.38	14.91	-3516	14.75	-3475
3649	238.38	14.94	-3521	14.755	-3476
3650	238.35	14.9	-3514	14.759	-3476.9
3651	238.33	14.92	-3517	14.763	-3477.9
3652	238.37	14.9	-3513	14.767	-3478.9
3653	238.32	14.91	-3515	14.771	-3479.8
3654	238.24	14.9	-3511	14.775	-3480.8
3655	238.22	14.94	-3520	14.779	-3481.8
3656	238.22	14.9	-3511	14.784	-3482.8
3657	238.14	14.91	-3511	14.788	-3483.7
3658	238.09	14.92	-3516	14.792	-3484.7
3659	238.14	14.92	-3515	14.796	-3485.7
3660	238.15	14.93	-3517	14.8	-3486.7
3661	238.12	14.9	-3509	14.804	-3487.6
3662	238.2	14.92	-3515	14.808	-3488.6
3663	238.11	14.93	-3516	14.813	-3489.6
3664	238.14	14.9	-3511	14.817	-3490.6

3665	238.22	14.89	-3509	14.821	-3491.6
3666	238.31	14.92	-3515	14.825	-3492.5
3667	238.28	14.92	-3515	14.829	-3493.5
3668	238.27	14.86	-3502	14.833	-3494.5
3669	238.12	14.95	-3521	14.837	-3495.5
3670	238.23	14.93	-3518	14.842	-3496.4
3671	238.28	14.92	-3518	14.846	-3497.4
3672	238.29	14.92	-3517	14.85	-3498.4
3673	238.24	14.94	-3520	14.854	-3499.4
3674	238.24	14.92	-3515	14.858	-3500.3
3675	238.28	14.89	-3509	14.862	-3501.3
3676	238.2	14.95	-3521	14.866	-3502.3
3677	238.17	14.88	-3506	14.871	-3503.3
3678	238.19	14.92	-3515	14.875	-3504.2
3679	238.19	14.93	-3518	14.879	-3505.2
3680	238.21	14.94	-3521	14.883	-3506.2
3681	238.25	14.9	-3512	14.887	-3507.2
3682	238.2	14.94	-3521	14.891	-3508.2
3683	238.21	14.93	-3518	14.895	-3509.1
3684	238.25	14.9	-3511	14.9	-3510.1
3685	238.25	14.93	-3520	14.904	-3511.1
3686	238.26	14.9	-3513	14.908	-3512.1
3687	238.32	14.88	-3508	14.912	-3513
3688	238.28	14.93	-3518	14.916	-3514
3689	238.31	14.9	-3514	14.92	-3515
3690	238.26	14.94	-3520	14.924	-3516
3691	238.3	14.92	-3517	14.929	-3516.9
3692	238.17	14.9	-3511	14.933	-3517.9
3693	238.21	14.97	-3528	14.937	-3518.9
3694	238.28	14.91	-3514	14.941	-3519.9
3695	237.97	14.92	-3513	14.945	-3520.8
3696	237.85	14.98	-3524	14.949	-3521.8
3697	238.16	14.91	-3514	14.953	-3522.8
3698	238.09	14.94	-3519	14.958	-3523.8
3699	238.18	14.94	-3521	14.962	-3524.8
3700	238.16	14.94	-3519	14.966	-3525.7
3701	238.18	14.91	-3515	14.97	-3526.7
3702	238.08	14.99	-3531	14.974	-3527.7
3703	238.15	14.92	-3514	14.978	-3528.7
3704	238.11	14.74	-3472	14.982	-3529.6
3705	238.12	14.72	-3469	14.987	-3530.6
3706	238.15	14.76	-3476	14.991	-3531.6
3707	238.14	14.78	-3481	14.995	-3532.5
3708	238.21	14.77	-3478	14.999	-3533.5
3709	238.27	14.76	-3477	15.003	-3534.5
3710	238.24	14.78	-3482	15.007	-3535.4
3711	238.23	14.79	-3483	15.011	-3536.4

3712	238.28	14.77	-3482	15.015	-3537.4
3713	238.24	14.76	-3479	15.019	-3538.3
3714	238.23	14.76	-3478	15.023	-3539.3
3715	238.21	14.77	-3479	15.028	-3540.3
3716	238.23	14.79	-3484	15.032	-3541.2
3717	238.16	14.77	-3478	15.036	-3542.2
3718	238.13	14.79	-3483	15.04	-3543.2
3719	238.18	14.79	-3484	15.044	-3544.2
3720	238.23	14.81	-3489	15.048	-3545.1
3721	238.18	14.76	-3477	15.052	-3546.1
3722	238.23	14.77	-3479	15.056	-3547.1
3723	238.24	14.78	-3483	15.06	-3548
3724	238.25	14.78	-3483	15.065	-3549
3725	238.21	14.74	-3472	15.069	-3550
3726	238.23	14.73	-3471	15.073	-3550.9
3727	238.16	14.79	-3482	15.077	-3551.9
3728	238.23	14.78	-3480	15.081	-3552.9
3729	238.18	14.79	-3485	15.085	-3553.8
3730	238.28	14.77	-3478	15.089	-3554.8
3731	238.24	14.82	-3491	15.093	-3555.8
3732	238.23	14.77	-3481	15.097	-3556.7
3733	237.49	14.81	-3479	15.101	-3557.7
3734	237.94	14.81	-3486	15.106	-3558.7
3735	238.21	14.77	-3478	15.11	-3559.6
3736	238.21	14.78	-3483	15.114	-3560.6
3737	238.22	14.78	-3481	15.118	-3561.6
3738	238.25	14.76	-3477	15.122	-3562.5
3739	238.21	14.77	-3478	15.126	-3563.5
3740	238.27	14.8	-3487	15.13	-3564.5
3741	238.25	14.8	-3488	15.134	-3565.4
3742	238.24	14.8	-3485	15.138	-3566.4
3743	238.2	14.77	-3480	15.143	-3567.4
3744	238.26	14.78	-3484	15.147	-3568.3
3745	238.2	14.76	-3477	15.151	-3569.3
3746	238.22	14.79	-3484	15.155	-3570.3
3747	238.22	14.8	-3485	15.159	-3571.2
3748	238.23	14.83	-3494	15.163	-3572.2
3749	238.27	14.78	-3483	15.167	-3573.2
3750	238.34	14.8	-3490	15.171	-3574.1
3751	238.36	14.77	-3481	15.175	-3575.1
3752	238.35	14.79	-3487	15.18	-3576.1
3753	238.29	14.77	-3481	15.184	-3577
3754	238.27	14.79	-3485	15.188	-3578
3755	238.32	14.76	-3477	15.192	-3579
3756	238.32	14.77	-3480	15.196	-3579.9
3757	238.34	14.78	-3483	15.2	-3580.9
3758	238.31	14.79	-3485	15.204	-3581.9

3759	238.32	14.79	-3486	15.208	-3582.8
3760	238.33	14.79	-3486	15.212	-3583.8
3761	238.32	14.82	-3493	15.216	-3584.8
3762	238.34	14.79	-3488	15.221	-3585.7
3763	238.28	14.79	-3486	15.225	-3586.7
3764	238.31	14.81	-3489	15.229	-3587.7
3765	238.3	14.76	-3478	15.233	-3588.6
3766	238.27	14.79	-3486	15.237	-3589.6
3767	238.3	14.78	-3482	15.241	-3590.6
3768	238.33	14.77	-3483	15.245	-3591.6
3769	238.34	14.8	-3487	15.249	-3592.5
3770	238.35	14.79	-3484	15.253	-3593.5
3771	238.41	14.8	-3490	15.258	-3594.5
3772	238.16	14.79	-3483	15.262	-3595.4
3773	238.29	14.83	-3495	15.266	-3596.4
3774	238.31	14.77	-3481	15.27	-3597.4
3775	238.26	14.83	-3494	15.274	-3598.3
3776	238.28	14.78	-3483	15.278	-3599.3
3777	238.29	14.8	-3487	15.282	-3600.3
3778	238.23	14.78	-3482	15.286	-3601.2
3779	238.32	14.79	-3486	15.29	-3602.2
3780	238.36	14.79	-3486	15.295	-3603.2
3781	238.29	14.79	-3486	15.299	-3604.1
3782	238.24	14.79	-3485	15.303	-3605.1
3783	238.21	14.83	-3493	15.307	-3606.1
3784	238.24	14.8	-3487	15.311	-3607.1
3785	238.17	14.8	-3485	15.315	-3608
3786	238.21	14.79	-3485	15.319	-3609
3787	238.1	14.81	-3486	15.323	-3610
3788	238.11	14.82	-3488	15.327	-3610.9
3789	238.19	14.77	-3479	15.332	-3611.9
3790	238.15	14.83	-3494	15.336	-3612.9
3791	238.18	14.79	-3485	15.34	-3613.8
3792	238.16	14.83	-3492	15.344	-3614.8
3793	238.11	14.8	-3485	15.348	-3615.8
3794	238.21	14.77	-3480	15.352	-3616.7
3795	238.2	14.82	-3492	15.356	-3617.7
3796	238.21	14.8	-3488	15.36	-3618.7
3797	238.22	14.85	-3498	15.364	-3619.6
3798	238.21	14.79	-3484	15.369	-3620.6
3799	238.24	14.81	-3489	15.373	-3621.6
3800	238.23	14.82	-3490	15.377	-3622.6
3801	238.27	14.8	-3488	15.381	-3623.5
3802	238.29	14.8	-3488	15.385	-3624.5
3803	238.3	14.79	-3488	15.389	-3625.5
3804	238.28	14.79	-3484	15.393	-3626.4
3805	238.2	14.83	-3494	15.397	-3627.4

3806	238.27	14.78	-3481	15.401	-3628.4
3807	238.23	14.81	-3488	15.406	-3629.3
3808	238.25	14.8	-3488	15.41	-3630.3
3809	238.22	14.86	-3498	15.414	-3631.3
3810	238.26	14.79	-3485	15.418	-3632.2
3811	238.22	14.8	-3488	15.422	-3633.2
3812	238.32	14.8	-3489	15.426	-3634.2
3813	238.34	14.8	-3488	15.43	-3635.2
3814	238.31	14.81	-3491	15.434	-3636.1
3815	238.31	14.83	-3496	15.438	-3637.1
3816	238.36	14.81	-3493	15.442	-3638
3817	238.29	14.79	-3483	15.447	-3639
3818	238.19	14.79	-3483	15.451	-3640
3819	238.22	14.81	-3491	15.455	-3640.9
3820	238.21	14.77	-3477	15.459	-3641.9
3821	238.17	14.85	-3495	15.463	-3642.9
3822	238.18	14.79	-3483	15.467	-3643.8
3823	238.26	14.82	-3491	15.471	-3644.8
3824	238.07	14.85	-3498	15.475	-3645.8
3825	238.09	14.82	-3492	15.48	-3646.8
3826	238.09	14.83	-3494	15.484	-3647.7
3827	238.02	14.86	-3499	15.488	-3648.7
3828	238.07	14.77	-3477	15.492	-3649.7
3829	238	14.79	-3485	15.496	-3650.6
3830	238.03	14.88	-3502	15.5	-3651.6
3831	238.01	14.81	-3485	15.504	-3652.6
3832	237.99	14.87	-3503	15.508	-3653.5
3833	238.07	14.81	-3486	15.512	-3654.5
3834	238.06	14.82	-3489	15.517	-3655.5
3835	238.09	14.86	-3501	15.521	-3656.5
3836	238.08	14.82	-3491	15.525	-3657.4
3837	238.12	14.83	-3494	15.529	-3658.4
3838	238.11	14.77	-3478	15.533	-3659.4
3839	238.15	14.79	-3484	15.537	-3660.3
3840	238.13	14.82	-3488	15.541	-3661.3
3841	238.1	14.78	-3479	15.545	-3662.3
3842	238.19	14.81	-3491	15.549	-3663.2
3843	237.92	14.8	-3483	15.554	-3664.2
3844	237.96	14.81	-3488	15.558	-3665.2
3845	237.99	14.83	-3492	15.562	-3666.2
3846	237.94	14.85	-3499	15.566	-3667.1
3847	238.17	14.8	-3489	15.57	-3668.1
3848	238.24	14.77	-3482	15.574	-3669.1
3849	238.22	14.81	-3494	15.578	-3670
3850	238.28	14.78	-3484	15.582	-3671
3851	238.22	14.81	-3490	15.587	-3672
3852	238.23	14.78	-3484	15.591	-3672.9

3853	238.2	14.87	-3504	15.595	-3673.9
3854	238.25	14.68	-3460	15.599	-3674.9
3855	238.24	14.82	-3494	15.603	-3675.9
3856	238.34	14.79	-3487	15.607	-3676.8
3857	238.34	14.82	-3494	15.611	-3677.8
3858	238.3	14.86	-3505	15.615	-3678.8
3859	238.27	14.83	-3495	15.619	-3679.7
3860	238.28	14.89	-3511	15.624	-3680.7
3861	238.26	14.79	-3485	15.628	-3681.7
3862	238.27	14.77	-3479	15.632	-3682.6
3863	238.2	14.8	-3486	15.636	-3683.6
3864	238.21	14.81	-3491	15.64	-3684.6
3865	238.21	14.79	-3484	15.644	-3685.6
3866	238.21	14.82	-3490	15.648	-3686.5
3867	238.28	14.75	-3476	15.652	-3687.5
3868	238.27	14.82	-3492	15.657	-3688.5
3869	238.31	14.79	-3485	15.661	-3689.4
3870	238.28	14.83	-3493	15.665	-3690.4
3871	238.28	14.84	-3497	15.669	-3691.4
3872	238.27	14.86	-3502	15.673	-3692.3
3873	238.25	14.79	-3487	15.677	-3693.3
3874	238.33	14.81	-3492	15.681	-3694.3
3875	238.28	14.79	-3486	15.685	-3695.3
3876	238.27	14.81	-3489	15.689	-3696.2
3877	238.26	14.81	-3490	15.694	-3697.2
3878	238.34	14.8	-3490	15.698	-3698.2
3879	238.32	14.84	-3499	15.702	-3699.1
3880	238.32	14.8	-3489	15.706	-3700.1
3881	238.24	14.85	-3497	15.71	-3701.1
3882	238.28	14.78	-3485	15.714	-3702
3883	238.31	14.81	-3491	15.718	-3703
3884	238.39	14.83	-3496	15.722	-3704
3885	238.34	14.82	-3494	15.726	-3705
3886	238.34	14.81	-3494	15.731	-3705.9
3887	238.31	14.81	-3491	15.735	-3706.9
3888	238.35	14.82	-3494	15.739	-3707.9
3889	238.33	14.78	-3484	15.743	-3708.8
3890	238.36	14.84	-3498	15.747	-3709.8
3891	238.33	14.82	-3494	15.751	-3710.8
3892	238.33	14.83	-3497	15.755	-3711.8
3893	238.31	14.82	-3495	15.759	-3712.7
3894	238.32	14.8	-3489	15.764	-3713.7
3895	238.33	14.84	-3500	15.768	-3714.7
3896	238.36	14.8	-3488	15.772	-3715.6
3897	238.37	14.83	-3498	15.776	-3716.6
3898	238.34	14.81	-3492	15.78	-3717.6
3899	238.4	14.8	-3490	15.784	-3718.5

3900	238.32	14.82	-3494	15.788	-3719.5
3901	238.32	14.82	-3494	15.792	-3720.5
3902	238.3	14.82	-3494	15.796	-3721.5
3903	238.28	14.8	-3488	15.801	-3722.4
3904	238.28	14.82	-3493	15.805	-3723.4
3905	238.23	14.84	-3497	15.809	-3724.4
3906	238.29	14.83	-3495	15.813	-3725.3
3907	238.27	14.86	-3503	15.817	-3726.3
3908	238.24	14.83	-3494	15.821	-3727.3
3909	238.27	14.84	-3497	15.825	-3728.3
3910	238.28	14.82	-3493	15.829	-3729.2
3911	238.27	14.83	-3496	15.834	-3730.2
3912	238.26	14.83	-3495	15.838	-3731.2
3913	238.28	14.85	-3500	15.842	-3732.1
3914	238.26	14.82	-3492	15.846	-3733.1
3915	238.19	14.79	-3484	15.85	-3734.1
3916	238.27	14.82	-3494	15.854	-3735
3917	238.24	14.82	-3492	15.858	-3736
3918	238.24	14.9	-3511	15.862	-3737
3919	238.18	14.83	-3493	15.867	-3738
3920	238.2	14.83	-3495	15.871	-3738.9
3921	238.19	14.82	-3492	15.875	-3739.9
3922	238.19	14.84	-3495	15.879	-3740.9
3923	238.17	14.84	-3496	15.883	-3741.8
3924	238.17	14.83	-3493	15.887	-3742.8
3925	238.18	14.82	-3492	15.891	-3743.8
3926	238.21	14.81	-3489	15.895	-3744.8
3927	238.18	14.84	-3497	15.899	-3745.7
3928	238.18	14.83	-3494	15.904	-3746.7
3929	238.28	14.84	-3497	15.908	-3747.7
3930	238.25	14.83	-3492	15.912	-3748.6
3931	238.3	14.86	-3502	15.916	-3749.6
3932	238.31	14.84	-3498	15.92	-3750.6
3933	238.32	14.83	-3496	15.924	-3751.6
3934	238.32	14.86	-3501	15.928	-3752.5
3935	238.29	14.82	-3492	15.932	-3753.5
3936	238.27	14.81	-3489	15.937	-3754.5
3937	238.36	14.83	-3496	15.941	-3755.4
3938	238.37	14.82	-3493	15.945	-3756.4
3939	238.4	14.84	-3499	15.949	-3757.4
3940	238.41	14.83	-3497	15.953	-3758.3
3941	238.36	14.78	-3485	15.957	-3759.3
3942	238.23	14.84	-3493	15.961	-3760.3
3943	238.36	14.81	-3490	15.965	-3761.2
3944	238.3	14.87	-3503	15.969	-3762.2
3945	238.26	14.84	-3493	15.974	-3763.2
3946	238.34	14.81	-3490	15.978	-3764.2

3947	238.29	14.9	-3510	15.982	-3765.1
3948	238.35	14.76	-3480	15.986	-3766.1
3949	238.29	14.85	-3501	15.99	-3767.1
3950	238.22	14.87	-3502	15.994	-3768
3951	238.27	14.84	-3498	15.998	-3769
3952	238.21	14.84	-3497	16.002	-3770
3953	238.27	14.88	-3507	16.007	-3771
3954	238.26	14.81	-3488	16.011	-3771.9
3955	238.23	14.85	-3497	16.015	-3772.9
3956	238.24	14.85	-3499	16.019	-3773.9
3957	238.26	14.84	-3496	16.023	-3774.8
3958	238.27	14.83	-3493	16.027	-3775.8
3959	238.24	14.85	-3500	16.031	-3776.8
3960	238.18	14.84	-3495	16.035	-3777.8
3961	238.24	14.81	-3490	16.04	-3778.7
3962	238.24	14.84	-3497	16.044	-3779.7
3963	238.24	14.83	-3495	16.048	-3780.7
3964	238.29	14.83	-3495	16.052	-3781.6
3965	238.28	14.78	-3482	16.056	-3782.6
3966	238.33	14.85	-3499	16.06	-3783.6
3967	238.21	14.84	-3494	16.064	-3784.6
3968	238.26	14.88	-3504	16.068	-3785.5
3969	238.26	14.85	-3499	16.073	-3786.5
3970	238.32	14.9	-3511	16.077	-3787.5
3971	238.4	14.84	-3498	16.081	-3788.5
3972	238.37	14.84	-3498	16.085	-3789.4
3973	238.44	14.84	-3500	16.089	-3790.4
3974	238.39	14.84	-3499	16.093	-3791.4
3975	238.41	14.88	-3510	16.097	-3792.3
3976	238.46	14.82	-3496	16.101	-3793.3
3977	238.46	14.88	-3508	16.106	-3794.3
3978	238.37	14.84	-3499	16.11	-3795.3
3979	238.48	14.84	-3499	16.114	-3796.2
3980	238.49	14.79	-3486	16.118	-3797.2
3981	238.48	14.84	-3500	16.122	-3798.2
3982	238.45	14.82	-3496	16.126	-3799.1
3983	238.39	14.85	-3499	16.13	-3800.1
3984	238.42	14.84	-3500	16.134	-3801.1
3985	238.44	14.84	-3500	16.138	-3802.1
3986	238.43	14.78	-3485	16.143	-3803
3987	238.44	14.84	-3502	16.147	-3804
3988	238.37	14.84	-3499	16.151	-3805
3989	238.38	14.75	-3476	16.155	-3806
3990	238.36	14.83	-3495	16.159	-3806.9
3991	238.38	14.83	-3496	16.163	-3807.9
3992	238.38	14.83	-3496	16.167	-3808.9
3993	238.38	14.85	-3499	16.171	-3809.8

3994	238.43	14.85	-3502	16.176	-3810.8
3995	238.35	14.87	-3506	16.18	-3811.8
3996	238.4	14.86	-3502	16.184	-3812.8
3997	238.35	14.9	-3515	16.188	-3813.7
3998	238.34	14.88	-3507	16.192	-3814.7
3999	238.35	14.8	-3489	16.196	-3815.7
4000	238.44	14.81	-3492	16.2	-3816.6
4001	238.36	14.88	-3511	16.204	-3817.6
4002	238.4	14.81	-3492	16.209	-3818.6
4003	238.36	14.83	-3496	16.213	-3819.6
4004	238.35	14.91	-3513	16.217	-3820.5
4005	238.4	14.81	-3489	16.221	-3821.5
4006	238.35	14.86	-3501	16.225	-3822.5
4007	238.45	14.89	-3512	16.229	-3823.5
4008	238.4	14.87	-3504	16.233	-3824.4
4009	238.33	14.85	-3499	16.237	-3825.4
4010	238.37	14.86	-3505	16.242	-3826.4
4011	238.33	14.88	-3508	16.246	-3827.3
4012	238.41	14.9	-3512	16.25	-3828.3
4013	238.4	14.85	-3503	16.254	-3829.3
4014	238.33	14.82	-3494	16.258	-3830.3
4015	238.37	14.87	-3506	16.262	-3831.2
4016	238.36	14.84	-3497	16.266	-3832.2
4017	238.32	14.84	-3497	16.27	-3833.2
4018	238.36	14.84	-3500	16.275	-3834.2
4019	238.34	14.85	-3500	16.279	-3835.1
4020	238.31	14.86	-3503	16.283	-3836.1
4021	238.35	14.9	-3511	16.287	-3837.1
4022	238.15	14.87	-3502	16.291	-3838
4023	238.35	14.87	-3506	16.295	-3839
4024	238.29	14.86	-3502	16.299	-3840
4025	238.27	14.81	-3488	16.304	-3841
4026	238.27	14.9	-3510	16.308	-3841.9
4027	238.28	14.83	-3496	16.312	-3842.9
4028	238.31	14.88	-3507	16.316	-3843.9
4029	238.22	14.87	-3502	16.32	-3844.9
4030	238.3	14.84	-3499	16.324	-3845.8
4031	238.24	14.92	-3516	16.328	-3846.8
4032	238.28	14.85	-3499	16.332	-3847.8
4033	238.23	14.87	-3503	16.337	-3848.8
4034	238.16	14.85	-3499	16.341	-3849.7
4035	238.22	14.86	-3502	16.345	-3850.7
4036	238.19	14.85	-3497	16.349	-3851.7
4037	238.14	14.86	-3500	16.353	-3852.6
4038	238.13	14.85	-3496	16.357	-3853.6
4039	238.19	14.91	-3512	16.361	-3854.6
4040	238.09	14.89	-3504	16.365	-3855.6

4041	238.18	14.84	-3496	16.37	-3856.5
4042	238.18	14.91	-3514	16.374	-3857.5
4043	238.22	14.92	-3516	16.378	-3858.5
4044	238.26	14.86	-3501	16.382	-3859.5
4045	238.19	14.87	-3504	16.386	-3860.4
4046	238.21	14.88	-3504	16.39	-3861.4
4047	238.21	14.89	-3507	16.394	-3862.4
4048	238.21	14.77	-3481	16.399	-3863.3
4049	238.18	14.91	-3511	16.403	-3864.3
4050	238.25	14.9	-3510	16.407	-3865.3
4051	238.22	14.88	-3505	16.411	-3866.3
4052	238.19	14.88	-3507	16.415	-3867.2
4053	238.24	14.83	-3495	16.419	-3868.2
4054	238.19	14.92	-3515	16.423	-3869.2
4055	238.18	14.84	-3494	16.427	-3870.2
4056	238.14	14.86	-3501	16.432	-3871.1
4057	238.19	14.9	-3509	16.436	-3872.1
4058	238.15	14.89	-3504	16.44	-3873.1
4059	238.14	14.93	-3515	16.444	-3874.1
4060	238.2	14.83	-3492	16.448	-3875
4061	238.09	15	-3533	16.452	-3876
4062	238.14	14.86	-3501	16.456	-3877
4063	238.11	14.87	-3503	16.461	-3878
4064	238.08	14.87	-3504	16.465	-3878.9
4065	238.15	14.9	-3507	16.469	-3879.9
4066	238.2	14.87	-3503	16.473	-3880.9
4067	238.16	14.82	-3492	16.477	-3881.8
4068	238.24	14.91	-3513	16.481	-3882.8
4069	238.21	14.89	-3506	16.485	-3883.8
4070	238.15	14.87	-3501	16.489	-3884.8
4071	238.23	14.86	-3499	16.494	-3885.7
4072	238.18	14.91	-3512	16.498	-3886.7
4073	238.22	14.88	-3505	16.502	-3887.7
4074	238.13	14.91	-3513	16.506	-3888.7
4075	238.14	14.89	-3506	16.51	-3889.6
4076	238.1	14.84	-3493	16.514	-3890.6
4077	238.11	14.91	-3510	16.518	-3891.6
4078	238.1	14.89	-3507	16.523	-3892.6
4079	238.11	14.85	-3496	16.527	-3893.5
4080	238.09	14.87	-3501	16.531	-3894.5
4081	238.06	14.9	-3508	16.535	-3895.5
4082	238.1	14.9	-3511	16.539	-3896.5
4083	238.05	14.9	-3509	16.543	-3897.4
4084	238.04	14.86	-3499	16.547	-3898.4
4085	238.07	14.94	-3517	16.551	-3899.4
4086	238.02	14.91	-3511	16.556	-3900.4
4087	238.06	14.89	-3505	16.56	-3901.3

4088	237.98	14.88	-3502	16.564	-3902.3
4089	238.06	14.93	-3517	16.568	-3903.3
4090	238.03	14.85	-3497	16.572	-3904.2
4091	238.04	14.94	-3518	16.576	-3905.2
4092	238.01	14.86	-3498	16.58	-3906.2
4093	237.97	14.92	-3513	16.585	-3907.2
4094	238.02	14.94	-3517	16.589	-3908.1
4095	238.09	14.86	-3499	16.593	-3909.1
4096	238.13	14.94	-3520	16.597	-3910.1
4097	238.13	14.89	-3507	16.601	-3911.1
4098	238.12	14.88	-3506	16.605	-3912
4099	238.1	14.9	-3511	16.609	-3913
4100	237.99	14.89	-3506	16.614	-3914
4101	238.07	14.9	-3510	16.618	-3915
4102	238.12	14.86	-3501	16.622	-3915.9
4103	238.12	14.87	-3504	16.626	-3916.9
4104	238.2	14.88	-3507	16.63	-3917.9
4105	238.07	14.87	-3502	16.634	-3918.9
4106	238.18	14.91	-3513	16.638	-3919.8
4107	238.14	14.86	-3500	16.642	-3920.8
4108	238.11	14.93	-3517	16.647	-3921.8
4109	238.18	14.92	-3514	16.651	-3922.8
4110	238.17	14.89	-3509	16.655	-3923.7
4111	238.11	14.94	-3521	16.659	-3924.7
4112	238.13	14.84	-3497	16.663	-3925.7
4113	238.14	14.89	-3507	16.667	-3926.7
4114	238.11	14.89	-3509	16.671	-3927.6
4115	238.08	14.89	-3507	16.676	-3928.6
4116	238.06	14.95	-3522	16.68	-3929.6
4117	238.04	14.87	-3500	16.684	-3930.6
4118	238.07	14.91	-3512	16.688	-3931.5
4119	238.15	14.89	-3509	16.692	-3932.5
4120	238.04	14.88	-3504	16.696	-3933.5
4121	238.03	14.9	-3507	16.7	-3934.5
4122	238.06	14.9	-3510	16.705	-3935.4
4123	238.02	14.94	-3519	16.709	-3936.4
4124	238.12	14.88	-3506	16.713	-3937.4
4125	238.15	14.89	-3509	16.717	-3938.4
4126	238.16	14.89	-3507	16.721	-3939.3
4127	238.19	14.9	-3511	16.725	-3940.3
4128	238.18	14.91	-3513	16.729	-3941.3
4129	238.16	14.88	-3506	16.734	-3942.3
4130	238.22	14.88	-3505	16.738	-3943.2
4131	238.13	14.92	-3515	16.742	-3944.2
4132	238.12	14.89	-3507	16.746	-3945.2
4133	238.08	14.95	-3524	16.75	-3946.2
4134	238.1	14.91	-3512	16.754	-3947.1

4135	238.1	14.91	-3512	16.758	-3948.1
4136	237.45	14.93	-3508	16.763	-3949.1
4137	238.06	14.92	-3513	16.767	-3950.1
4138	237.99	14.91	-3511	16.771	-3951
4139	238.05	14.89	-3507	16.775	-3952
4140	238.04	14.9	-3509	16.779	-3953
4141	238.03	14.89	-3506	16.783	-3954
4142	238.09	14.92	-3513	16.787	-3954.9
4143	238.06	14.91	-3511	16.792	-3955.9
4144	238.02	14.92	-3513	16.796	-3956.9
4145	238.07	14.91	-3510	16.8	-3957.9
4146	238.08	14.92	-3513	16.804	-3958.8
4147	238.07	14.89	-3507	16.808	-3959.8
4148	238.07	14.94	-3519	16.812	-3960.8
4149	238.09	14.9	-3511	16.816	-3961.8
4150	238.06	14.94	-3521	16.82	-3962.7
4151	238.07	14.89	-3507	16.825	-3963.7
4152	238.09	14.92	-3514	16.829	-3964.7
4153	238.11	14.9	-3509	16.833	-3965.7
4154	238.16	14.91	-3515	16.837	-3966.6
4155	238.08	14.92	-3514	16.841	-3967.6
4156	238.09	14.92	-3513	16.845	-3968.6
4157	238.04	14.92	-3515	16.849	-3969.6
4158	238.06	14.9	-3509	16.854	-3970.5
4159	238.05	14.92	-3514	16.858	-3971.5
4160	238.08	14.89	-3508	16.862	-3972.5
4161	238.02	14.91	-3511	16.866	-3973.5
4162	237.98	14.92	-3513	16.87	-3974.4
4163	238	14.91	-3511	16.874	-3975.4
4164	238.03	14.94	-3517	16.878	-3976.4
4165	238.01	14.89	-3506	16.883	-3977.4
4166	237.9	14.94	-3515	16.887	-3978.3
4167	237.87	14.94	-3516	16.891	-3979.3
4168	237.89	14.94	-3515	16.895	-3980.3
4169	237.92	14.92	-3512	16.899	-3981.3
4170	237.88	14.91	-3509	16.903	-3982.3
4171	237.92	14.92	-3510	16.908	-3983.2
4172	237.98	14.9	-3507	16.912	-3984.2
4173	237.89	14.94	-3515	16.916	-3985.2
4174	237.89	14.93	-3513	16.92	-3986.2
4175	237.82	14.95	-3517	16.924	-3987.1
4176	237.87	14.94	-3514	16.928	-3988.1
4177	237.98	14.93	-3514	16.932	-3989.1
4178	237.92	14.91	-3508	16.937	-3990.1
4179	237.9	14.96	-3521	16.941	-3991
4180	237.9	14.93	-3512	16.945	-3992
4181	237.87	14.96	-3521	16.949	-3993

4182	237.88	14.93	-3513	16.953	-3994
4183	237.89	14.9	-3506	16.957	-3994.9
4184	237.89	14.95	-3517	16.961	-3995.9
4185	237.88	14.92	-3511	16.966	-3996.9
4186	237.86	14.93	-3512	16.97	-3997.9
4187	237.83	14.96	-3518	16.974	-3998.8
4188	237.94	14.9	-3506	16.978	-3999.8
4189	237.93	14.96	-3521	16.982	-4000.8
4190	237.91	14.92	-3511	16.986	-4001.8
4191	237.86	14.95	-3519	16.99	-4002.8
4192	237.83	14.94	-3514	16.995	-4003.7
4193	237.88	14.9	-3507	16.999	-4004.7
4194	237.86	14.98	-3525	17.003	-4005.7
4195	237.88	14.94	-3514	17.007	-4006.7
4196	237.87	14.95	-3519	17.011	-4007.6
4197	237.9	14.96	-3520	17.015	-4008.6
4198	238.02	14.9	-3509	17.02	-4009.6
4199	237.99	14.96	-3521	17.024	-4010.6
4200	237.55	14.92	-3508	17.028	-4011.5
4201	237.62	14.96	-3516	17.032	-4012.5
4202	237.64	14.95	-3515	17.036	-4013.5
4203	237.63	14.91	-3505	17.04	-4014.5
4204	237.69	14.99	-3524	17.044	-4015.4
4205	237.71	14.95	-3516	17.049	-4016.4
4206	237.7	14.96	-3518	17.053	-4017.4
4207	237.67	14.97	-3518	17.057	-4018.4
4208	237.75	14.95	-3514	17.061	-4019.4
4209	237.77	14.89	-3503	17.065	-4020.4
4210	237.69	14.96	-3517	17.069	-4021.3
4211	237.76	14.93	-3512	17.074	-4022.3
4212	237.71	14.96	-3518	17.078	-4023.3
4213	237.72	14.97	-3520	17.082	-4024.2
4214	237.75	14.94	-3515	17.086	-4025.2
4215	237.75	14.96	-3518	17.09	-4026.2
4216	237.73	14.95	-3516	17.094	-4027.2
4217	237.7	14.97	-3519	17.098	-4028.1
4218	237.71	14.95	-3516	17.103	-4029.1
4219	237.74	14.97	-3521	17.107	-4030.1
4220	237.78	14.96	-3521	17.111	-4031.1
4221	237.83	14.92	-3511	17.115	-4032
4222	237.7	14.95	-3515	17.119	-4033
4223	237.82	14.92	-3510	17.123	-4034
4224	237.87	14.9	-3507	17.128	-4035
4225	237.84	14.94	-3515	17.132	-4036
4226	237.89	14.94	-3515	17.136	-4036.9
4227	237.85	14.96	-3520	17.14	-4037.9
4228	237.93	14.93	-3514	17.144	-4038.9

4229	237.88	14.95	-3519	17.148	-4039.9
4230	237.84	14.96	-3519	17.152	-4040.8
4231	237.94	14.92	-3511	17.157	-4041.8
4232	237.91	14.92	-3512	17.161	-4042.8
4233	237.98	14.94	-3516	17.165	-4043.8
4234	237.96	14.94	-3519	17.169	-4044.7
4235	237.92	14.92	-3514	17.173	-4045.7
4236	237.97	14.92	-3513	17.177	-4046.7
4237	237.93	14.93	-3514	17.181	-4047.7
4238	237.93	14.95	-3519	17.186	-4048.7
4239	237.81	14.98	-3523	17.19	-4049.6
4240	237.9	14.96	-3521	17.194	-4050.6
4241	237.84	14.96	-3519	17.198	-4051.6
4242	237.82	14.95	-3517	17.202	-4052.6
4243	237.85	14.96	-3520	17.206	-4053.5
4244	237.77	14.96	-3519	17.211	-4054.5
4245	237.81	14.92	-3510	17.215	-4055.5
4246	237.89	14.95	-3518	17.219	-4056.5
4247	237.85	14.96	-3519	17.223	-4057.5
4248	237.88	14.96	-3519	17.227	-4058.4
4249	237.79	15	-3529	17.231	-4059.4
4250	237.84	14.94	-3516	17.235	-4060.4
4251	237.92	14.92	-3515	17.24	-4061.4
4252	237.91	14.96	-3523	17.244	-4062.3
4253	237.84	14.94	-3514	17.248	-4063.3
4254	237.88	14.97	-3521	17.252	-4064.3
4255	237.85	14.95	-3519	17.256	-4065.3
4256	237.81	14.96	-3518	17.261	-4066.3
4257	237.83	14.98	-3523	17.264	-4067.2
4258	237.83	14.9	-3503	17.269	-4068.2
4259	237.8	15.01	-3534	17.273	-4069.1
4260	237.79	14.92	-3508	17.277	-4070.1
4261	237.87	14.93	-3513	17.281	-4071.1
4262	237.74	14.97	-3519	17.285	-4072.1
4263	237.88	14.91	-3509	17.289	-4073.1
4264	237.83	15.01	-3533	17.293	-4074
4265	237.64	14.9	-3503	17.298	-4075
4266	237.84	14.98	-3525	17.302	-4076
4267	237.79	14.97	-3523	17.306	-4077
4268	237.75	14.95	-3517	17.31	-4077.9
4269	237.93	14.98	-3529	17.314	-4078.9
4270	237.93	14.93	-3514	17.318	-4079.9
4271	237.98	14.95	-3517	17.323	-4080.9
4272	237.95	14.94	-3516	17.327	-4081.9
4273	237.85	14.97	-3521	17.331	-4082.8
4274	237.83	15.02	-3535	17.335	-4083.8
4275	237.87	14.93	-3513	17.339	-4084.8

4276	237.89	14.98	-3527	17.343	-4085.8
4277	237.93	14.95	-3519	17.347	-4086.7
4278	237.92	14.94	-3516	17.352	-4087.7
4279	237.88	14.91	-3507	17.356	-4088.7
4280	237.9	14.97	-3521	17.36	-4089.7
4281	237.89	14.87	-3501	17.364	-4090.7
4282	237.89	14.96	-3523	17.368	-4091.6
4283	237.8	14.94	-3514	17.372	-4092.6
4284	237.83	14.95	-3519	17.377	-4093.6
4285	237.62	14.97	-3518	17.381	-4094.6
4286	237.56	14.93	-3509	17.385	-4095.5
4287	237.52	15	-3524	17.389	-4096.5
4288	237.62	14.97	-3520	17.394	-4097.6
4289	237.57	15	-3525	17.397	-4098.5
4290	237.41	14.98	-3517	17.402	-4099.5
4291	237.45	14.99	-3525	17.406	-4100.4
4292	237.37	14.99	-3523	17.41	-4101.4
4293	237.35	15.05	-3534	17.414	-4102.4
4294	237.38	15.02	-3527	17.418	-4103.4
4295	237.42	14.94	-3507	17.422	-4104.4
4296	237.48	15.02	-3530	17.427	-4105.3
4297	237.4	14.99	-3525	17.431	-4106.3
4298	237.45	15	-3525	17.435	-4107.3
4299	237.35	15.01	-3525	17.439	-4108.3
4300	237.5	15.02	-3528	17.443	-4109.2
4301	237.71	14.95	-3516	17.447	-4110.2
4302	237.57	14.99	-3523	17.452	-4111.2
4303	237.55	15.01	-3529	17.456	-4112.2
4304	237.64	15	-3528	17.46	-4113.2
4305	237.47	14.99	-3521	17.464	-4114.1
4306	237.63	14.96	-3516	17.468	-4115.1
4307	237.43	14.97	-3515	17.472	-4116.1
4308	237.59	14.97	-3519	17.477	-4117.1
4309	237.41	15.03	-3530	17.481	-4118.1
4310	237.53	14.99	-3523	17.485	-4119
4311	237.38	15.04	-3534	17.489	-4120
4312	237.57	14.98	-3524	17.493	-4121
4313	237.38	15.04	-3533	17.497	-4122
4314	237.81	14.98	-3524	17.502	-4122.9
4315	237.62	14.91	-3503	17.506	-4123.9
4316	237.43	14.98	-3518	17.51	-4124.9
4317	237.59	15.02	-3533	17.514	-4125.9
4318	237.57	14.98	-3521	17.518	-4126.9
4319	237.48	14.98	-3519	17.522	-4127.8
4320	237.57	14.98	-3520	17.526	-4128.8
4321	237.57	15.01	-3529	17.531	-4129.8
4322	237.56	14.98	-3521	17.535	-4130.8

4323	237.43	15.01	-3525	17.539	-4131.8
4324	237.6	14.99	-3525	17.543	-4132.7
4325	237.53	15	-3525	17.547	-4133.7
4326	237.41	15	-3525	17.551	-4134.7
4327	237.34	14.97	-3515	17.556	-4135.7
4328	237.46	14.98	-3521	17.56	-4136.6
4329	237.51	14.98	-3520	17.564	-4137.6
4330	237.45	14.98	-3520	17.568	-4138.6
4331	237.55	14.84	-3487	17.572	-4139.6
4332	237.47	14.97	-3520	17.576	-4140.6
4333	237.36	14.94	-3507	17.581	-4141.5
4334	237.49	15.01	-3528	17.585	-4142.5
4335	237.21	14.9	-3499	17.589	-4143.5
4336	237.4	14.92	-3504	17.593	-4144.5
4337	237.37	14.94	-3507	17.597	-4145.4
4338	237.58	14.86	-3495	17.601	-4146.4
4339	237.31	14.8	-3475	17.605	-4147.4
4340	237.33	14.83	-3482	17.61	-4148.3
4341	237.39	14.83	-3481	17.614	-4149.3
4342	237.37	14.93	-3504	17.618	-4150.3
4343	237.23	14.82	-3478	17.622	-4151.2
4344	237.45	14.86	-3490	17.626	-4152.2
4345	237.21	14.85	-3485	17.63	-4153.2
4346	237.24	14.85	-3485	17.634	-4154.2
4347	237.28	14.97	-3514	17.638	-4155.1
4348	237.34	14.81	-3476	17.643	-4156.1
4349	237.53	14.83	-3484	17.647	-4157.1
4350	237.64	14.82	-3485	17.651	-4158
4351	237.56	14.83	-3484	17.655	-4159
4352	237.4	14.83	-3482	17.659	-4160
4353	237.71	14.81	-3482	17.663	-4160.9
4354	237.42	14.82	-3481	17.667	-4161.9
4355	237.69	14.8	-3477	17.671	-4162.8
4356	237.33	14.84	-3483	17.675	-4163.8
4357	237.69	14.82	-3484	17.68	-4164.8
4358	237.43	14.86	-3492	17.684	-4165.7
4359	237.45	14.81	-3480	17.688	-4166.7
4360	237.69	14.85	-3494	17.692	-4167.7
4361	237.72	14.83	-3487	17.696	-4168.6
4362	237.76	14.76	-3471	17.7	-4169.6
4363	237.58	14.81	-3479	17.704	-4170.6
4364	237.56	14.87	-3494	17.708	-4171.5
4365	237.55	14.86	-3492	17.712	-4172.5
4366	237.62	14.85	-3491	17.717	-4173.5
4367	237.62	14.84	-3488	17.721	-4174.5
4368	237.42	14.75	-3464	17.725	-4175.4
4369	237.78	14.8	-3483	17.729	-4176.4

4370	237.55	14.85	-3491	17.733	-4177.4
4371	237.78	14.78	-3477	17.737	-4178.3
4372	237.42	14.92	-3503	17.741	-4179.3
4373	237.22	14.77	-3464	17.745	-4180.3
4374	237.79	14.79	-3480	17.75	-4181.2
4375	237.59	14.86	-3493	17.754	-4182.2
4376	237.61	14.75	-3467	17.758	-4183.2
4377	237.72	14.87	-3494	17.762	-4184.1
4378	237.38	14.81	-3475	17.766	-4185.1
4379	237.48	14.83	-3485	17.77	-4186.1
4380	237.81	14.84	-3490	17.774	-4187
4381	237.52	14.81	-3482	17.778	-4188
4382	237.76	14.87	-3499	17.782	-4189
4383	237.79	14.73	-3465	17.787	-4189.9
4384	237.42	14.85	-3488	17.791	-4190.9
4385	237.52	14.87	-3494	17.795	-4191.9
4386	237.5	14.82	-3484	17.799	-4192.8
4387	237.66	14.86	-3494	17.803	-4193.8
4388	237.54	14.76	-3467	17.807	-4194.8
4389	237.69	14.82	-3483	17.811	-4195.8
4390	237.45	14.86	-3490	17.815	-4196.7
4391	237.54	14.8	-3477	17.82	-4197.7
4392	237.75	14.88	-3502	17.824	-4198.7
4393	237.57	14.73	-3464	17.828	-4199.6
4394	237.87	14.79	-3478	17.832	-4200.6
4395	237.61	14.86	-3488	17.836	-4201.6
4396	237.71	14.86	-3493	17.84	-4202.5
4397	237.95	14.84	-3492	17.844	-4203.5
4398	237.75	14.85	-3493	17.848	-4204.5
4399	237.68	14.79	-3478	17.853	-4205.4
4400	237.62	14.84	-3488	17.857	-4206.4
4401	237.72	14.85	-3489	17.861	-4207.4
4402	237.86	14.83	-3490	17.865	-4208.3
4403	237.77	14.83	-3485	17.869	-4209.3
4404	237.63	14.91	-3504	17.873	-4210.3
4405	237.64	14.79	-3477	17.877	-4211.2
4406	237.7	14.85	-3492	17.881	-4212.2
4407	237.76	14.8	-3481	17.885	-4213.2
4408	237.81	14.87	-3496	17.89	-4214.2
4409	237.69	14.88	-3497	17.894	-4215.1
4410	237.75	14.75	-3466	17.898	-4216.1
4411	237.9	14.87	-3498	17.902	-4217.1
4412	237.53	14.78	-3470	17.906	-4218
4413	237.81	14.86	-3497	17.91	-4219
4414	237.67	14.82	-3485	17.914	-4220
4415	237.56	14.89	-3500	17.918	-4220.9
4416	237.41	14.85	-3489	17.923	-4221.9

4417	237.57	14.84	-3489	17.927	-4222.9
4418	237.45	14.81	-3477	17.931	-4223.8
4419	237.5	14.83	-3484	17.935	-4224.8
4420	237.46	14.82	-3480	17.939	-4225.8
4421	237.24	14.89	-3494	17.943	-4226.7
4422	237.32	14.91	-3500	17.947	-4227.7
4423	237.37	14.89	-3496	17.951	-4228.7
4424	237.39	14.84	-3486	17.956	-4229.7
4425	237.51	14.81	-3477	17.96	-4230.6
4426	237.48	14.85	-3488	17.964	-4231.6
4427	237.33	14.89	-3495	17.968	-4232.6
4428	237.51	14.84	-3485	17.972	-4233.5
4429	237.56	14.86	-3493	17.976	-4234.5
4430	237.36	14.88	-3493	17.98	-4235.5
4431	237.45	14.79	-3474	17.984	-4236.4
4432	237.57	14.81	-3479	17.989	-4237.4
4433	237.46	14.87	-3493	17.993	-4238.4
4434	237.34	14.9	-3500	17.997	-4239.3
4435	237.49	14.85	-3489	18.001	-4240.3
4436	237.36	14.94	-3508	18.005	-4241.3
4437	237.39	14.85	-3484	18.009	-4242.3
4438	237.38	14.86	-3487	18.013	-4243.2
4439	237.45	14.88	-3494	18.018	-4244.2
4440	237.38	14.87	-3490	18.022	-4245.2
4441	237.34	14.83	-3480	18.026	-4246.1
4442	237.51	14.86	-3491	18.03	-4247.1
4443	237.57	14.82	-3482	18.034	-4248.1
4444	237.35	14.84	-3485	18.038	-4249
4445	237.32	14.89	-3495	18.042	-4250
4446	237.37	14.88	-3497	18.046	-4251
4447	237.2	14.89	-3495	18.051	-4252
4448	237.22	14.85	-3484	18.055	-4252.9
4449	237.32	14.9	-3497	18.059	-4253.9
4450	237.18	14.83	-3479	18.063	-4254.9
4451	237.27	14.86	-3487	18.067	-4255.8
4452	237.32	14.84	-3484	18.071	-4256.8
4453	237.24	14.87	-3489	18.075	-4257.8
4454	237.05	14.91	-3497	18.079	-4258.7
4455	237.14	14.92	-3500	18.084	-4259.7
4456	237.3	14.89	-3495	18.088	-4260.7
4457	237.29	14.86	-3487	18.092	-4261.7
4458	237.36	14.84	-3486	18.096	-4262.6
4459	237.4	14.88	-3495	18.1	-4263.6
4460	237.33	14.91	-3501	18.104	-4264.6
4461	237.33	14.81	-3478	18.108	-4265.5
4462	237.29	14.87	-3492	18.113	-4266.5
4463	237.25	14.93	-3506	18.117	-4267.5

4464	237.36	14.87	-3493	18.121	-4268.4
4465	237.33	14.87	-3490	18.125	-4269.4
4466	237.24	14.88	-3492	18.129	-4270.4
4467	237.39	14.91	-3500	18.133	-4271.4
4468	237.46	14.85	-3489	18.137	-4272.3
4469	237.38	14.86	-3489	18.141	-4273.3
4470	237.41	14.87	-3494	18.146	-4274.3
4471	237.47	14.86	-3491	18.15	-4275.2
4472	237.51	14.87	-3493	18.154	-4276.2
4473	237.18	14.9	-3495	18.158	-4277.2
4474	237.29	14.89	-3496	18.162	-4278.1
4475	237.42	14.9	-3501	18.166	-4279.1
4476	237.49	14.87	-3494	18.17	-4280.1
4477	237.38	14.85	-3486	18.174	-4281.1
4478	237.43	14.89	-3498	18.179	-4282
4479	237.6	14.85	-3490	18.183	-4283
4480	237.47	14.87	-3495	18.187	-4284
4481	237.51	14.88	-3497	18.191	-4284.9
4482	237.64	14.83	-3486	18.195	-4285.9
4483	237.57	14.86	-3493	18.199	-4286.9
4484	237.43	14.84	-3486	18.203	-4287.8
4485	237.53	14.87	-3494	18.208	-4288.8
4486	237.66	14.85	-3490	18.212	-4289.8
4487	237.46	14.85	-3489	18.216	-4290.8
4488	237.58	14.86	-3491	18.22	-4291.7
4489	237.46	14.87	-3494	18.224	-4292.7
4490	237.46	14.91	-3502	18.228	-4293.7
4491	237.49	14.84	-3487	18.232	-4294.6
4492	237.57	14.86	-3494	18.236	-4295.6
4493	237.42	14.82	-3478	18.241	-4296.6
4494	237.56	14.84	-3488	18.245	-4297.5
4495	237.44	14.93	-3508	18.249	-4298.5
4496	237.28	14.85	-3488	18.253	-4299.5
4497	237.49	14.89	-3500	18.257	-4300.5
4498	237.45	14.88	-3495	18.261	-4301.4
4499	237.33	14.85	-3487	18.265	-4302.4
4500	237.35	14.85	-3485	18.269	-4303.4
4501	237.43	14.93	-3509	18.274	-4304.3
4502	237.33	14.86	-3491	18.278	-4305.3
4503	237.46	14.88	-3498	18.282	-4306.3
4504	237.31	14.89	-3494	18.286	-4307.3
4505	237.48	14.88	-3495	18.29	-4308.2
4506	237.6	14.85	-3489	18.294	-4309.2
4507	237.44	14.87	-3492	18.298	-4310.2
4508	237.57	14.85	-3490	18.303	-4311.1
4509	237.39	14.85	-3489	18.307	-4312.1
4510	237.37	14.87	-3493	18.311	-4313.1

4511	237.32	14.85	-3485	18.315	-4314
4512	237.63	14.89	-3501	18.319	-4315
4513	237.34	14.86	-3490	18.323	-4316
4514	237.46	14.93	-3510	18.327	-4317
4515	237.32	14.81	-3477	18.331	-4317.9
4516	237.45	14.86	-3491	18.336	-4318.9
4517	237.66	14.88	-3499	18.34	-4319.9
4518	237.48	14.89	-3496	18.344	-4320.8
4519	237.61	14.87	-3493	18.348	-4321.8
4520	237.71	14.86	-3493	18.352	-4322.8
4521	237.38	14.87	-3491	18.356	-4323.8
4522	237.6	14.9	-3501	18.36	-4324.7
4523	237.46	14.87	-3493	18.365	-4325.7
4524	237.28	14.88	-3491	18.369	-4326.7
4525	237.48	14.88	-3495	18.373	-4327.6
4526	237.41	14.9	-3498	18.377	-4328.6
4527	237.46	14.91	-3501	18.381	-4329.6
4528	237.57	14.81	-3480	18.385	-4330.6
4529	237.63	14.87	-3494	18.389	-4331.5
4530	237.35	14.92	-3505	18.393	-4332.5
4531	237.46	14.9	-3499	18.398	-4333.5
4532	237.55	14.84	-3486	18.402	-4334.4
4533	237.62	14.81	-3481	18.406	-4335.4
4534	237.36	14.88	-3492	18.41	-4336.4
4535	237.3	14.91	-3500	18.414	-4337.3
4536	237.39	14.89	-3498	18.418	-4338.3
4537	237.45	14.9	-3499	18.422	-4339.3
4538	237.47	14.89	-3498	18.427	-4340.3
4539	237.51	14.87	-3494	18.431	-4341.2
4540	237.52	14.87	-3494	18.435	-4342.2
4541	237.52	14.89	-3499	18.439	-4343.2
4542	237.59	14.88	-3496	18.443	-4344.1
4543	237.39	14.91	-3500	18.447	-4345.1
4544	237.43	14.9	-3498	18.451	-4346.1
4545	237.54	14.91	-3503	18.455	-4347.1
4546	237.54	14.9	-3502	18.46	-4348
4547	237.46	14.87	-3494	18.464	-4349
4548	237.47	14.91	-3502	18.468	-4350
4549	236.76	14.93	-3499	18.472	-4350.9
4550	236.96	14.93	-3500	18.476	-4351.9
4551	237.33	14.89	-3497	18.48	-4352.9
4552	237.3	14.91	-3500	18.484	-4353.9
4553	237.34	14.89	-3494	18.489	-4354.8
4554	237.26	14.93	-3504	18.493	-4355.8
4555	237.34	14.9	-3500	18.497	-4356.8
4556	237.29	14.91	-3500	18.501	-4357.7
4557	237.25	14.93	-3504	18.505	-4358.7

4558	237.39	14.91	-3501	18.509	-4359.7
4559	237.35	14.9	-3499	18.513	-4360.7
4560	237.14	14.84	-3481	18.518	-4361.7
4561	237.18	14.93	-3503	18.522	-4362.6
4562	237.49	14.85	-3489	18.526	-4363.6
4563	237.48	14.89	-3499	18.53	-4364.6
4564	237.2	14.92	-3501	18.534	-4365.5
4565	237.42	14.87	-3493	18.538	-4366.5
4566	237.39	14.9	-3499	18.542	-4367.5
4567	237.39	14.88	-3496	18.547	-4368.4
4568	237.65	14.84	-3488	18.551	-4369.4
4569	237.51	14.88	-3496	18.555	-4370.4
4570	237.67	14.88	-3496	18.559	-4371.4
4571	237.82	14.84	-3490	18.563	-4372.3
4572	237.86	14.86	-3495	18.567	-4373.3
4573	237.73	14.87	-3497	18.571	-4374.3
4574	237.62	14.84	-3487	18.575	-4375.2
4575	237.83	14.87	-3499	18.58	-4376.2
4576	237.89	14.93	-3512	18.584	-4377.2
4577	237.7	14.88	-3498	18.588	-4378.2
4578	237.79	14.9	-3505	18.592	-4379.1
4579	237.71	14.89	-3500	18.596	-4380.1
4580	237.74	14.88	-3499	18.6	-4381.1
4581	237.97	14.9	-3509	18.604	-4382
4582	237.92	14.88	-3502	18.609	-4383
4583	237.94	14.87	-3500	18.613	-4384
4584	237.87	14.88	-3500	18.617	-4385
4585	237.99	14.86	-3498	18.621	-4385.9
4586	237.9	14.88	-3502	18.625	-4386.9
4587	237.9	14.88	-3502	18.629	-4387.9
4588	237.88	14.87	-3499	18.633	-4388.9
4589	237.92	14.86	-3497	18.637	-4389.8
4590	237.9	14.86	-3496	18.642	-4390.8
4591	237.86	14.86	-3495	18.646	-4391.8
4592	237.97	14.87	-3499	18.65	-4392.7
4593	237.85	14.88	-3501	18.654	-4393.7
4594	237.96	14.87	-3500	18.658	-4394.7
4595	237.91	14.89	-3504	18.662	-4395.7
4596	237.99	14.85	-3496	18.666	-4396.6
4597	237.83	14.9	-3505	18.67	-4397.6
4598	238.06	14.85	-3496	18.675	-4398.6
4599	238.03	14.86	-3498	18.679	-4399.5
4600	237.73	14.89	-3500	18.683	-4400.5
4601	237.75	14.9	-3504	18.687	-4401.5
4602	237.86	14.87	-3498	18.691	-4402.5
4603	238.18	14.87	-3502	18.695	-4403.4
4604	237.81	14.92	-3511	18.699	-4404.4

4605	237.89	14.85	-3495	18.704	-4405.4
4606	238.3	14.85	-3499	18.708	-4406.4
4607	238.08	14.87	-3502	18.712	-4407.3
4608	237.88	14.91	-3509	18.716	-4408.3
4609	237.93	14.88	-3502	18.72	-4409.3
4610	237.76	14.93	-3511	18.724	-4410.2
4611	237.8	14.9	-3505	18.728	-4411.2
4612	238.14	14.87	-3502	18.732	-4412.2
4613	237.65	14.9	-3502	18.737	-4413.2
4614	237.8	14.91	-3506	18.741	-4414.1
4615	237.9	14.87	-3499	18.745	-4415.1
4616	238.05	14.87	-3501	18.749	-4416.1
4617	238.1	14.86	-3499	18.753	-4417.1
4618	238.2	14.85	-3498	18.757	-4418
4619	237.97	14.86	-3497	18.761	-4419
4620	237.99	14.88	-3504	18.766	-4420
4621	238.11	14.85	-3497	18.77	-4420.9
4622	238.16	14.85	-3499	18.774	-4421.9
4623	238.11	14.87	-3501	18.778	-4422.9
4624	238.08	14.9	-3509	18.782	-4423.9
4625	238.17	14.89	-3506	18.786	-4424.8
4626	238.13	14.86	-3501	18.79	-4425.8
4627	238.24	14.89	-3509	18.794	-4426.8
4628	238.23	14.89	-3507	18.799	-4427.8
4629	238.12	14.89	-3507	18.803	-4428.8
4630	238.16	14.88	-3505	18.807	-4429.7
4631	238.08	14.9	-3508	18.811	-4430.7
4632	238.18	14.87	-3503	18.815	-4431.6
4633	238.19	14.86	-3501	18.819	-4432.6
4634	238.12	14.87	-3502	18.823	-4433.6
4635	238.4	14.87	-3507	18.827	-4434.6
4636	238.26	14.88	-3504	18.832	-4435.5
4637	238.05	14.88	-3503	18.836	-4436.5
4638	238.17	14.89	-3509	18.84	-4437.5
4639	238.11	14.87	-3503	18.844	-4438.5
4640	238.27	14.88	-3507	18.848	-4439.4
4641	238.16	14.84	-3498	18.852	-4440.4
4642	238.26	14.86	-3501	18.857	-4441.4
4643	237.93	14.91	-3509	18.861	-4442.4
4644	238.1	14.91	-3509	18.865	-4443.3
4645	238.04	14.93	-3515	18.869	-4444.3
4646	237.99	14.9	-3507	18.873	-4445.3
4647	238.17	14.8	-3485	18.877	-4446.3
4648	238.11	14.9	-3509	18.881	-4447.3
4649	237.96	14.86	-3500	18.885	-4448.2
4650	238.22	14.84	-3495	18.889	-4449.2
4651	238.32	14.87	-3503	18.894	-4450.1

4652	238.15	14.92	-3513	18.898	-4451.1
4653	238.03	14.9	-3507	18.902	-4452.1
4654	238.05	14.85	-3495	18.906	-4453.1
4655	237.94	14.9	-3507	18.91	-4454.1
4656	237.98	14.88	-3505	18.914	-4455
4657	238.08	14.95	-3522	18.919	-4456
4658	237.73	14.93	-3510	18.923	-4457
4659	238.11	14.88	-3504	18.927	-4458
4660	238.07	14.88	-3503	18.931	-4458.9
4661	238.13	14.9	-3511	18.935	-4459.9
4662	237.98	14.88	-3503	18.939	-4460.8
4663	237.84	14.91	-3508	18.943	-4461.8
4664	237.9	14.91	-3507	18.947	-4462.8
4665	238.01	14.89	-3506	18.951	-4463.8
4666	238	14.89	-3504	18.956	-4464.7
4667	237.95	14.92	-3510	18.96	-4465.7
4668	238.11	14.89	-3507	18.964	-4466.7
4669	237.95	14.91	-3510	18.968	-4467.7
4670	238	14.89	-3503	18.972	-4468.6
4671	237.93	14.88	-3499	18.976	-4469.6
4672	237.98	14.91	-3507	18.98	-4470.6
4673	238.07	14.89	-3505	18.985	-4471.6
4674	238.07	14.92	-3514	18.989	-4472.5
4675	237.73	14.93	-3512	18.993	-4473.5
4676	237.88	14.99	-3527	18.997	-4474.5
4677	238.03	14.92	-3513	19.001	-4475.5
4678	237.68	14.91	-3506	19.006	-4476.5
4679	237.71	14.92	-3508	19.01	-4477.5
4680	238.01	14.9	-3507	19.014	-4478.4
4681	237.93	14.91	-3506	19.018	-4479.4
4682	237.83	14.92	-3508	19.022	-4480.4
4683	237.93	14.88	-3501	19.026	-4481.4
4684	237.56	14.94	-3509	19.03	-4482.3
4685	237.72	14.92	-3509	19.035	-4483.3
4686	237.58	14.9	-3502	19.039	-4484.3
4687	237.86	14.91	-3507	19.043	-4485.3
4688	237.68	14.94	-3514	19.047	-4486.2
4689	237.85	14.91	-3508	19.051	-4487.2
4690	237.67	14.91	-3506	19.055	-4488.2
4691	237.7	14.93	-3510	19.059	-4489.2
4692	237.76	14.92	-3511	19.064	-4490.1
4693	237.85	14.89	-3505	19.068	-4491.1
4694	237.76	14.92	-3510	19.072	-4492.1
4695	237.72	14.91	-3505	19.076	-4493.1
4696	237.76	14.91	-3506	19.08	-4494
4697	237.82	14.91	-3507	19.084	-4495
4698	237.81	14.9	-3507	19.088	-4496

4699	237.87	14.89	-3504	19.093	-4497
4700	237.78	14.92	-3510	19.097	-4497.9
4701	237.75	14.91	-3505	19.101	-4498.9
4702	237.71	14.91	-3505	19.105	-4499.9
4703	237.79	14.91	-3505	19.109	-4500.8
4704	237.88	14.88	-3503	19.113	-4501.8
4705	237.9	14.88	-3503	19.117	-4502.7
4706	237.87	14.9	-3508	19.121	-4503.7
4707	237.86	14.91	-3511	19.125	-4504.7
4708	237.87	14.97	-3522	19.13	-4505.7
4709	237.89	14.91	-3508	19.134	-4506.6
4710	237.82	14.92	-3512	19.138	-4507.7
4711	237.78	14.89	-3504	19.142	-4508.6
4712	237.92	14.95	-3519	19.146	-4509.6
4713	237.97	14.96	-3524	19.15	-4510.5
4714	237.92	14.91	-3507	19.155	-4511.6
4715	237.84	14.93	-3513	19.159	-4512.5
4716	237.9	14.93	-3513	19.163	-4513.5
4717	237.92	14.88	-3503	19.167	-4514.5
4718	237.87	14.9	-3506	19.171	-4515.5
4719	237.84	14.88	-3502	19.175	-4516.4
4720	237.72	14.91	-3506	19.179	-4517.4
4721	237.85	14.93	-3512	19.184	-4518.4
4722	237.76	14.9	-3504	19.188	-4519.4
4723	237.65	14.93	-3509	19.192	-4520.3
4724	237.69	14.93	-3510	19.196	-4521.3
4725	237.71	14.92	-3508	19.2	-4522.3
4726	237.79	14.92	-3510	19.204	-4523.3
4727	237.69	14.92	-3508	19.209	-4524.2
4728	237.72	14.93	-3512	19.213	-4525.2
4729	237.65	14.93	-3512	19.217	-4526.2
4730	237.72	14.97	-3521	19.221	-4527.2
4731	237.74	14.93	-3511	19.225	-4528.1
4732	237.8	14.91	-3508	19.229	-4529.1
4733	237.76	14.94	-3513	19.233	-4530.1
4734	237.79	14.94	-3513	19.238	-4531.1
4735	237.81	14.94	-3514	19.242	-4532
4736	237.84	14.9	-3506	19.246	-4533
4737	237.78	14.96	-3516	19.25	-4533.9
4738	237.8	14.92	-3508	19.254	-4535
4739	237.68	14.94	-3511	19.258	-4535.9
4740	237.77	14.92	-3510	19.262	-4536.9
4741	237.75	14.93	-3511	19.267	-4537.9
4742	237.71	14.93	-3513	19.271	-4538.9
4743	237.73	14.96	-3517	19.275	-4539.8
4744	237.71	14.92	-3508	19.279	-4540.8
4745	237.79	14.92	-3508	19.283	-4541.8

4746	237.74	14.91	-3508	19.287	-4542.8
4747	237.65	14.95	-3514	19.291	-4543.7
4748	237.63	14.92	-3510	19.296	-4544.7
4749	237.65	14.94	-3513	19.3	-4545.7
4750	237.76	14.93	-3512	19.304	-4546.7
4751	237.76	14.94	-3515	19.308	-4547.6
4752	237.66	14.96	-3519	19.312	-4548.6
4753	237.63	14.93	-3511	19.316	-4549.6
4754	237.69	14.92	-3511	19.32	-4550.6
4755	237.74	14.93	-3512	19.325	-4551.6
4756	237.73	14.93	-3513	19.329	-4552.5
4757	237.64	14.94	-3512	19.333	-4553.5
4758	237.67	14.92	-3507	19.337	-4554.5
4759	237.71	14.93	-3511	19.341	-4555.5
4760	237.7	14.92	-3509	19.345	-4556.4
4761	237.64	14.94	-3512	19.35	-4557.4
4762	237.64	14.95	-3516	19.354	-4558.4
4763	237.55	14.98	-3521	19.358	-4559.4
4764	237.66	14.95	-3515	19.362	-4560.3
4765	237.59	14.94	-3510	19.366	-4561.3
4766	237.53	14.95	-3514	19.37	-4562.3
4767	237.58	14.97	-3519	19.374	-4563.3
4768	237.62	14.92	-3508	19.379	-4564.2
4769	237.67	14.93	-3511	19.383	-4565.2
4770	237.58	14.96	-3516	19.387	-4566.2
4771	237.6	14.95	-3516	19.391	-4567.2
4772	237.63	14.93	-3510	19.395	-4568.1
4773	237.6	14.96	-3517	19.399	-4569.1
4774	237.58	14.96	-3518	19.403	-4570.1
4775	237.54	14.93	-3510	19.408	-4571.1
4776	237.63	14.94	-3513	19.412	-4572
4777	237.61	14.94	-3513	19.416	-4573
4778	237.62	14.95	-3515	19.42	-4574
4779	237.7	14.94	-3515	19.424	-4575
4780	237.62	14.96	-3516	19.428	-4576
4781	237.73	14.91	-3508	19.433	-4576.9
4782	237.74	14.97	-3519	19.437	-4577.9
4783	237.69	14.95	-3514	19.441	-4578.9
4784	237.7	14.96	-3517	19.445	-4579.9
4785	237.67	14.94	-3514	19.449	-4580.8
4786	237.61	14.93	-3511	19.453	-4581.8
4787	237.73	14.96	-3517	19.457	-4582.8
4788	237.67	14.94	-3513	19.462	-4583.8
4789	237.68	14.94	-3513	19.466	-4584.7
4790	237.69	14.96	-3517	19.47	-4585.7
4791	237.7	14.94	-3512	19.474	-4586.7
4792	237.71	14.95	-3517	19.478	-4587.7

4793	237.68	14.95	-3515	19.482	-4588.7
4794	237.71	14.95	-3516	19.487	-4589.6
4795	237.72	14.95	-3517	19.491	-4590.6
4796	237.7	14.95	-3517	19.495	-4591.6
4797	237.69	14.94	-3511	19.499	-4592.6
4798	237.66	14.93	-3511	19.503	-4593.5
4799	237.71	14.99	-3524	19.507	-4594.5
4800	237.77	14.93	-3510	19.511	-4595.5
4801	237.69	14.97	-3521	19.516	-4596.5
4802	237.75	14.93	-3510	19.52	-4597.4
4803	237.76	14.98	-3522	19.524	-4598.4
4804	237.76	14.96	-3518	19.528	-4599.4
4805	237.71	14.93	-3512	19.532	-4600.4
4806	237.76	14.98	-3523	19.536	-4601.4
4807	237.69	14.94	-3513	19.541	-4602.3
4808	237.67	14.98	-3523	19.545	-4603.3
4809	237.72	14.95	-3516	19.549	-4604.3
4810	237.76	14.95	-3515	19.553	-4605.3
4811	237.73	14.93	-3512	19.557	-4606.2
4812	237.73	14.99	-3526	19.561	-4607.2
4813	237.68	14.96	-3516	19.566	-4608.2
4814	237.77	14.97	-3521	19.57	-4609.2
4815	237.68	14.95	-3516	19.574	-4610.1
4816	237.73	14.99	-3526	19.578	-4611.1
4817	237.69	14.94	-3514	19.582	-4612.1
4818	237.74	14.89	-3500	19.586	-4613
4819	237.69	14.96	-3517	19.59	-4614
4820	237.72	14.95	-3514	19.594	-4615
4821	237.72	14.97	-3521	19.599	-4616
4822	237.71	14.78	-3477	19.603	-4616.9
4823	237.8	14.74	-3468	19.607	-4617.9
4824	237.8	14.91	-3507	19.611	-4618.9
4825	237.8	14.93	-3512	19.615	-4619.9
4826	237.66	14.79	-3475	19.619	-4620.8
4827	237.75	14.77	-3475	19.623	-4621.8
4828	237.78	14.78	-3478	19.627	-4622.8
4829	237.77	15.04	-3536	19.632	-4623.7
4830	237.72	14.71	-3461	19.636	-4624.7
4831	237.85	14.76	-3472	19.64	-4625.7
4832	237.68	14.84	-3486	19.644	-4626.6
4833	237.72	14.75	-3469	19.648	-4627.6
4834	237.78	14.83	-3489	19.652	-4628.6
4835	237.75	14.77	-3473	19.656	-4629.5
4836	237.77	14.8	-3481	19.66	-4630.5
4837	237.82	14.7	-3457	19.665	-4631.5
4838	237.79	14.79	-3477	19.669	-4632.5
4839	237.76	14.77	-3472	19.673	-4633.4

4840	237.82	14.76	-3470	19.677	-4634.4
4841	237.86	14.82	-3487	19.681	-4635.4
4842	237.86	14.88	-3501	19.685	-4636.3
4843	237.78	14.8	-3482	19.689	-4637.3
4844	237.82	14.78	-3476	19.693	-4638.3
4845	237.87	14.78	-3474	19.697	-4639.2
4846	237.96	14.79	-3483	19.702	-4640.2
4847	237.84	14.78	-3477	19.706	-4641.2
4848	237.8	14.77	-3472	19.71	-4642.1
4849	237.8	14.85	-3493	19.714	-4643.1
4850	237.8	14.74	-3467	19.718	-4644.1
4851	237.79	14.78	-3476	19.722	-4645
4852	237.83	14.89	-3502	19.726	-4646
4853	237.9	14.74	-3469	19.73	-4647
4854	237.85	14.79	-3478	19.734	-4647.9
4855	237.83	14.78	-3476	19.739	-4648.9
4856	237.92	14.77	-3475	19.743	-4649.9
4857	237.91	14.74	-3469	19.747	-4650.8
4858	237.96	14.8	-3485	19.751	-4651.8
4859	237.92	14.92	-3513	19.755	-4652.8
4860	237.9	14.79	-3479	19.759	-4653.7
4861	237.9	14.79	-3476	19.763	-4654.7
4862	237.94	14.78	-3477	19.767	-4655.7
4863	237.9	14.77	-3476	19.771	-4656.6
4864	237.94	14.78	-3479	19.776	-4657.6
4865	237.86	14.8	-3483	19.78	-4658.6
4866	237.89	14.8	-3481	19.784	-4659.5
4867	237.91	14.85	-3494	19.788	-4660.5
4868	237.94	14.78	-3477	19.792	-4661.5
4869	237.94	14.78	-3477	19.796	-4662.4
4870	237.98	14.8	-3481	19.8	-4663.4
4871	237.92	14.82	-3486	19.804	-4664.4
4872	237.94	14.84	-3494	19.808	-4665.3
4873	237.95	14.74	-3470	19.812	-4666.3
4874	238	14.83	-3490	19.817	-4667.3
4875	237.92	14.75	-3468	19.821	-4668.2
4876	237.92	14.76	-3472	19.825	-4669.2
4877	237.92	14.72	-3462	19.829	-4670.1
4878	238.06	14.78	-3479	19.833	-4671.1
4879	237.99	14.78	-3478	19.837	-4672.1
4880	237.97	14.76	-3475	19.841	-4673
4881	238.02	14.81	-3485	19.845	-4674
4882	238.06	14.73	-3467	19.849	-4675
4883	238.07	14.79	-3482	19.854	-4675.9
4884	238.03	14.77	-3476	19.858	-4676.9
4885	238.04	14.8	-3483	19.862	-4677.9
4886	238.05	14.78	-3478	19.866	-4678.8

4887	238.03	14.81	-3484	19.87	-4679.8
4888	237.97	14.79	-3481	19.874	-4680.8
4889	238.02	14.81	-3487	19.878	-4681.7
4890	237.77	14.81	-3481	19.882	-4682.7
4891	237.97	14.8	-3482	19.886	-4683.7
4892	237.93	14.78	-3477	19.891	-4684.6
4893	237.93	14.79	-3480	19.895	-4685.6
4894	237.96	14.77	-3475	19.899	-4686.6
4895	237.93	14.81	-3486	19.903	-4687.6
4896	238	14.77	-3476	19.907	-4688.5
4897	238.02	14.8	-3484	19.911	-4689.5
4898	238.05	14.77	-3477	19.915	-4690.5
4899	238.01	14.8	-3485	19.919	-4691.4
4900	238.01	14.78	-3477	19.923	-4692.4
4901	237.96	14.82	-3488	19.927	-4693.4
4902	237.89	14.79	-3478	19.932	-4694.3
4903	237.91	14.83	-3487	19.936	-4695.3
4904	237.94	14.8	-3483	19.94	-4696.3
4905	237.97	14.79	-3482	19.944	-4697.2
4906	237.95	14.79	-3480	19.948	-4698.2
4907	238	14.81	-3485	19.952	-4699.2
4908	238.01	14.79	-3482	19.956	-4700.1
4909	238.01	14.77	-3475	19.96	-4701.1
4910	238	14.8	-3482	19.964	-4702.1
4911	237.89	14.81	-3484	19.969	-4703
4912	237.9	14.8	-3481	19.973	-4704
4913	237.87	14.79	-3478	19.977	-4705
4914	237.86	14.8	-3482	19.981	-4705.9
4915	237.9	14.8	-3481	19.985	-4706.9
4916	237.87	14.78	-3477	19.989	-4707.9
4917	237.8	14.83	-3486	19.993	-4708.8
4918	237.88	14.81	-3484	19.997	-4709.8
4919	237.84	14.83	-3487	20.001	-4710.8
4920	237.86	14.82	-3485	20.006	-4711.7
4921	237.86	14.81	-3483	20.01	-4712.7
4922	237.81	14.82	-3486	20.014	-4713.7
4923	237.75	14.82	-3484	20.018	-4714.6
4924	237.83	14.82	-3486	20.022	-4715.6
4925	237.59	14.82	-3482	20.026	-4716.6
4926	237.85	14.79	-3481	20.03	-4717.5
4927	237.75	14.83	-3488	20.034	-4718.5
4928	237.62	14.83	-3484	20.039	-4719.5
4929	237.92	14.8	-3484	20.043	-4720.4
4930	237.89	14.79	-3480	20.047	-4721.4
4931	237.76	14.82	-3483	20.051	-4722.4
4932	237.78	14.83	-3485	20.055	-4723.3
4933	237.89	14.81	-3483	20.059	-4724.3

4934	237.75	14.83	-3487	20.063	-4725.3
4935	237.82	14.82	-3486	20.067	-4726.3
4936	237.83	14.8	-3480	20.071	-4727.2
4937	237.78	14.8	-3482	20.076	-4728.2
4938	237.79	14.81	-3483	20.08	-4729.2
4939	237.89	14.82	-3487	20.084	-4730.1
4940	237.9	14.8	-3480	20.088	-4731.1
4941	237.9	14.83	-3488	20.092	-4732.1
4942	237.89	14.84	-3491	20.096	-4733
4943	237.81	14.83	-3486	20.1	-4734
4944	237.95	14.81	-3486	20.104	-4735
4945	237.89	14.8	-3481	20.108	-4735.9
4946	237.77	14.83	-3485	20.113	-4736.9
4947	237.89	14.8	-3481	20.117	-4737.9
4948	237.89	14.8	-3481	20.121	-4738.8
4949	237.83	14.85	-3492	20.125	-4739.8
4950	237.91	14.81	-3484	20.129	-4740.8
4951	237.89	14.83	-3487	20.133	-4741.7
4952	237.77	14.81	-3484	20.137	-4742.7
4953	237.95	14.83	-3489	20.141	-4743.7
4954	237.86	14.83	-3490	20.146	-4744.6
4955	237.89	14.81	-3485	20.15	-4745.6
4956	237.82	14.83	-3487	20.154	-4746.6
4957	237.87	14.83	-3488	20.158	-4747.6
4958	237.83	14.8	-3480	20.162	-4748.5
4959	237.79	14.86	-3494	20.166	-4749.5
4960	237.79	14.82	-3485	20.17	-4750.5
4961	237.16	14.86	-3486	20.174	-4751.4
4962	237.81	14.84	-3489	20.178	-4752.4
4963	237.68	14.81	-3482	20.183	-4753.4
4964	237.66	14.84	-3486	20.187	-4754.3
4965	237.74	14.85	-3490	20.191	-4755.3
4966	237.71	14.82	-3484	20.195	-4756.3
4967	237.73	14.83	-3486	20.199	-4757.2
4968	237.72	14.84	-3488	20.203	-4758.2
4969	237.71	14.84	-3488	20.207	-4759.2
4970	237.75	14.83	-3486	20.211	-4760.1
4971	237.62	14.82	-3482	20.216	-4761.1
4972	237.67	14.85	-3490	20.22	-4762.1
4973	237.79	14.81	-3484	20.224	-4763
4974	237.71	14.83	-3485	20.228	-4764
4975	237.76	14.82	-3485	20.232	-4765
4976	237.62	14.81	-3482	20.236	-4766
4977	237.86	14.83	-3487	20.24	-4766.9
4978	237.83	14.82	-3484	20.244	-4767.9
4979	237.82	14.82	-3486	20.249	-4768.9
4980	237.88	14.83	-3488	20.253	-4769.8

4981	237.88	14.82	-3486	20.257	-4770.8
4982	237.84	14.81	-3484	20.261	-4771.8
4983	237.91	14.79	-3480	20.265	-4772.7
4984	237.85	14.86	-3494	20.269	-4773.7
4985	237.87	14.84	-3489	20.273	-4774.7
4986	237.72	14.83	-3486	20.277	-4775.6
4987	237.83	14.85	-3491	20.281	-4776.6
4988	237.88	14.79	-3480	20.286	-4777.6
4989	237.72	14.89	-3503	20.29	-4778.5
4990	237.73	14.85	-3495	20.294	-4779.5
4991	237.89	14.76	-3471	20.298	-4780.4
4992	237.85	14.77	-3474	20.302	-4781.4
4993	237.89	14.81	-3483	20.306	-4782.4
4994	237.73	14.85	-3491	20.31	-4783.4
4995	237.84	14.89	-3501	20.314	-4784.3
4996	237.86	14.84	-3492	20.318	-4785.3
4997	237.74	14.86	-3494	20.323	-4786.3
4998	237.79	14.86	-3494	20.327	-4787.2
4999	237.83	14.78	-3476	20.331	-4788.2
5000	237.84	14.8	-3481	20.335	-4789.2
5001	237.81	14.84	-3488	20.339	-4790.1
5002	237.83	14.82	-3485	20.343	-4791.1
5003	237.77	14.86	-3496	20.347	-4792.1
5004	237.87	14.86	-3500	20.351	-4793
5005	237.99	14.89	-3506	20.355	-4794
5006	238.02	14.85	-3494	20.36	-4795
5007	237.98	14.82	-3487	20.364	-4796
5008	237.95	14.86	-3496	20.368	-4796.9
5009	237.98	14.84	-3488	20.372	-4797.9
5010	237.97	14.85	-3493	20.376	-4798.9
5011	238.02	14.83	-3493	20.38	-4799.8
5012	237.89	14.89	-3503	20.384	-4800.8
5013	237.96	14.79	-3479	20.388	-4801.8
5014	237.97	14.8	-3479	20.393	-4802.7
5015	237.85	14.84	-3487	20.397	-4803.7
5016	237.95	14.81	-3481	20.401	-4804.7
5017	237.87	14.85	-3493	20.405	-4805.6
5018	237.87	14.85	-3495	20.409	-4806.6
5019	237.86	14.77	-3476	20.413	-4807.6
5020	237.83	14.81	-3482	20.417	-4808.6
5021	237.85	14.82	-3485	20.421	-4809.5
5022	237.88	14.81	-3482	20.426	-4810.5
5023	237.9	14.86	-3495	20.43	-4811.5
5024	237.91	14.87	-3499	20.434	-4812.4
5025	237.87	14.78	-3478	20.438	-4813.4
5026	237.9	14.84	-3494	20.442	-4814.4
5027	237.85	14.87	-3499	20.446	-4815.3

5028	237.96	14.81	-3483	20.45	-4816.3
5029	237.84	14.89	-3501	20.454	-4817.3
5030	237.87	14.84	-3491	20.459	-4818.2
5031	237.79	14.86	-3496	20.463	-4819.2
5032	237.84	14.79	-3480	20.467	-4820.2
5033	237.82	14.83	-3488	20.471	-4821.2
5034	237.83	14.86	-3494	20.475	-4822.1
5035	237.79	14.8	-3480	20.479	-4823.1
5036	237.77	14.77	-3472	20.483	-4824.1
5037	237.77	14.87	-3497	20.487	-4825
5038	237.73	14.84	-3490	20.491	-4826
5039	237.72	14.83	-3487	20.496	-4827
5040	237.67	14.81	-3483	20.5	-4827.9
5041	237.73	14.86	-3494	20.504	-4828.9
5042	237.73	14.85	-3488	20.508	-4829.9
5043	237.82	14.88	-3498	20.512	-4830.9
5044	237.78	14.83	-3486	20.516	-4831.8
5045	237.74	14.86	-3493	20.52	-4832.8
5046	237.83	14.8	-3480	20.524	-4833.8
5047	237.77	14.85	-3494	20.529	-4834.7
5048	237.86	14.86	-3495	20.533	-4835.7
5049	237.74	14.88	-3498	20.537	-4836.7
5050	237.86	14.82	-3484	20.541	-4837.6
5051	237.85	14.85	-3492	20.545	-4838.6
5052	237.62	14.87	-3494	20.549	-4839.6
5053	237.64	14.8	-3478	20.553	-4840.6
5054	237.83	14.86	-3497	20.557	-4841.5
5055	237.81	14.88	-3501	20.562	-4842.5
5056	237.7	14.85	-3491	20.566	-4843.5
5057	237.77	14.86	-3491	20.57	-4844.4
5058	237.68	14.94	-3509	20.574	-4845.4
5059	237.74	14.91	-3504	20.578	-4846.4
5060	237.74	14.86	-3495	20.582	-4847.3
5061	237.71	14.76	-3469	20.586	-4848.3
5062	237.68	14.88	-3496	20.591	-4849.3
5063	237.78	14.88	-3497	20.595	-4850.3
5064	237.8	14.88	-3500	20.599	-4851.2
5065	237.81	14.83	-3486	20.603	-4852.2
5066	237.81	14.97	-3518	20.607	-4853.2
5067	237.56	14.88	-3497	20.611	-4854.1
5068	237.64	14.85	-3490	20.615	-4855.1
5069	237.76	14.8	-3480	20.619	-4856.1
5070	237.74	14.84	-3486	20.624	-4857.1
5071	237.71	14.91	-3505	20.628	-4858
5072	237.72	14.88	-3497	20.632	-4859
5073	237.65	14.92	-3507	20.636	-4860
5074	237.72	14.83	-3486	20.64	-4860.9

5075	237.64	14.87	-3494	20.644	-4861.9
5076	237.63	14.88	-3498	20.648	-4862.9
5077	237.49	14.79	-3473	20.652	-4863.8
5078	237.72	14.93	-3510	20.657	-4864.8
5079	237.47	14.9	-3502	20.661	-4865.8
5080	237.52	14.88	-3497	20.665	-4866.8
5081	237.53	14.9	-3500	20.669	-4867.7
5082	237.49	14.91	-3500	20.673	-4868.7
5083	237.52	14.87	-3493	20.677	-4869.7
5084	237.57	14.93	-3506	20.681	-4870.6
5085	237.45	14.89	-3497	20.686	-4871.6
5086	237.35	14.82	-3478	20.69	-4872.6
5087	237.38	14.88	-3493	20.694	-4873.6
5088	237.41	14.91	-3502	20.698	-4874.5
5089	237.5	14.89	-3500	20.702	-4875.5
5090	237.45	14.9	-3500	20.706	-4876.5
5091	237.21	14.92	-3499	20.71	-4877.4
5092	237.26	14.9	-3497	20.714	-4878.4
5093	237.65	14.87	-3496	20.719	-4879.4
5094	237.31	14.88	-3492	20.723	-4880.4
5095	237.4	14.9	-3497	20.727	-4881.3
5096	237.34	14.91	-3499	20.731	-4882.3
5097	237.21	14.9	-3497	20.735	-4883.3
5098	237.37	14.89	-3496	20.739	-4884.2
5099	236.96	14.91	-3494	20.743	-4885.2
5100	237.46	14.87	-3492	20.748	-4886.2
5101	237.52	14.87	-3493	20.752	-4887.2
5102	237.48	14.9	-3501	20.756	-4888.1
5103	237.63	14.86	-3494	20.76	-4889.1
5104	237.56	14.88	-3497	20.764	-4890.1
5105	237.62	14.88	-3495	20.768	-4891
5106	237.29	14.91	-3497	20.772	-4892
5107	237.69	14.9	-3501	20.777	-4893
5108	237.41	14.89	-3496	20.781	-4894
5109	237.46	14.86	-3490	20.785	-4894.9
5110	237.79	14.88	-3501	20.789	-4895.9
5111	237.58	14.89	-3498	20.793	-4896.9
5112	237.44	14.87	-3492	20.797	-4897.8
5113	237.65	14.87	-3495	20.801	-4898.8
5114	237.72	14.88	-3498	20.805	-4899.8
5115	237.4	14.91	-3503	20.81	-4900.8
5116	237.57	14.9	-3500	20.814	-4901.7
5117	237.67	14.88	-3497	20.818	-4902.7
5118	237.62	14.88	-3497	20.822	-4903.7
5119	237.26	14.91	-3500	20.826	-4904.6
5120	237.39	14.87	-3492	20.83	-4905.6
5121	237.46	14.89	-3497	20.834	-4906.6

5122	237.41	14.84	-3486	20.839	-4907.6
5123	237.68	14.86	-3494	20.843	-4908.5
5124	237.5	14.92	-3505	20.847	-4909.5
5125	237.52	14.89	-3498	20.851	-4910.5
5126	237.48	14.92	-3504	20.855	-4911.4
5127	237.57	14.86	-3492	20.859	-4912.4
5128	237.53	14.9	-3499	20.863	-4913.4
5129	237.63	14.9	-3501	20.867	-4914.4
5130	237.52	14.91	-3500	20.872	-4915.3
5131	239.38	14.78	-3499	20.876	-4916.3
5132	239.36	14.77	-3495	20.88	-4917.3
5133	239.39	14.78	-3498	20.884	-4918.2
5134	239.26	14.77	-3493	20.888	-4919.2
5135	239.25	14.81	-3504	20.892	-4920.2
5136	239.3	14.8	-3502	20.896	-4921.2
5137	239.16	14.8	-3500	20.9	-4922.1
5138	239.27	14.79	-3498	20.905	-4923.1
5139	238.85	14.8	-3494	20.909	-4924.1
5140	239.27	14.8	-3501	20.913	-4925
5141	239.15	14.81	-3500	20.917	-4926
5142	239.01	14.82	-3499	20.921	-4927
5143	239.28	14.79	-3499	20.925	-4928
5144	239.21	14.81	-3501	20.929	-4928.9
5145	239.62	14.78	-3501	20.933	-4929.9
5146	239.6	14.77	-3498	20.937	-4930.9
5147	239.58	14.73	-3489	20.941	-4931.9
5148	239.65	14.77	-3498	20.946	-4932.8
5149	239.62	14.75	-3495	20.95	-4933.8
5150	239.54	14.78	-3500	20.954	-4934.8
5151	239.66	14.78	-3501	20.958	-4935.7
5152	239.62	14.78	-3499	20.962	-4936.7
5153	239.52	14.8	-3503	20.966	-4937.7
5154	239.44	14.82	-3506	20.97	-4938.6
5155	239.61	14.77	-3500	20.974	-4939.6
5156	239.49	14.76	-3493	20.978	-4940.6
5157	239.45	14.76	-3496	20.982	-4941.5
5158	239.47	14.72	-3486	20.987	-4942.5
5159	239.54	14.78	-3498	20.991	-4943.5
5160	239.5	14.75	-3494	20.995	-4944.5
5161	239.45	14.78	-3500	20.999	-4945.4
5162	239.47	14.77	-3496	21.003	-4946.4
5163	239.47	14.73	-3488	21.007	-4947.4
5164	239.64	14.76	-3499	21.011	-4948.3
5165	239.5	14.78	-3500	21.015	-4949.3
5166	239.56	14.77	-3497	21.019	-4950.3
5167	239.46	14.85	-3517	21.023	-4951.3
5168	239.34	14.81	-3504	21.028	-4952.2

5169	239.41	14.82	-3506	21.032	-4953.2
5170	239.39	14.79	-3502	21.036	-4954.2
5171	239.25	14.84	-3511	21.04	-4955.2
5172	239.37	14.79	-3501	21.044	-4956.1
5173	239.38	14.77	-3497	21.048	-4957.1
5174	239.39	14.79	-3501	21.052	-4958.1
5175	239.32	14.77	-3495	21.056	-4959
5176	239.43	14.73	-3485	21.06	-4960
5177	239.42	14.76	-3494	21.065	-4961
5178	239.32	14.83	-3509	21.069	-4962
5179	239.29	14.81	-3503	21.073	-4962.9
5180	239.19	14.85	-3510	21.077	-4963.9
5181	239.03	14.78	-3495	21.081	-4964.9
5182	239.25	14.78	-3498	21.085	-4965.9
5183	239.37	14.83	-3508	21.089	-4966.8
5184	239.32	14.84	-3511	21.093	-4967.8
5185	239.32	14.83	-3511	21.097	-4968.8
5186	239.21	14.85	-3510	21.102	-4969.7
5187	239.3	14.8	-3501	21.106	-4970.7
5188	239.41	14.82	-3507	21.11	-4971.7
5189	239.37	14.82	-3506	21.114	-4972.7
5190	239.21	14.79	-3496	21.118	-4973.6
5191	239.16	14.83	-3508	21.122	-4974.6
5192	239.02	14.8	-3499	21.126	-4975.6
5193	239.56	14.77	-3496	21.13	-4976.6
5194	239.25	14.79	-3499	21.134	-4977.5
5195	239.2	14.86	-3516	21.139	-4978.5
5196	239.44	14.86	-3519	21.143	-4979.5
5197	239.45	14.83	-3512	21.147	-4980.4
5198	239.28	14.83	-3509	21.151	-4981.4
5199	239.36	14.84	-3513	21.155	-4982.4
5200	239.16	14.83	-3507	21.159	-4983.4
5201	239.32	14.77	-3495	21.163	-4984.3
5202	239.16	14.84	-3510	21.167	-4985.3
5203	239.25	14.82	-3505	21.171	-4986.3
5204	239.4	14.82	-3508	21.176	-4987.3
5205	239.42	14.83	-3509	21.18	-4988.2
5206	239.29	14.78	-3495	21.184	-4989.2
5207	239.28	14.73	-3485	21.188	-4990.2
5208	239.16	14.83	-3506	21.192	-4991.2
5209	239.23	14.86	-3515	21.196	-4992.1
5210	239.49	14.78	-3499	21.2	-4993.1
5211	239.21	14.82	-3503	21.204	-4994.1
5212	239.38	14.82	-3506	21.209	-4995
5213	239.28	14.84	-3510	21.213	-4996
5214	239.41	14.8	-3503	21.217	-4997
5215	239.36	14.82	-3507	21.221	-4998

5216	239.47	14.79	-3503	21.225	-4998.9
5217	239.42	14.8	-3502	21.229	-4999.9
5218	239.51	14.81	-3506	21.233	-5000.9
5219	239.43	14.81	-3507	21.237	-5001.9
5220	239.55	14.79	-3502	21.241	-5002.8
5221	239.51	14.78	-3501	21.246	-5003.8
5222	239.46	14.82	-3507	21.25	-5004.8
5223	239.46	14.8	-3504	21.254	-5005.8
5224	239.36	14.77	-3495	21.258	-5006.7
5225	239.61	14.79	-3503	21.262	-5007.7
5226	239.81	14.76	-3498	21.266	-5008.7
5227	239.75	14.79	-3506	21.27	-5009.6
5228	239.84	14.73	-3492	21.274	-5010.6
5229	239.74	14.81	-3510	21.278	-5011.6
5230	239.94	14.77	-3504	21.282	-5012.6
5231	239.75	14.74	-3493	21.287	-5013.5
5232	239.97	14.79	-3511	21.291	-5014.5
5233	239.72	14.83	-3515	21.295	-5015.5
5234	239.86	14.79	-3510	21.299	-5016.5
5235	239.89	14.8	-3511	21.303	-5017.4
5236	239.89	14.77	-3503	21.307	-5018.4
5237	239.77	14.78	-3503	21.311	-5019.4
5238	239.86	14.69	-3485	21.315	-5020.4
5239	239.85	14.79	-3508	21.319	-5021.3
5240	239.87	14.74	-3498	21.324	-5022.3
5241	239.85	14.79	-3511	21.328	-5023.3
5242	239.74	14.84	-3521	21.332	-5024.2
5243	239.86	14.8	-3510	21.336	-5025.2
5244	239.66	14.84	-3521	21.34	-5026.2
5245	239.84	14.77	-3504	21.344	-5027.2
5246	239.85	14.83	-3518	21.348	-5028.1
5247	239.82	14.76	-3503	21.352	-5029.1
5248	239.93	14.81	-3517	21.356	-5030.1
5249	239.9	14.8	-3511	21.36	-5031.1
5250	239.73	14.76	-3497	21.365	-5032
5251	239.87	14.78	-3505	21.369	-5033
5252	239.98	14.8	-3512	21.373	-5034
5253	239.82	14.79	-3505	21.377	-5035
5254	239.87	14.79	-3509	21.381	-5035.9
5255	239.9	14.81	-3511	21.385	-5036.9
5256	240.02	14.79	-3510	21.389	-5037.9
5257	239.59	14.79	-3504	21.393	-5038.9
5258	239.98	14.86	-3525	21.397	-5039.8
5259	239.74	14.76	-3498	21.402	-5040.8
5260	240	14.76	-3506	21.406	-5041.8
5261	239.94	14.75	-3500	21.41	-5042.8
5262	239.84	14.74	-3495	21.414	-5043.7

5263	240.12	14.73	-3501	21.418	-5044.7
5264	239.88	14.78	-3505	21.422	-5045.7
5265	239.99	14.69	-3486	21.426	-5046.6
5266	239.9	14.77	-3505	21.43	-5047.6
5267	239.94	14.78	-3508	21.434	-5048.6
5268	239.83	14.74	-3497	21.438	-5049.6
5269	239.87	14.79	-3510	21.443	-5050.5
5270	239.88	14.8	-3511	21.447	-5051.5
5271	239.7	14.83	-3513	21.451	-5052.5
5272	239.93	14.77	-3504	21.455	-5053.5
5273	239.91	14.79	-3509	21.459	-5054.4
5274	239.91	14.81	-3511	21.463	-5055.4
5275	239.86	14.84	-3518	21.467	-5056.4
5276	239.91	14.79	-3508	21.471	-5057.4
5277	239.95	14.87	-3527	21.475	-5058.3
5278	239.95	14.79	-3511	21.48	-5059.3
5279	239.96	14.78	-3507	21.484	-5060.3
5280	240.03	14.78	-3508	21.488	-5061.3
5281	239.86	14.82	-3515	21.492	-5062.2
5282	239.96	14.81	-3515	21.496	-5063.2
5283	240	14.78	-3506	21.5	-5064.2
5284	239.86	14.79	-3507	21.504	-5065.2
5285	239.91	14.8	-3511	21.508	-5066.1
5286	240.02	14.78	-3507	21.512	-5067.1
5287	240.09	14.79	-3510	21.517	-5068.1
5288	240	14.77	-3503	21.521	-5069.1
5289	239.99	14.75	-3498	21.525	-5070
5290	239.94	14.77	-3504	21.529	-5071
5291	240.08	14.71	-3491	21.533	-5072
5292	239.89	14.7	-3488	21.537	-5073
5293	240.07	14.71	-3493	21.541	-5073.9
5294	239.93	14.77	-3502	21.545	-5074.9
5295	239.94	14.81	-3511	21.549	-5075.9
5296	240.01	14.77	-3504	21.553	-5076.9
5297	239.98	14.77	-3505	21.558	-5077.8
5298	240.02	14.78	-3509	21.562	-5078.8
5299	240.02	14.78	-3507	21.566	-5079.8
5300	239.96	14.81	-3514	21.57	-5080.8
5301	239.85	14.78	-3505	21.574	-5081.7
5302	239.97	14.82	-3515	21.578	-5082.7
5303	239.97	14.79	-3509	21.582	-5083.7
5304	239.89	14.84	-3520	21.586	-5084.7
5305	239.95	14.82	-3516	21.59	-5085.6
5306	239.96	14.81	-3511	21.595	-5086.6
5307	239.93	14.78	-3506	21.599	-5087.6
5308	239.98	14.8	-3512	21.603	-5088.6
5309	240.01	14.79	-3512	21.607	-5089.5

5310	239.98	14.81	-3515	21.611	-5090.5
5311	240.01	14.8	-3515	21.615	-5091.5
5312	239.96	14.81	-3513	21.619	-5092.5
5313	240.01	14.82	-3519	21.623	-5093.4
5314	240.04	14.81	-3516	21.627	-5094.4
5315	240.04	14.8	-3512	21.632	-5095.4
5316	240.06	14.8	-3513	21.636	-5096.4
5317	240	14.79	-3511	21.64	-5097.3
5318	240.05	14.78	-3508	21.644	-5098.3
5319	240.05	14.76	-3503	21.648	-5099.3
5320	240.03	14.8	-3512	21.652	-5100.3
5321	240.07	14.76	-3502	21.656	-5101.2
5322	239.98	14.75	-3500	21.66	-5102.2
5323	239.94	14.74	-3496	21.664	-5103.2
5324	240	14.69	-3485	21.669	-5104.2
5325	240.03	14.75	-3500	21.673	-5105.1
5326	240.01	14.81	-3513	21.677	-5106.1
5327	240.03	14.79	-3508	21.681	-5107.1
5328	239.94	14.79	-3512	21.685	-5108.1
5329	239.93	14.81	-3516	21.689	-5109
5330	239.96	14.77	-3507	21.693	-5110
5331	239.89	14.78	-3509	21.697	-5111
5332	239.83	14.81	-3513	21.701	-5112
5333	239.94	14.82	-3517	21.706	-5112.9
5334	239.9	14.86	-3527	21.71	-5113.9
5335	239.94	14.84	-3521	21.714	-5114.9
5336	239.9	14.82	-3517	21.718	-5115.9
5337	239.97	14.83	-3520	21.722	-5116.8
5338	239.88	14.85	-3526	21.726	-5117.8
5339	239.88	14.81	-3513	21.73	-5118.8
5340	239.95	14.82	-3517	21.734	-5119.8
5341	239.97	14.86	-3527	21.738	-5120.7
5342	239.91	14.85	-3523	21.743	-5121.7
5343	239.98	14.89	-3533	21.747	-5122.7
5344	239.9	14.79	-3509	21.751	-5123.7
5345	239.9	14.78	-3505	21.755	-5124.6
5346	239.98	14.82	-3517	21.759	-5125.6
5347	240	14.82	-3517	21.763	-5126.6
5348	239.98	14.78	-3506	21.767	-5127.6
5349	239.93	14.84	-3521	21.771	-5128.6
5350	239.91	14.83	-3520	21.775	-5129.5
5351	239.93	14.8	-3511	21.78	-5130.5
5352	239.92	14.83	-3520	21.784	-5131.5
5353	239.91	14.81	-3514	21.788	-5132.5
5354	239.91	14.77	-3504	21.792	-5133.4
5355	239.88	14.81	-3513	21.796	-5134.4
5356	240.01	14.83	-3522	21.8	-5135.4

5357	240.06	14.83	-3519	21.804	-5136.4
5358	240.01	14.83	-3522	21.808	-5137.3
5359	240.06	14.85	-3525	21.812	-5138.3
5360	239.99	14.81	-3513	21.817	-5139.3
5361	239.99	14.88	-3532	21.821	-5140.3
5362	239.95	14.81	-3512	21.825	-5141.2
5363	240.03	14.82	-3516	21.829	-5142.2
5364	240.05	14.81	-3516	21.833	-5143.2
5365	240.03	14.81	-3515	21.837	-5144.2
5366	240.03	14.81	-3515	21.841	-5145.1
5367	240.07	14.8	-3513	21.845	-5146.1
5368	240	14.85	-3524	21.849	-5147.1
5369	240	14.77	-3505	21.854	-5148.1
5370	240.02	14.81	-3514	21.858	-5149.1
5371	239.98	14.83	-3520	21.862	-5150
5372	239.92	14.82	-3514	21.866	-5151
5373	239.98	14.84	-3524	21.87	-5152
5374	240.03	14.83	-3520	21.874	-5153
5375	239.95	14.81	-3513	21.878	-5153.9
5376	239.98	14.81	-3515	21.882	-5154.9
5377	240.06	14.81	-3515	21.887	-5155.9
5378	239.9	14.82	-3513	21.891	-5156.9
5379	239.95	14.77	-3505	21.895	-5157.8
5380	240	14.82	-3515	21.899	-5158.8
5381	240.08	14.71	-3491	21.903	-5159.8
5382	240.04	14.81	-3516	21.907	-5160.8
5383	239.31	14.83	-3508	21.911	-5161.8
5384	239.76	14.83	-3514	21.915	-5162.7
5385	239.82	14.84	-3519	21.919	-5163.7
5386	239.92	14.83	-3517	21.924	-5164.7
5387	240.02	14.89	-3532	21.928	-5165.7
5388	240.08	14.83	-3521	21.932	-5166.6
5389	240.04	14.85	-3523	21.936	-5167.6
5390	240.06	14.81	-3514	21.94	-5168.6
5391	240.11	14.79	-3510	21.944	-5169.6
5392	240.18	14.81	-3515	21.948	-5170.5
5393	240.16	14.81	-3516	21.952	-5171.5
5394	240.14	14.83	-3521	21.957	-5172.5
5395	240.16	14.79	-3510	21.961	-5173.5
5396	240.14	14.89	-3535	21.965	-5174.5
5397	240.21	14.79	-3511	21.969	-5175.4
5398	240.24	14.78	-3511	21.973	-5176.4
5399	240.17	14.83	-3520	21.977	-5177.4
5400	240.22	14.76	-3505	21.981	-5178.4
5401	240.18	14.77	-3507	21.985	-5179.3
5402	240.18	14.83	-3522	21.989	-5180.3
5403	240.25	14.81	-3517	21.994	-5181.3

5404	240.25	14.83	-3521	21.998	-5182.3
5405	240.24	14.91	-3541	22.002	-5183.2
5406	240.24	14.77	-3505	22.006	-5184.2
5407	240.22	14.87	-3531	22.01	-5185.2
5408	240.28	14.82	-3518	22.014	-5186.2
5409	240.21	14.6	-3466	22.018	-5187.1
5410	240.21	14.64	-3477	22.022	-5188.1
5411	240.24	14.75	-3502	22.026	-5189.1
5412	240.2	14.79	-3513	22.03	-5190.1
5413	240.2	14.67	-3484	22.035	-5191
5414	240.17	14.89	-3534	22.039	-5192
5415	240.22	14.61	-3470	22.043	-5193
5416	240.22	14.69	-3490	22.047	-5193.9
5417	240.18	14.63	-3471	22.051	-5194.9
5418	240.26	14.63	-3472	22.055	-5195.9
5419	240.34	14.63	-3475	22.059	-5196.8
5420	240.23	14.61	-3466	22.063	-5197.8
5421	240.22	14.62	-3472	22.067	-5198.8
5422	240.29	14.64	-3475	22.071	-5199.7
5423	240.34	14.62	-3474	22.075	-5200.7
5424	240.37	14.68	-3490	22.079	-5201.7
5425	240.32	14.61	-3469	22.083	-5202.6
5426	240.35	14.66	-3484	22.087	-5203.6
5427	240.34	14.64	-3476	22.092	-5204.6
5428	240.31	14.66	-3480	22.096	-5205.5
5429	240.28	14.66	-3482	22.1	-5206.5
5430	240.3	14.57	-3460	22.104	-5207.5
5431	240.21	14.67	-3481	22.108	-5208.4
5432	240.16	14.68	-3485	22.112	-5209.4
5433	240.18	14.63	-3474	22.116	-5210.4
5434	240.22	14.7	-3492	22.12	-5211.3
5435	240.23	14.67	-3485	22.124	-5212.3
5436	240.21	14.68	-3487	22.128	-5213.3
5437	240.16	14.69	-3487	22.132	-5214.2
5438	240.23	14.65	-3479	22.136	-5215.2
5439	240.13	14.66	-3478	22.14	-5216.2
5440	240.2	14.64	-3474	22.144	-5217.1
5441	240.2	14.66	-3480	22.149	-5218.1
5442	240.25	14.63	-3476	22.153	-5219.1
5443	240.19	14.63	-3473	22.157	-5220
5444	240.19	14.65	-3479	22.161	-5221
5445	240.11	14.67	-3483	22.165	-5222
5446	240.09	14.68	-3484	22.169	-5222.9
5447	240.11	14.66	-3480	22.173	-5223.9
5448	240.07	14.68	-3484	22.177	-5224.9
5449	240.05	14.65	-3478	22.181	-5225.8
5450	240.05	14.68	-3484	22.185	-5226.8

5451	239.99	14.67	-3480	22.189	-5227.8
5452	240.04	14.66	-3479	22.193	-5228.7
5453	239.96	14.68	-3482	22.197	-5229.7
5454	239.96	14.66	-3479	22.202	-5230.7
5455	239.95	14.71	-3488	22.206	-5231.6
5456	239.97	14.67	-3478	22.21	-5232.6
5457	240.03	14.67	-3482	22.214	-5233.6
5458	240.01	14.67	-3480	22.218	-5234.5
5459	240.07	14.66	-3481	22.222	-5235.5
5460	240.02	14.66	-3480	22.226	-5236.5
5461	240.03	14.68	-3485	22.23	-5237.4
5462	240.08	14.69	-3487	22.234	-5238.4
5463	240.11	14.66	-3481	22.238	-5239.4
5464	240.11	14.64	-3476	22.242	-5240.3
5465	240.07	14.66	-3479	22.246	-5241.3
5466	240.16	14.67	-3482	22.25	-5242.3
5467	240.05	14.66	-3480	22.255	-5243.2
5468	240.03	14.68	-3484	22.259	-5244.2
5469	240	14.68	-3482	22.263	-5245.2
5470	239.98	14.68	-3482	22.267	-5246.1
5471	239.92	14.69	-3483	22.271	-5247.1
5472	239.88	14.71	-3487	22.275	-5248.1
5473	239.88	14.7	-3486	22.279	-5249.1
5474	239.84	14.69	-3483	22.283	-5250
5475	239.86	14.7	-3485	22.287	-5251
5476	239.84	14.68	-3481	22.291	-5252
5477	239.88	14.65	-3476	22.295	-5252.9
5478	239.87	14.69	-3482	22.299	-5253.9
5479	239.88	14.68	-3483	22.303	-5254.9
5480	239.88	14.68	-3481	22.308	-5255.8
5481	239.93	14.71	-3489	22.312	-5256.8
5482	239.89	14.69	-3484	22.316	-5257.8
5483	239.88	14.68	-3481	22.32	-5258.7
5484	239.85	14.7	-3485	22.324	-5259.7
5485	239.95	14.69	-3484	22.328	-5260.7
5486	240.03	14.69	-3484	22.332	-5261.6
5487	240.06	14.68	-3483	22.336	-5262.6
5488	240.07	14.67	-3480	22.34	-5263.6
5489	240.1	14.68	-3485	22.344	-5264.5
5490	240.09	14.68	-3484	22.348	-5265.5
5491	240.12	14.67	-3482	22.352	-5266.5
5492	240.16	14.69	-3487	22.357	-5267.4
5493	240.16	14.68	-3485	22.361	-5268.4
5494	240.09	14.67	-3480	22.365	-5269.4
5495	240.13	14.69	-3486	22.369	-5270.3
5496	240.1	14.68	-3484	22.373	-5271.3
5497	240.14	14.68	-3483	22.377	-5272.3

5498	240.11	14.7	-3489	22.381	-5273.3
5499	239.98	14.67	-3479	22.385	-5274.2
5500	239.97	14.69	-3485	22.389	-5275.2
5501	239.96	14.69	-3484	22.393	-5276.2
5502	240.05	14.67	-3482	22.397	-5277.1
5503	240.1	14.75	-3500	22.401	-5278.1
5504	240.11	14.66	-3478	22.405	-5279
5505	240.17	14.66	-3481	22.409	-5280
5506	240.17	14.63	-3471	22.414	-5281
5507	240.19	14.7	-3488	22.418	-5281.9
5508	240.14	14.68	-3484	22.422	-5282.9
5509	240.18	14.69	-3485	22.426	-5283.9
5510	240.28	14.66	-3482	22.43	-5284.8
5511	240.14	14.66	-3478	22.434	-5285.8
5512	240.12	14.67	-3479	22.438	-5286.8
5513	240.09	14.76	-3501	22.442	-5287.7
5514	240.16	14.69	-3487	22.446	-5288.7
5515	240.16	14.65	-3475	22.45	-5289.7
5516	240.23	14.71	-3492	22.454	-5290.7
5517	240.22	14.71	-3492	22.458	-5291.6
5518	240.14	14.66	-3482	22.463	-5292.6
5519	240.16	14.67	-3483	22.467	-5293.6
5520	240.14	14.69	-3485	22.471	-5294.5
5521	240.22	14.72	-3494	22.475	-5295.5
5522	240.22	14.72	-3494	22.479	-5296.5
5523	240.28	14.66	-3480	22.483	-5297.4
5524	240.28	14.68	-3485	22.487	-5298.4
5525	240.24	14.66	-3481	22.491	-5299.4
5526	240.26	14.65	-3479	22.495	-5300.3
5527	240.25	14.68	-3487	22.499	-5301.3
5528	240.24	14.63	-3474	22.503	-5302.3
5529	240.27	14.69	-3488	22.507	-5303.2
5530	240.28	14.69	-3489	22.511	-5304.2
5531	240.43	14.67	-3487	22.516	-5305.2
5532	240.32	14.7	-3493	22.52	-5306.2
5533	240.31	14.65	-3477	22.524	-5307.1
5534	240.28	14.68	-3484	22.528	-5308.1
5535	240.34	14.68	-3487	22.532	-5309.1
5536	240.26	14.69	-3487	22.536	-5310
5537	240.28	14.66	-3484	22.54	-5311
5538	240.23	14.67	-3484	22.544	-5312
5539	240.12	14.7	-3489	22.548	-5312.9
5540	240.17	14.68	-3485	22.552	-5313.9
5541	240.32	14.72	-3496	22.556	-5314.9
5542	240.34	14.67	-3485	22.56	-5315.8
5543	240.31	14.68	-3485	22.564	-5316.8
5544	240.28	14.68	-3483	22.569	-5317.8

5545	240.35	14.67	-3484	22.573	-5318.7
5546	240.35	14.68	-3487	22.577	-5319.7
5547	240.29	14.73	-3497	22.581	-5320.7
5548	240.34	14.71	-3495	22.585	-5321.7
5549	240.3	14.72	-3496	22.589	-5322.6
5550	240.29	14.63	-3474	22.593	-5323.6
5551	240.15	14.71	-3491	22.597	-5324.6
5552	240.28	14.76	-3506	22.601	-5325.5
5553	240.19	14.69	-3487	22.605	-5326.5
5554	240.21	14.64	-3476	22.609	-5327.5
5555	240.18	14.72	-3491	22.613	-5328.4
5556	240.15	14.68	-3486	22.618	-5329.4
5557	240.25	14.66	-3481	22.622	-5330.4
5558	240.29	14.66	-3481	22.626	-5331.3
5559	240.42	14.67	-3487	22.63	-5332.3
5560	240.3	14.69	-3490	22.634	-5333.3
5561	240.41	14.67	-3488	22.638	-5334.3
5562	240.39	14.69	-3493	22.642	-5335.2
5563	240.4	14.75	-3503	22.646	-5336.2
5564	240.38	14.68	-3488	22.65	-5337.2
5565	240.4	14.69	-3490	22.654	-5338.1
5566	240.42	14.66	-3482	22.658	-5339.1
5567	240.42	14.67	-3485	22.662	-5340.1
5568	240.34	14.66	-3482	22.667	-5341
5569	240.33	14.69	-3487	22.671	-5342
5570	240.29	14.69	-3491	22.675	-5343
5571	240.32	14.71	-3496	22.679	-5343.9
5572	240.23	14.67	-3482	22.683	-5344.9
5573	240.29	14.68	-3487	22.687	-5345.9
5574	240.31	14.72	-3494	22.691	-5346.9
5575	240.38	14.67	-3486	22.695	-5347.8
5576	240.38	14.7	-3491	22.699	-5348.8
5577	240.4	14.67	-3486	22.703	-5349.8
5578	240.31	14.68	-3487	22.707	-5350.7
5579	240.38	14.68	-3488	22.711	-5351.7
5580	240.31	14.69	-3489	22.715	-5352.7
5581	240.27	14.7	-3493	22.72	-5353.6
5582	240.16	14.7	-3489	22.724	-5354.6
5583	240.26	14.72	-3496	22.728	-5355.6
5584	240.26	14.68	-3486	22.732	-5356.5
5585	240.1	14.71	-3490	22.736	-5357.5
5586	240.33	14.7	-3493	22.74	-5358.5
5587	240.23	14.71	-3493	22.744	-5359.5
5588	240.32	14.66	-3483	22.748	-5360.4
5589	240.36	14.68	-3489	22.752	-5361.4
5590	240.29	14.68	-3487	22.756	-5362.4
5591	240.31	14.69	-3492	22.76	-5363.3

5592	240.3	14.7	-3492	22.764	-5364.3
5593	240.23	14.73	-3498	22.769	-5365.3
5594	240.31	14.7	-3492	22.773	-5366.2
5595	240.28	14.72	-3496	22.777	-5367.2
5596	240.31	14.69	-3489	22.781	-5368.2
5597	240.22	14.71	-3493	22.785	-5369.2
5598	240.23	14.68	-3487	22.789	-5370.1
5599	240.2	14.71	-3492	22.793	-5371.1
5600	240.25	14.72	-3495	22.797	-5372.1
5601	240.32	14.69	-3489	22.801	-5373
5602	240.27	14.71	-3495	22.805	-5374
5603	240.24	14.72	-3497	22.809	-5375
5604	240.26	14.7	-3491	22.813	-5375.9
5605	240.23	14.71	-3494	22.818	-5376.9
5606	240.32	14.72	-3497	22.822	-5377.9
5607	240.28	14.72	-3496	22.826	-5378.9
5608	240.26	14.73	-3497	22.83	-5379.8
5609	240.39	14.69	-3491	22.834	-5380.8
5610	240.4	14.72	-3497	22.838	-5381.8
5611	240.49	14.7	-3494	22.842	-5382.7
5612	240.46	14.7	-3493	22.846	-5383.7
5613	239.89	14.69	-3485	22.85	-5384.7
5614	240.22	14.7	-3490	22.854	-5385.7
5615	240.07	14.71	-3491	22.858	-5386.6
5616	240.22	14.7	-3490	22.863	-5387.6
5617	240.09	14.7	-3488	22.867	-5388.6
5618	240.41	14.7	-3493	22.871	-5389.5
5619	240.37	14.72	-3498	22.875	-5390.5
5620	240.31	14.74	-3501	22.879	-5391.5
5621	240.33	14.73	-3498	22.883	-5392.4
5622	240.17	14.72	-3495	22.887	-5393.4
5623	240.28	14.68	-3487	22.891	-5394.4
5624	240.32	14.71	-3494	22.895	-5395.4
5625	240.34	14.72	-3499	22.899	-5396.3
5626	240.03	14.71	-3491	22.903	-5397.3
5627	240.02	14.74	-3498	22.907	-5398.3
5628	240.24	14.71	-3495	22.912	-5399.2
5629	240.19	14.72	-3495	22.916	-5400.2
5630	240.19	14.68	-3486	22.92	-5401.2
5631	240.2	14.7	-3491	22.924	-5402.1
5632	240.16	14.69	-3488	22.928	-5403.1
5633	240.22	14.72	-3497	22.932	-5404.1
5634	240.01	14.71	-3490	22.936	-5405.1
5635	240.16	14.72	-3495	22.94	-5406
5636	240.28	14.73	-3499	22.944	-5407
5637	240.12	14.72	-3493	22.948	-5408
5638	240.2	14.71	-3492	22.952	-5408.9

5639	240.27	14.72	-3496	22.957	-5409.9
5640	240.15	14.73	-3496	22.961	-5410.9
5641	240.19	14.72	-3497	22.965	-5411.9
5642	240.32	14.68	-3489	22.969	-5412.8
5643	240.25	14.7	-3493	22.973	-5413.8
5644	240.27	14.71	-3495	22.977	-5414.8
5645	240.19	14.74	-3502	22.981	-5415.7
5646	240.18	14.72	-3495	22.985	-5416.7
5647	240.2	14.72	-3495	22.989	-5417.7
5648	240.16	14.73	-3497	22.993	-5418.7
5649	240.11	14.74	-3498	22.997	-5419.6
5650	240.16	14.73	-3497	23.002	-5420.6
5651	240.2	14.73	-3498	23.006	-5421.6
5652	240.19	14.73	-3499	23.01	-5422.5
5653	240.19	14.67	-3484	23.014	-5423.5
5654	240.18	14.72	-3497	23.018	-5424.5
5655	240.24	14.73	-3498	23.022	-5425.5
5656	240.19	14.74	-3499	23.026	-5426.4
5657	240.27	14.72	-3496	23.03	-5427.4
5658	240.19	14.73	-3497	23.034	-5428.4
5659	240.17	14.73	-3499	23.038	-5429.3
5660	240.2	14.72	-3494	23.042	-5430.3
5661	240.23	14.7	-3491	23.046	-5431.3
5662	240.23	14.72	-3496	23.051	-5432.3
5663	240.2	14.73	-3498	23.055	-5433.2
5664	240.26	14.72	-3496	23.059	-5434.2
5665	240.23	14.73	-3499	23.063	-5435.2
5666	240.29	14.73	-3499	23.067	-5436.1
5667	240.21	14.73	-3500	23.071	-5437.1
5668	240.2	14.73	-3497	23.075	-5438.1
5669	240.22	14.76	-3505	23.079	-5439.1
5670	240.3	14.71	-3496	23.083	-5440
5671	240.24	14.73	-3499	23.087	-5441
5672	240.27	14.71	-3495	23.091	-5442
5673	240.26	14.71	-3494	23.096	-5442.9
5674	240.31	14.72	-3496	23.1	-5443.9
5675	240.27	14.72	-3498	23.104	-5444.9
5676	240.23	14.74	-3501	23.108	-5445.9
5677	240.2	14.74	-3499	23.112	-5446.8
5678	240.19	14.72	-3496	23.116	-5447.8
5679	240.14	14.74	-3498	23.12	-5448.8
5680	240.21	14.74	-3502	23.124	-5449.7
5681	240.24	14.73	-3498	23.128	-5450.7
5682	240.2	14.74	-3502	23.132	-5451.7
5683	240.2	14.73	-3497	23.136	-5452.7
5684	240.32	14.73	-3499	23.141	-5453.6
5685	240.27	14.74	-3500	23.145	-5454.6

5686	240.26	14.7	-3492	23.149	-5455.6
5687	240.26	14.71	-3492	23.153	-5456.5
5688	240.37	14.74	-3502	23.157	-5457.5
5689	240.3	14.69	-3490	23.161	-5458.5
5690	240.39	14.72	-3498	23.165	-5459.5
5691	240.39	14.72	-3498	23.169	-5460.4
5692	240.4	14.74	-3502	23.173	-5461.4
5693	240.16	14.75	-3501	23.177	-5462.4
5694	240.43	14.73	-3500	23.181	-5463.3
5695	240.58	14.72	-3499	23.186	-5464.3
5696	240.42	14.73	-3500	23.19	-5465.3
5697	240.39	14.75	-3503	23.194	-5466.3
5698	240.46	14.72	-3499	23.198	-5467.2
5699	240.35	14.72	-3495	23.202	-5468.2
5700	240.39	14.73	-3500	23.206	-5469.2
5701	240.34	14.72	-3498	23.21	-5470.2
5702	240.43	14.72	-3497	23.214	-5471.1
5703	240.42	14.73	-3500	23.218	-5472.1
5704	240.26	14.74	-3501	23.222	-5473.1
5705	240.34	14.75	-3504	23.226	-5474
5706	240.37	14.73	-3499	23.231	-5475
5707	240.25	14.74	-3500	23.235	-5476
5708	240.42	14.71	-3496	23.239	-5477
5709	240.38	14.78	-3512	23.243	-5477.9
5710	240.27	14.75	-3503	23.247	-5478.9
5711	240.4	14.73	-3500	23.251	-5479.9
5712	240.39	14.74	-3501	23.255	-5480.8
5713	240.44	14.71	-3497	23.259	-5481.8
5714	240.36	14.76	-3507	23.263	-5482.8
5715	240.29	14.72	-3497	23.267	-5483.8
5716	240.4	14.73	-3500	23.271	-5484.7
5717	240.41	14.74	-3503	23.276	-5485.7
5718	240.35	14.73	-3499	23.28	-5486.7
5719	240.43	14.75	-3504	23.284	-5487.6
5720	240.48	14.7	-3493	23.288	-5488.6
5721	240.3	14.76	-3505	23.292	-5489.6
5722	240.23	14.78	-3509	23.296	-5490.6
5723	240.53	14.72	-3500	23.3	-5491.5
5724	240.41	14.72	-3498	23.304	-5492.5
5725	240.38	14.73	-3501	23.308	-5493.5
5726	240.55	14.77	-3512	23.312	-5494.5
5727	240.48	14.75	-3505	23.317	-5495.4
5728	240.49	14.75	-3504	23.321	-5496.4
5729	240.52	14.74	-3503	23.325	-5497.4
5730	240.57	14.7	-3495	23.329	-5498.3
5731	240.45	14.74	-3504	23.333	-5499.3
5732	240.39	14.72	-3498	23.337	-5500.3

5733	240.31	14.76	-3506	23.341	-5501.3
5734	240.21	14.74	-3499	23.345	-5502.2
5735	240.53	14.73	-3502	23.349	-5503.2
5736	240.49	14.73	-3502	23.353	-5504.2
5737	240.41	14.72	-3496	23.357	-5505.2
5738	240.18	14.76	-3505	23.362	-5506.1
5739	240.52	14.74	-3505	23.366	-5507.1
5740	240.4	14.74	-3502	23.37	-5508.1
5741	240.46	14.76	-3509	23.374	-5509
5742	240.46	14.72	-3498	23.378	-5510
5743	240.42	14.74	-3501	23.382	-5511
5744	240.39	14.77	-3508	23.386	-5512
5745	240.35	14.74	-3501	23.39	-5512.9
5746	240.3	14.73	-3497	23.394	-5513.9
5747	240.26	14.74	-3500	23.398	-5514.9
5748	240.24	14.76	-3503	23.402	-5515.8
5749	240.43	14.7	-3493	23.407	-5516.8
5750	240.37	14.76	-3507	23.411	-5517.8
5751	240.38	14.77	-3511	23.415	-5518.8
5752	240.31	14.8	-3517	23.419	-5519.7
5753	240.29	14.76	-3507	23.423	-5520.7
5754	240.34	14.71	-3494	23.427	-5521.7
5755	240.21	14.75	-3502	23.431	-5522.7
5756	240.37	14.75	-3505	23.435	-5523.6
5757	240.35	14.75	-3503	23.439	-5524.6
5758	240.25	14.75	-3502	23.443	-5525.6
5759	240.37	14.75	-3504	23.448	-5526.6
5760	240.36	14.73	-3499	23.452	-5527.5
5761	240.29	14.72	-3497	23.456	-5528.5
5762	240.3	14.77	-3508	23.46	-5529.5
5763	240.35	14.73	-3498	23.464	-5530.4
5764	240.1	14.77	-3506	23.468	-5531.4
5765	240.29	14.79	-3514	23.472	-5532.4
5766	240.16	14.81	-3514	23.476	-5533.4
5767	240.26	14.75	-3501	23.48	-5534.3
5768	240.2	14.82	-3519	23.484	-5535.3
5769	240.22	14.77	-3504	23.488	-5536.3
5770	240.36	14.72	-3495	23.493	-5537.3
5771	240.38	14.75	-3504	23.497	-5538.2
5772	240.34	14.76	-3505	23.501	-5539.2
5773	240.09	14.67	-3482	23.505	-5540.2
5774	239.99	14.78	-3507	23.509	-5541.1
5775	240.48	14.75	-3506	23.513	-5542.1
5776	240.21	14.69	-3486	23.517	-5543.1
5777	240.18	14.79	-3514	23.521	-5544.1
5778	240.34	14.75	-3503	23.525	-5545
5779	240.36	14.73	-3501	23.529	-5546

5780	240.5	14.77	-3513	23.534	-5547
5781	240.35	14.75	-3504	23.538	-5548
5782	240.24	14.72	-3495	23.542	-5548.9
5783	240.26	14.76	-3504	23.546	-5549.9
5784	240.25	14.77	-3505	23.55	-5550.9
5785	240.29	14.76	-3505	23.554	-5551.9
5786	240.44	14.77	-3511	23.558	-5552.9
5787	240.36	14.73	-3500	23.562	-5553.8
5788	240.53	14.74	-3504	23.566	-5554.8
5789	240.24	14.78	-3511	23.571	-5555.8
5790	240.37	14.73	-3500	23.575	-5556.8
5791	239.64	14.8	-3506	23.579	-5557.7
5792	239.87	14.78	-3504	23.583	-5558.7
5793	240.3	14.73	-3498	23.587	-5559.7
5794	240.1	14.81	-3514	23.591	-5560.7
5795	240.21	14.77	-3506	23.595	-5561.6
5796	240.17	14.74	-3498	23.599	-5562.6
5797	240.21	14.76	-3506	23.603	-5563.6
5798	240.39	14.76	-3507	23.608	-5564.5
5799	240.24	14.75	-3504	23.612	-5565.5
5800	240.29	14.77	-3510	23.616	-5566.5
5801	240.32	14.77	-3508	23.62	-5567.5
5802	240.2	14.75	-3502	23.624	-5568.4
5803	240.25	14.77	-3508	23.628	-5569.4
5804	240.21	14.79	-3511	23.632	-5570.4
5805	240.12	14.75	-3502	23.636	-5571.4
5806	240.15	14.76	-3503	23.64	-5572.3
5807	240.19	14.77	-3508	23.644	-5573.3
5808	240.03	14.78	-3508	23.649	-5574.3
5809	240.19	14.78	-3511	23.653	-5575.3
5810	240.02	14.78	-3508	23.657	-5576.2
5811	239.97	14.8	-3510	23.661	-5577.2
5812	240.15	14.77	-3507	23.665	-5578.2
5813	240.13	14.79	-3511	23.669	-5579.2
5814	240.12	14.78	-3508	23.673	-5580.1
5815	240.08	14.8	-3513	23.677	-5581.1
5816	240.15	14.76	-3505	23.681	-5582.1
5817	240.23	14.76	-3506	23.685	-5583.1
5818	240.25	14.8	-3515	23.69	-5584
5819	240.22	14.78	-3509	23.694	-5585
5820	240.19	14.78	-3510	23.698	-5586
5821	240.17	14.78	-3509	23.702	-5586.9
5822	240.32	14.77	-3510	23.706	-5587.9
5823	240.21	14.77	-3508	23.71	-5588.9
5824	240.25	14.74	-3502	23.714	-5589.9
5825	240.17	14.77	-3508	23.718	-5590.8
5826	240.18	14.77	-3508	23.722	-5591.8

5827	240.27	14.77	-3512	23.726	-5592.8
5828	240.16	14.78	-3510	23.731	-5593.8
5829	240.21	14.74	-3499	23.735	-5594.7
5830	240.11	14.76	-3503	23.739	-5595.7
5831	240.2	14.8	-3515	23.743	-5596.7
5832	240.15	14.77	-3508	23.747	-5597.7
5833	240.21	14.76	-3506	23.751	-5598.6
5834	240.17	14.78	-3512	23.755	-5599.6
5835	240.24	14.78	-3510	23.759	-5600.6
5836	240.27	14.79	-3513	23.763	-5601.6
5837	240.24	14.78	-3509	23.767	-5602.5
5838	240.23	14.8	-3514	23.772	-5603.5
5839	240.31	14.74	-3501	23.776	-5604.5
5840	240.27	14.75	-3504	23.78	-5605.5
5841	240.32	14.82	-3522	23.784	-5606.4
5842	240.17	14.77	-3507	23.788	-5607.4
5843	240.22	14.77	-3510	23.792	-5608.4
5844	240.18	14.8	-3514	23.796	-5609.4
5845	240.33	14.79	-3513	23.8	-5610.3
5846	240.17	14.79	-3513	23.804	-5611.3
5847	240.24	14.74	-3501	23.809	-5612.3
5848	240.27	14.81	-3519	23.813	-5613.3
5849	240.28	14.78	-3513	23.817	-5614.2
5850	240.15	14.81	-3518	23.821	-5615.2
5851	240.27	14.81	-3517	23.825	-5616.2
5852	240.22	14.8	-3515	23.829	-5617.2
5853	240.26	14.83	-3523	23.833	-5618.1
5854	240.24	14.74	-3499	23.837	-5619.1
5855	240.25	14.79	-3514	23.841	-5620.1
5856	240.28	14.82	-3522	23.845	-5621.1
5857	240.28	14.77	-3510	23.85	-5622
5858	240.37	14.79	-3516	23.854	-5623
5859	240.34	14.78	-3514	23.858	-5624
5860	240.26	14.77	-3509	23.862	-5625
5861	240.32	14.76	-3508	23.866	-5625.9
5862	240.24	14.79	-3512	23.87	-5626.9
5863	240.3	14.74	-3501	23.874	-5627.9
5864	240.32	14.84	-3526	23.878	-5628.9
5865	240.35	14.75	-3503	23.882	-5629.8
5866	240.26	14.78	-3509	23.887	-5630.8
5867	240.38	14.78	-3513	23.891	-5631.8
5868	240.29	14.79	-3515	23.895	-5632.8
5869	240.4	14.74	-3503	23.899	-5633.7
5870	240.2	14.81	-3518	23.903	-5634.7
5871	240.32	14.76	-3509	23.907	-5635.7
5872	240.29	14.75	-3504	23.911	-5636.7
5873	240.35	14.81	-3521	23.915	-5637.6

5874	240.26	14.83	-3521	23.919	-5638.6
5875	240.31	14.86	-3530	23.923	-5639.6
5876	240.25	14.8	-3515	23.928	-5640.6
5877	240.28	14.78	-3509	23.932	-5641.6
5878	240.25	14.81	-3517	23.936	-5642.5
5879	240.27	14.79	-3512	23.94	-5643.5
5880	240.24	14.78	-3507	23.944	-5644.5
5881	240.38	14.78	-3513	23.948	-5645.5
5882	240.26	14.84	-3526	23.952	-5646.4
5883	240.31	14.77	-3510	23.956	-5647.4
5884	240.32	14.77	-3511	23.96	-5648.4
5885	240.33	14.79	-3514	23.965	-5649.4
5886	240.29	14.79	-3513	23.969	-5650.3
5887	240.22	14.73	-3499	23.973	-5651.3
5888	240.22	14.78	-3508	23.977	-5652.3
5889	240.24	14.79	-3512	23.981	-5653.3
5890	240.25	14.79	-3515	23.985	-5654.2
5891	240.32	14.75	-3504	23.989	-5655.2
5892	240.23	14.75	-3503	23.993	-5656.2
5893	240.24	14.8	-3516	23.997	-5657.2
5894	240.14	14.8	-3514	24.002	-5658.1
5895	240.12	14.79	-3511	24.006	-5659.1
5896	240.15	14.81	-3518	24.01	-5660.1
5897	240.18	14.84	-3525	24.014	-5661.1
5898	240.21	14.81	-3516	24.018	-5662.1
5899	240.25	14.82	-3520	24.022	-5663
5900	240.26	14.81	-3515	24.026	-5664
5901	240.17	14.81	-3516	24.03	-5665
5902	240.28	14.82	-3519	24.034	-5666
5903	240.22	14.81	-3517	24.039	-5666.9
5904	240.23	14.79	-3513	24.043	-5667.9
5905	240.28	14.81	-3518	24.047	-5668.9
5906	240.24	14.79	-3513	24.051	-5669.9
5907	240.18	14.81	-3518	24.055	-5670.8
5908	240.21	14.82	-3518	24.059	-5671.8
5909	240.2	14.82	-3519	24.063	-5672.8
5910	240.22	14.81	-3515	24.067	-5673.8
5911	240.24	14.78	-3512	24.071	-5674.7
5912	240.27	14.83	-3521	24.076	-5675.7
5913	240.24	14.81	-3518	24.08	-5676.7
5914	240.32	14.81	-3517	24.084	-5677.7
5915	240.25	14.82	-3518	24.088	-5678.7
5916	240.25	14.81	-3514	24.092	-5679.6
5917	240.29	14.8	-3516	24.096	-5680.6
5918	240.29	14.58	-3463	24.1	-5681.6
5919	240.24	14.83	-3522	24.104	-5682.5
5920	240.25	14.65	-3479	24.108	-5683.5

5921	240.29	14.83	-3523	24.112	-5684.5
5922	240.29	14.77	-3510	24.117	-5685.5
5923	240.33	14.8	-3518	24.121	-5686.4
5924	240.4	14.8	-3516	24.125	-5687.4
5925	240.39	14.63	-3477	24.129	-5688.4
5926	240.27	14.64	-3477	24.133	-5689.3
5927	240.38	14.63	-3474	24.137	-5690.3
5928	239.86	14.6	-3461	24.141	-5691.3
5929	240.06	14.64	-3473	24.145	-5692.2
5930	240.05	14.64	-3472	24.149	-5693.2
5931	240.09	14.67	-3480	24.153	-5694.2
5932	240.02	14.62	-3469	24.157	-5695.1
5933	240.05	14.67	-3481	24.161	-5696.1
5934	240.11	14.65	-3474	24.165	-5697.1
5935	240.07	14.66	-3477	24.169	-5698
5936	240.12	14.65	-3477	24.174	-5699
5937	240.15	14.63	-3472	24.178	-5699.9
5938	240.18	14.63	-3473	24.182	-5700.9
5939	240.18	14.67	-3485	24.186	-5701.9
5940	240.12	14.66	-3479	24.19	-5702.8
5941	240.14	14.6	-3465	24.194	-5703.8
5942	240.25	14.63	-3475	24.198	-5704.8
5943	240.09	14.65	-3474	24.202	-5705.7
5944	240.06	14.69	-3486	24.206	-5706.7
5945	238.29	14.77	-3478	24.21	-5707.7
5946	239.92	14.63	-3469	24.214	-5708.6
5947	239.88	14.66	-3475	24.218	-5709.6
5948	239.96	14.66	-3475	24.222	-5710.6
5949	239.93	14.66	-3475	24.226	-5711.5
5950	239.95	14.67	-3477	24.231	-5712.5
5951	239.86	14.66	-3473	24.235	-5713.5
5952	239.92	14.65	-3473	24.239	-5714.4
5953	239.97	14.64	-3474	24.243	-5715.4
5954	239.97	14.61	-3465	24.247	-5716.4
5955	239.5	14.68	-3477	24.251	-5717.3
5956	239.61	14.65	-3471	24.255	-5718.3
5957	239.66	14.68	-3478	24.259	-5719.3
5958	239.65	14.64	-3469	24.263	-5720.2
5959	239.76	14.63	-3467	24.267	-5721.2
5960	239.66	14.58	-3456	24.271	-5722.2
5961	239.66	14.62	-3463	24.275	-5723.1
5962	239.92	14.66	-3477	24.279	-5724.1
5963	239.85	14.71	-3489	24.283	-5725
5964	239.87	14.64	-3472	24.288	-5726
5965	239.76	14.62	-3465	24.292	-5727
5966	239.93	14.64	-3470	24.296	-5727.9
5967	239.78	14.63	-3470	24.3	-5728.9

5968	239.72	14.66	-3477	24.304	-5729.9
5969	239.78	14.65	-3475	24.308	-5730.8
5970	239.83	14.68	-3480	24.312	-5731.8
5971	239.78	14.68	-3482	24.316	-5732.8
5972	239.83	14.69	-3485	24.32	-5733.7
5973	239.8	14.67	-3480	24.324	-5734.7
5974	239.82	14.67	-3480	24.328	-5735.7
5975	239.86	14.66	-3479	24.332	-5736.6
5976	239.69	14.68	-3479	24.336	-5737.6
5977	239.86	14.67	-3479	24.34	-5738.6
5978	239.92	14.66	-3478	24.345	-5739.5
5979	239.87	14.57	-3456	24.349	-5740.5
5980	239.83	14.71	-3489	24.353	-5741.5
5981	239.95	14.59	-3462	24.357	-5742.4
5982	239.8	14.62	-3466	24.361	-5743.4
5983	239.89	14.65	-3477	24.365	-5744.4
5984	239.83	14.68	-3481	24.369	-5745.3
5985	239.85	14.64	-3470	24.373	-5746.3
5986	239.83	14.72	-3491	24.377	-5747.3
5987	239.82	14.67	-3480	24.381	-5748.2
5988	239.76	14.78	-3504	24.385	-5749.2
5989	239.71	14.72	-3486	24.389	-5750.2
5990	239.72	14.66	-3477	24.393	-5751.1
5991	239.74	14.67	-3478	24.398	-5752.1
5992	239.69	14.64	-3472	24.402	-5753.1
5993	239.74	14.65	-3471	24.406	-5754
5994	239.73	14.63	-3468	24.41	-5755
5995	239.83	14.68	-3482	24.414	-5756
5996	239.73	14.73	-3492	24.418	-5756.9
5997	239.66	14.69	-3480	24.422	-5757.9
5998	239.73	14.68	-3480	24.426	-5758.9
5999	239.65	14.67	-3478	24.43	-5759.8
6000	239.55	14.68	-3478	24.434	-5760.8
6001	239.63	14.61	-3461	24.438	-5761.8
6002	239.69	14.69	-3481	24.442	-5762.7
6003	239.61	14.7	-3483	24.446	-5763.7
6004	239.76	14.7	-3485	24.451	-5764.7
6005	239.88	14.71	-3490	24.455	-5765.6
6006	239.9	14.69	-3483	24.459	-5766.6
6007	239.9	14.69	-3484	24.463	-5767.6
6008	239.8	14.7	-3486	24.467	-5768.5
6009	239.86	14.69	-3483	24.471	-5769.5
6010	239.89	14.67	-3478	24.475	-5770.5
6011	239.91	14.75	-3498	24.479	-5771.4
6012	239.75	14.65	-3472	24.483	-5772.4
6013	239.97	14.66	-3475	24.487	-5773.4
6014	239.95	14.69	-3486	24.491	-5774.3

6015	239.91	14.67	-3478	24.495	-5775.3
6016	239.9	14.69	-3483	24.5	-5776.3
6017	239.83	14.66	-3475	24.504	-5777.2
6018	239.86	14.67	-3478	24.508	-5778.2
6019	239.96	14.69	-3484	24.512	-5779.2
6020	239.85	14.66	-3474	24.516	-5780.1
6021	239.95	14.65	-3476	24.52	-5781.1
6022	239.74	14.74	-3496	24.524	-5782.1
6023	239.92	14.69	-3482	24.528	-5783
6024	239.74	14.7	-3481	24.532	-5784
6025	240.12	14.65	-3478	24.536	-5785
6026	239.88	14.7	-3487	24.54	-5785.9
6027	239.9	14.65	-3474	24.544	-5786.9
6028	239.96	14.65	-3475	24.548	-5787.9
6029	240	14.66	-3479	24.553	-5788.8
6030	240	14.65	-3475	24.557	-5789.8
6031	239.99	14.66	-3478	24.561	-5790.8
6032	239.93	14.64	-3473	24.565	-5791.7
6033	239.91	14.7	-3487	24.569	-5792.7
6034	239.79	14.72	-3489	24.573	-5793.7
6035	239.71	14.69	-3480	24.577	-5794.6
6036	239.99	14.72	-3494	24.581	-5795.6
6037	240.09	14.65	-3477	24.585	-5796.6
6038	239.79	14.67	-3477	24.589	-5797.5
6039	239.89	14.67	-3480	24.593	-5798.5
6040	239.99	14.72	-3492	24.597	-5799.5
6041	239.99	14.69	-3484	24.601	-5800.4
6042	239.85	14.71	-3487	24.606	-5801.4
6043	239.82	14.7	-3488	24.61	-5802.4
6044	240.08	14.63	-3470	24.614	-5803.3
6045	239.79	14.75	-3495	24.618	-5804.3
6046	240.04	14.61	-3467	24.622	-5805.3
6047	240.04	14.67	-3481	24.626	-5806.2
6048	240.12	14.64	-3475	24.63	-5807.2
6049	240.15	14.67	-3482	24.634	-5808.2
6050	239.87	14.7	-3485	24.638	-5809.1
6051	239.89	14.68	-3481	24.642	-5810.1
6052	239.81	14.7	-3485	24.646	-5811.1
6053	239.83	14.66	-3474	24.65	-5812
6054	239.82	14.66	-3476	24.655	-5813
6055	240.06	14.67	-3481	24.659	-5814
6056	239.95	14.73	-3495	24.663	-5814.9
6057	239.72	14.66	-3475	24.667	-5815.9
6058	239.69	14.71	-3485	24.671	-5816.9
6059	239.83	14.7	-3485	24.675	-5817.9
6060	239.93	14.67	-3479	24.679	-5818.8
6061	239.71	14.7	-3486	24.683	-5819.8

6062	239.74	14.74	-3492	24.687	-5820.8
6063	239.64	14.74	-3489	24.691	-5821.7
6064	239.78	14.72	-3488	24.695	-5822.7
6065	239.71	14.68	-3480	24.699	-5823.7
6066	239.97	14.72	-3490	24.703	-5824.6
6067	239.86	14.67	-3478	24.708	-5825.6
6068	239.9	14.7	-3489	24.712	-5826.6
6069	239.78	14.74	-3493	24.716	-5827.5
6070	239.94	14.68	-3482	24.72	-5828.5
6071	239.9	14.68	-3481	24.724	-5829.5
6072	239.9	14.68	-3484	24.728	-5830.4
6073	239.92	14.74	-3497	24.732	-5831.4
6074	239.77	14.72	-3487	24.736	-5832.4
6075	239.89	14.71	-3487	24.74	-5833.3
6076	240.01	14.69	-3488	24.744	-5834.3
6077	239.64	14.71	-3485	24.748	-5835.3
6078	239.89	14.69	-3482	24.752	-5836.2
6079	239.84	14.7	-3485	24.757	-5837.2
6080	239.94	14.7	-3486	24.761	-5838.2
6081	239.97	14.68	-3482	24.765	-5839.1
6082	239.8	14.73	-3491	24.769	-5840.1
6083	239.75	14.68	-3480	24.773	-5841.1
6084	240.01	14.73	-3495	24.777	-5842
6085	239.99	14.71	-3489	24.781	-5843
6086	239.84	14.73	-3492	24.785	-5844
6087	239.88	14.71	-3487	24.789	-5844.9
6088	239.86	14.68	-3483	24.793	-5845.9
6089	239.86	14.72	-3489	24.797	-5846.9
6090	240.03	14.69	-3485	24.801	-5847.9
6091	239.97	14.74	-3497	24.806	-5848.8
6092	239.8	14.69	-3481	24.81	-5849.8
6093	239.85	14.7	-3483	24.814	-5850.8
6094	240.06	14.64	-3472	24.818	-5851.7
6095	239.78	14.71	-3484	24.822	-5852.7
6096	240.13	14.67	-3480	24.826	-5853.7
6097	239.94	14.74	-3494	24.83	-5854.6
6098	239.95	14.7	-3485	24.834	-5855.6
6099	239.87	14.68	-3479	24.838	-5856.6
6100	240.01	14.68	-3484	24.842	-5857.5
6101	239.92	14.72	-3489	24.846	-5858.5
6102	239.91	14.73	-3493	24.85	-5859.5
6103	239.58	14.73	-3486	24.855	-5860.4
6104	239.62	14.68	-3478	24.859	-5861.4
6105	239.51	14.78	-3499	24.863	-5862.4
6106	240	14.67	-3478	24.867	-5863.3
6107	239.94	14.69	-3484	24.871	-5864.3
6108	239.88	14.69	-3483	24.875	-5865.3

6109	239.82	14.73	-3491	24.879	-5866.3
6110	239.89	14.71	-3489	24.883	-5867.2
6111	239.81	14.68	-3479	24.887	-5868.2
6112	239.94	14.7	-3485	24.891	-5869.2
6113	239.79	14.73	-3491	24.895	-5870.1
6114	239.88	14.7	-3487	24.9	-5871.1
6115	239.68	14.7	-3483	24.904	-5872.1
6116	239.76	14.73	-3489	24.908	-5873.1
6117	239.76	14.72	-3488	24.912	-5874
6118	239.86	14.71	-3488	24.916	-5875
6119	239.88	14.69	-3484	24.92	-5876
6120	239.85	14.71	-3488	24.924	-5876.9
6121	239.77	14.73	-3491	24.928	-5877.9
6122	239.86	14.7	-3485	24.932	-5878.9
6123	239.82	14.69	-3482	24.936	-5879.8
6124	239.92	14.71	-3488	24.94	-5880.8
6125	239.98	14.7	-3487	24.945	-5881.8
6126	239.9	14.71	-3487	24.949	-5882.7
6127	239.86	14.71	-3487	24.953	-5883.7
6128	239.78	14.7	-3485	24.957	-5884.7
6129	239.91	14.74	-3495	24.961	-5885.6
6130	240.03	14.69	-3484	24.965	-5886.6
6131	239.77	14.72	-3488	24.969	-5887.6
6132	239.93	14.68	-3483	24.973	-5888.6
6133	239.85	14.69	-3483	24.977	-5889.5
6134	239.63	14.73	-3490	24.981	-5890.5
6135	239.96	14.71	-3489	24.985	-5891.5
6136	239.98	14.68	-3484	24.989	-5892.4
6137	239.82	14.7	-3488	24.994	-5893.4
6138	239.74	14.73	-3491	24.998	-5894.4
6139	239.73	14.73	-3491	25.002	-5895.3
6140	239.7	14.69	-3482	25.006	-5896.3
6141	239.78	14.73	-3492	25.01	-5897.3
6142	239.89	14.73	-3494	25.014	-5898.2
6143	239.63	14.71	-3486	25.018	-5899.2
6144	239.81	14.7	-3484	25.022	-5900.2
6145	239.72	14.73	-3490	25.026	-5901.1
6146	239.85	14.7	-3485	25.03	-5902.1
6147	239.83	14.75	-3497	25.034	-5903.1
6148	239.78	14.7	-3486	25.039	-5904.1
6149	239.88	14.68	-3479	25.043	-5905
6150	239.62	14.71	-3484	25.047	-5906
6151	239.64	14.75	-3494	25.051	-5907
6152	239.81	14.76	-3499	25.055	-5907.9
6153	239.46	14.72	-3486	25.059	-5908.9
6154	239.64	14.76	-3495	25.063	-5909.9
6155	239.6	14.72	-3486	25.067	-5910.8

6156	239.45	14.76	-3495	25.071	-5911.8
6157	239.55	14.77	-3498	25.075	-5912.8
6158	239.49	14.8	-3504	25.079	-5913.7
6159	239.46	14.73	-3487	25.084	-5914.7
6160	239.77	14.69	-3483	25.088	-5915.7
6161	239.66	14.71	-3484	25.092	-5916.7
6162	239.6	14.74	-3493	25.096	-5917.6
6163	239.4	14.77	-3495	25.1	-5918.6
6164	239.65	14.77	-3500	25.104	-5919.6
6165	239.49	14.82	-3508	25.108	-5920.5
6166	239.69	14.72	-3490	25.112	-5921.5
6167	237.27	14.9	-3500	25.116	-5922.5
6168	239.32	14.77	-3497	25.12	-5923.4
6169	239.03	14.79	-3496	25.124	-5924.4
6170	239.16	14.8	-3500	25.129	-5925.4
6171	239.28	14.73	-3487	25.133	-5926.4
6172	239.42	14.76	-3497	25.137	-5927.3
6173	239.13	14.79	-3495	25.141	-5928.3
6174	239.31	14.72	-3483	25.145	-5929.3
6175	239.3	14.76	-3493	25.149	-5930.2
6176	239.43	14.76	-3497	25.153	-5931.2
6177	239.39	14.76	-3495	25.157	-5932.2
6178	239.31	14.76	-3493	25.161	-5933.1
6179	239.16	14.73	-3481	25.165	-5934.1
6180	239.21	14.77	-3493	25.17	-5935.1
6181	239.22	14.77	-3494	25.174	-5936.1
6182	239.11	14.77	-3492	25.178	-5937
6183	239.03	14.76	-3487	25.182	-5938
6184	239.22	14.73	-3483	25.186	-5939
6185	239.2	14.75	-3488	25.19	-5939.9
6186	239.17	14.77	-3495	25.194	-5940.9
6187	239.25	14.76	-3492	25.198	-5941.9
6188	239.17	14.77	-3493	25.203	-5942.9
6189	239.05	14.76	-3490	25.207	-5943.8
6190	238.99	14.78	-3492	25.211	-5944.8
6191	239.14	14.79	-3497	25.215	-5945.8
6192	239.06	14.78	-3494	25.219	-5946.8
6193	239.25	14.77	-3495	25.223	-5947.7
6194	239.22	14.79	-3496	25.227	-5948.7
6195	239.2	14.78	-3495	25.231	-5949.7
6196	239.25	14.79	-3498	25.235	-5950.6
6197	239.18	14.79	-3498	25.239	-5951.6
6198	239.17	14.78	-3496	25.244	-5952.6
6199	238.96	14.77	-3489	25.248	-5953.6
6200	239.17	14.78	-3495	25.252	-5954.5
6201	239.19	14.79	-3498	25.256	-5955.5
6202	239.17	14.78	-3496	25.26	-5956.5

6203	239.24	14.78	-3497	25.264	-5957.4
6204	238.98	14.8	-3497	25.268	-5958.4
6205	239.13	14.77	-3493	25.272	-5959.4
6206	239.2	14.75	-3489	25.276	-5960.3
6207	239.1	14.78	-3494	25.281	-5961.3
6208	238.45	14.82	-3495	25.285	-5962.3
6209	238.41	14.85	-3501	25.289	-5963.3
6210	238.97	14.78	-3493	25.293	-5964.2
6211	238.98	14.8	-3498	25.297	-5965.2
6212	239.18	14.8	-3500	25.301	-5966.2
6213	239.25	14.78	-3495	25.305	-5967.1
6214	239.35	14.79	-3498	25.309	-5968.1
6215	238.88	14.8	-3495	25.313	-5969.1
6216	239.26	14.79	-3498	25.317	-5970.1
6217	239.46	14.75	-3492	25.322	-5971
6218	239.69	14.78	-3503	25.326	-5972
6219	239.72	14.75	-3494	25.33	-5973
6220	239.6	14.76	-3497	25.334	-5973.9
6221	239.67	14.75	-3495	25.338	-5974.9
6222	239.6	14.75	-3495	25.342	-5975.9
6223	239.62	14.73	-3488	25.346	-5976.8
6224	239.62	14.76	-3497	25.35	-5977.8
6225	239.61	14.74	-3491	25.354	-5978.8
6226	239.66	14.74	-3492	25.358	-5979.8
6227	239.66	14.78	-3501	25.363	-5980.7
6228	239.64	14.75	-3493	25.367	-5981.7
6229	239.66	14.74	-3491	25.371	-5982.7
6230	239.64	14.76	-3497	25.375	-5983.6
6231	239.68	14.77	-3499	25.379	-5984.6
6232	239.61	14.74	-3492	25.383	-5985.6
6233	239.66	14.78	-3500	25.387	-5986.6
6234	239.65	14.75	-3494	25.391	-5987.5
6235	239.63	14.77	-3499	25.395	-5988.5
6236	239.67	14.79	-3504	25.399	-5989.5
6237	239.66	14.77	-3498	25.404	-5990.4
6238	239.57	14.75	-3493	25.408	-5991.4
6239	239.54	14.75	-3493	25.412	-5992.4
6240	239.52	14.77	-3497	25.416	-5993.4
6241	239.51	14.76	-3497	25.42	-5994.3
6242	239.54	14.78	-3499	25.424	-5995.3
6243	239.61	14.78	-3502	25.428	-5996.3
6244	239.59	14.77	-3499	25.432	-5997.2
6245	239.52	14.78	-3500	25.436	-5998.2
6246	239.61	14.76	-3498	25.44	-5999.2
6247	239.65	14.77	-3498	25.445	-6000.2
6248	239.55	14.75	-3494	25.449	-6001.1
6249	239.5	14.77	-3497	25.453	-6002.1

6250	239.61	14.76	-3497	25.457	-6003.1
6251	239.71	14.77	-3499	25.461	-6004
6252	239.73	14.78	-3503	25.465	-6005
6253	239.68	14.77	-3500	25.469	-6006
6254	239.71	14.77	-3498	25.473	-6007
6255	239.66	14.75	-3494	25.477	-6007.9
6256	239.77	14.77	-3501	25.481	-6008.9
6257	239.86	14.76	-3501	25.486	-6009.9
6258	239.92	14.75	-3497	25.49	-6010.8
6259	239.96	14.74	-3498	25.494	-6011.8
6260	239.87	14.74	-3496	25.498	-6012.8
6261	239.77	14.76	-3500	25.502	-6013.8
6262	239.79	14.76	-3498	25.506	-6014.7
6263	239.81	14.77	-3502	25.51	-6015.7
6264	239.74	14.79	-3504	25.514	-6016.7
6265	239.73	14.77	-3500	25.518	-6017.6
6266	239.69	14.81	-3512	25.522	-6018.6
6267	239.82	14.82	-3516	25.527	-6019.6
6268	239.75	14.72	-3489	25.531	-6020.6
6269	239.81	14.78	-3506	25.535	-6021.5
6270	239.69	14.81	-3512	25.539	-6022.5
6271	240.02	14.72	-3493	25.543	-6023.5
6272	239.98	14.77	-3503	25.547	-6024.5
6273	239.9	14.72	-3493	25.551	-6025.4
6274	239.92	14.69	-3488	25.555	-6026.4
6275	239.82	14.79	-3505	25.559	-6027.4
6276	239.88	14.76	-3500	25.563	-6028.3
6277	239.89	14.71	-3488	25.568	-6029.3
6278	239.87	14.75	-3499	25.572	-6030.3
6279	239.82	14.82	-3514	25.576	-6031.3
6280	239.7	14.77	-3498	25.58	-6032.2
6281	239.71	14.74	-3494	25.584	-6033.2
6282	239.78	14.79	-3506	25.588	-6034.2
6283	239.77	14.78	-3505	25.592	-6035.1
6284	239.78	14.72	-3488	25.596	-6036.1
6285	239.73	14.76	-3498	25.6	-6037.1
6286	239.66	14.76	-3498	25.604	-6038.1
6287	239.6	14.75	-3496	25.609	-6039
6288	239.66	14.73	-3491	25.613	-6040
6289	239.52	14.76	-3496	25.617	-6041
6290	239.68	14.77	-3501	25.621	-6042
6291	239.55	14.78	-3503	25.625	-6042.9
6292	239.57	14.76	-3495	25.629	-6043.9
6293	239.63	14.75	-3493	25.633	-6044.9
6294	239.56	14.75	-3494	25.637	-6045.8
6295	239.68	14.74	-3495	25.641	-6046.8
6296	239.7	14.68	-3480	25.646	-6047.8

6297	239.7	14.76	-3498	25.65	-6048.8
6298	239.8	14.75	-3498	25.654	-6049.7
6299	239.76	14.76	-3500	25.658	-6050.7
6300	239.75	14.75	-3497	25.662	-6051.7
6301	239.74	14.74	-3493	25.666	-6052.7
6302	239.77	14.78	-3506	25.67	-6053.6
6303	239.71	14.77	-3503	25.674	-6054.6
6304	239.72	14.78	-3504	25.678	-6055.6
6305	239.79	14.77	-3500	25.682	-6056.5
6306	239.81	14.77	-3504	25.687	-6057.5
6307	239.66	14.84	-3518	25.691	-6058.5
6308	239.8	14.76	-3500	25.695	-6059.5
6309	239.68	14.77	-3499	25.699	-6060.4
6310	239.63	14.76	-3499	25.703	-6061.4
6311	239.74	14.82	-3516	25.707	-6062.4
6312	239.81	14.77	-3504	25.711	-6063.4
6313	239.63	14.78	-3503	25.715	-6064.3
6314	239.64	14.76	-3497	25.719	-6065.3
6315	239.73	14.81	-3514	25.724	-6066.3
6316	239.67	14.79	-3505	25.728	-6067.3
6317	239.54	14.81	-3509	25.732	-6068.2
6318	239.66	14.75	-3498	25.736	-6069.2
6319	239.45	14.8	-3507	25.74	-6070.2
6320	239.8	14.81	-3516	25.744	-6071.1
6321	239.7	14.81	-3513	25.748	-6072.1
6322	239.68	14.76	-3499	25.752	-6073.1
6323	239.7	14.75	-3497	25.756	-6074.1
6324	239.6	14.81	-3511	25.76	-6075
6325	239.75	14.76	-3499	25.765	-6076
6326	239.77	14.79	-3508	25.769	-6077
6327	239.75	14.79	-3510	25.773	-6078
6328	239.69	14.84	-3517	25.777	-6078.9
6329	239.88	14.79	-3508	25.781	-6079.9
6330	239.69	14.81	-3511	25.785	-6080.9
6331	239.72	14.79	-3505	25.789	-6081.9
6332	239.7	14.78	-3503	25.793	-6082.8
6333	239.64	14.79	-3505	25.797	-6083.8
6334	239.56	14.77	-3497	25.802	-6084.8
6335	239.54	14.8	-3505	25.806	-6085.8
6336	239.79	14.79	-3508	25.81	-6086.7
6337	239.56	14.82	-3512	25.814	-6087.7
6338	239.78	14.78	-3504	25.818	-6088.7
6339	240.06	14.82	-3517	25.822	-6089.6
6340	239.97	14.78	-3508	25.826	-6090.6
6341	240.14	14.73	-3498	25.83	-6091.6
6342	239.96	14.77	-3502	25.834	-6092.6
6343	239.93	14.78	-3503	25.838	-6093.5

6344	240.03	14.83	-3520	25.843	-6094.5
6345	239.88	14.75	-3497	25.847	-6095.5
6346	239.97	14.74	-3495	25.851	-6096.5
6347	239.85	14.79	-3507	25.855	-6097.4
6348	239.77	14.79	-3505	25.859	-6098.4
6349	239.84	14.82	-3513	25.863	-6099.4
6350	239.74	14.8	-3508	25.867	-6100.4
6351	239.65	14.8	-3506	25.871	-6101.3
6352	239.63	14.8	-3507	25.875	-6102.3
6353	239.67	14.83	-3514	25.88	-6103.3
6354	239.63	14.75	-3494	25.884	-6104.3
6355	239.83	14.77	-3499	25.888	-6105.2
6356	239.6	14.82	-3510	25.892	-6106.2
6357	239.76	14.86	-3522	25.896	-6107.2
6358	239.76	14.82	-3511	25.9	-6108.1
6359	239.72	14.72	-3486	25.904	-6109.1
6360	239.82	14.78	-3505	25.908	-6110.1
6361	239.59	14.79	-3505	25.912	-6111.1
6362	239.74	14.87	-3524	25.917	-6112
6363	239.69	14.83	-3511	25.921	-6113
6364	239.67	14.74	-3491	25.925	-6114
6365	239.66	14.81	-3509	25.929	-6115
6366	239.65	14.8	-3506	25.933	-6115.9
6367	239.66	14.85	-3517	25.937	-6116.9
6368	239.67	14.8	-3508	25.941	-6117.9
6369	239.75	14.78	-3504	25.945	-6118.9
6370	239.68	14.8	-3508	25.949	-6119.8
6371	239.6	14.82	-3512	25.954	-6120.8
6372	239.64	14.79	-3504	25.958	-6121.8
6373	239.62	14.81	-3510	25.962	-6122.8
6374	239.58	14.82	-3511	25.966	-6123.7
6375	239.62	14.79	-3505	25.97	-6124.7
6376	239.61	14.81	-3508	25.974	-6125.7
6377	239.58	14.82	-3512	25.978	-6126.7
6378	239.59	14.8	-3505	25.982	-6127.6
6379	239.51	14.83	-3511	25.986	-6128.6
6380	239.57	14.81	-3507	25.991	-6129.6
6381	239.56	14.81	-3507	25.995	-6130.6
6382	239.53	14.8	-3505	25.999	-6131.5
6383	239.57	14.82	-3512	26.003	-6132.5
6384	239.59	14.81	-3509	26.007	-6133.5
6385	239.5	14.8	-3504	26.011	-6134.5
6386	239.6	14.81	-3509	26.015	-6135.4
6387	239.48	14.82	-3509	26.019	-6136.4
6388	239.45	14.82	-3509	26.024	-6137.4
6389	239.62	14.81	-3508	26.028	-6138.4
6390	239.57	14.79	-3504	26.032	-6139.3

6391	239.46	14.83	-3512	26.036	-6140.3
6392	239.58	14.81	-3508	26.04	-6141.3
6393	239.54	14.81	-3507	26.044	-6142.3
6394	239.56	14.82	-3512	26.048	-6143.2
6395	239.45	14.81	-3507	26.052	-6144.2
6396	239.42	14.83	-3511	26.056	-6145.2
6397	239.47	14.83	-3510	26.061	-6146.2
6398	239.57	14.83	-3512	26.065	-6147.1
6399	239.44	14.8	-3503	26.069	-6148.1
6400	239.68	14.8	-3509	26.073	-6149.1
6401	239.54	14.84	-3516	26.077	-6150.1
6402	239.64	14.8	-3507	26.081	-6151
6403	239.57	14.82	-3511	26.085	-6152
6404	239.52	14.82	-3508	26.089	-6153
6405	239.58	14.83	-3513	26.094	-6154
6406	239.54	14.84	-3514	26.098	-6154.9
6407	239.46	14.82	-3509	26.102	-6155.9
6408	239.47	14.82	-3510	26.106	-6156.9
6409	239.48	14.83	-3510	26.11	-6157.9
6410	239.48	14.81	-3506	26.114	-6158.8
6411	239.6	14.82	-3510	26.118	-6159.8
6412	239.51	14.84	-3514	26.122	-6160.8
6413	239.62	14.85	-3520	26.126	-6161.8
6414	239.4	14.82	-3509	26.131	-6162.7
6415	239.33	14.84	-3511	26.135	-6163.7
6416	239.36	14.87	-3518	26.139	-6164.7
6417	239.61	14.82	-3513	26.143	-6165.7
6418	239.36	14.85	-3516	26.147	-6166.6
6419	239.73	14.82	-3513	26.151	-6167.6
6420	239.59	14.82	-3511	26.155	-6168.6
6421	239.67	14.82	-3512	26.159	-6169.6
6422	239.57	14.82	-3512	26.164	-6170.6
6423	239.58	14.84	-3516	26.168	-6171.5
6424	239.79	14.81	-3511	26.172	-6172.5
6425	239.64	14.79	-3505	26.176	-6173.5
6426	239.65	14.86	-3521	26.18	-6174.5
6427	239.65	14.83	-3516	26.184	-6175.4
6428	239.52	14.84	-3515	26.188	-6176.4
6429	239.6	14.83	-3515	26.192	-6177.4
6430	239.57	14.82	-3512	26.197	-6178.4
6431	239.57	14.83	-3514	26.201	-6179.3
6432	239.58	14.82	-3511	26.205	-6180.3
6433	239.59	14.83	-3514	26.209	-6181.3
6434	239.6	14.82	-3512	26.213	-6182.3
6435	239.82	14.82	-3514	26.217	-6183.2
6436	239.85	14.81	-3512	26.221	-6184.2
6437	239.86	14.8	-3509	26.225	-6185.2

6438	239.79	14.82	-3513	26.229	-6186.2
6439	239.83	14.77	-3500	26.234	-6187.1
6440	239.91	14.84	-3520	26.238	-6188.1
6441	239.88	14.82	-3515	26.242	-6189.1
6442	239.87	14.82	-3514	26.246	-6190.1
6443	239.94	14.85	-3523	26.25	-6191
6444	239.96	14.8	-3511	26.254	-6192
6445	239.99	14.76	-3501	26.258	-6193
6446	239.97	14.77	-3505	26.262	-6194
6447	239.94	14.68	-3480	26.266	-6194.9
6448	239.86	14.81	-3513	26.27	-6195.9
6449	239.83	14.63	-3468	26.275	-6196.9
6450	239.81	14.64	-3470	26.279	-6197.8
6451	239.85	14.65	-3473	26.283	-6198.8
6452	239.82	14.66	-3476	26.287	-6199.8
6453	239.88	14.63	-3468	26.291	-6200.7
6454	239.78	14.64	-3471	26.295	-6201.7
6455	239.71	14.66	-3472	26.299	-6202.6
6456	239.84	14.65	-3473	26.303	-6203.6
6457	239.84	14.64	-3470	26.307	-6204.6
6458	239.8	14.66	-3473	26.311	-6205.5
6459	239.78	14.66	-3473	26.315	-6206.5
6460	239.82	14.65	-3473	26.319	-6207.5
6461	239.77	14.66	-3474	26.323	-6208.4
6462	239.82	14.66	-3476	26.327	-6209.4
6463	239.87	14.63	-3467	26.332	-6210.4
6464	239.88	14.65	-3473	26.336	-6211.3
6465	239.85	14.68	-3478	26.34	-6212.3
6466	239.87	14.64	-3471	26.344	-6213.3
6467	239.85	14.67	-3477	26.348	-6214.2
6468	239.92	14.67	-3479	26.352	-6215.2
6469	240.81	0.56	0	26.352	-6215.3
6470	240.81	0.56	0	26.353	-6215.3
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6473	240.87	0.56	0	26.353	-6215.3
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6481	240.34	0.56	0	26.354	-6215.3
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6483	240.81	0.56	0	26.355	-6215.3
6484	240.86	0.56	0	26.355	-6215.3

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6494	240.72	0.56	0	26.356	-6215.3
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